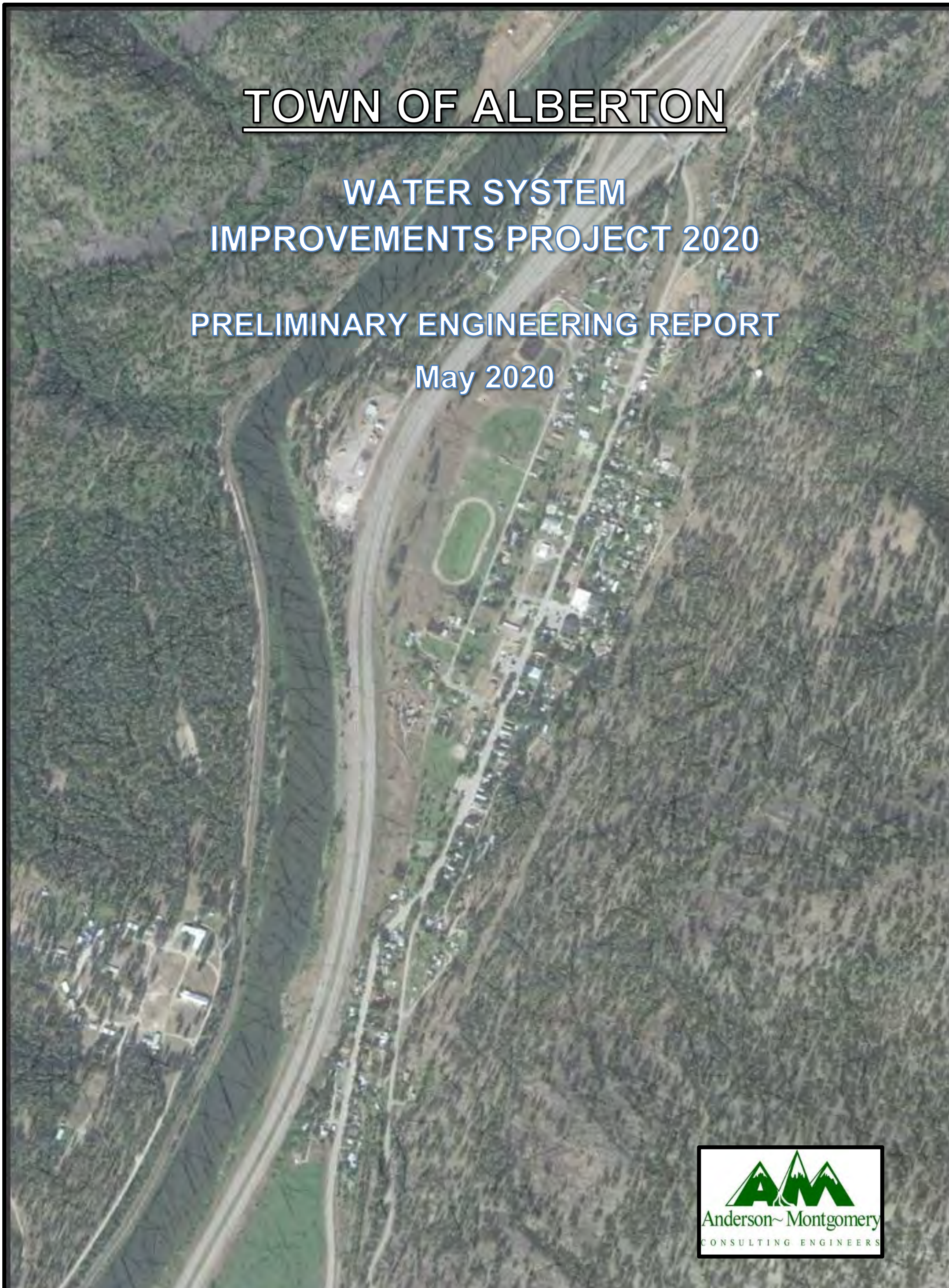
TOWN OF ALBERTON

WATER SYSTEM
IMPROVEMENTS PROJECT 2020

PRELIMINARY ENGINEERING REPORT

May 2020



Anderson~Montgomery
CONSULTING ENGINEERS

TOWN OF ALBERTON

WATER SYSTEM
IMPROVEMENTS PROJECT 2020

PRELIMINARY ENGINEERING REPORT

MONTANA
MARCUS J.
GOLZ
10195PE
LICENSED
PROFESSIONAL ENGINEER

TABLE OF CONTENTS

APPENDICES

Anderson~Montgomery
CONSULTING ENGINEERS

CHAPTER 1

EXECUTIVE SUMMARY

CHAPTER 1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

This section of the Preliminary Engineering Report (PER) provides a general summary of the findings, conclusions and recommendations arising from this document. The goal of the PER is to give the Town of Alberton, located 30 miles west of Missoula (see location map below) a tool with which to prioritize and implement needed improvements to its drinking water system.

Alberton owns and operates a municipal water system with two groundwater sources (a natural spring and a municipal well), a steel storage tank, a transmission main from the storage tank, and a distribution network of ¾-inch to 8-inch mains. In 2018, the Town completed a technical study by Anderson-Montgomery Consulting Engineers which recommended a series of high-priority improvements to the water system. The highest priority improvements from 2018 will be completed in Spring/Summer 2020. These improvements include a new telemetry control system (SCADA) upgrade, well house improvements and a new liquid hypo- chlorination system for the Town's two water sources. The system currently does not have a control system allowing communication between the groundwater well and storage tank. An inoperable Cla-Val altitude valve on the spring source is causing the storage tank to discharge chlorinated water into the environment. The 2020 project will resolve all these needs.

This PER will therefore, focus on the next highest priority projects and future needs.

1.2 AUTHORIZATION

The Town of Alberton hired Anderson-Montgomery Consulting Engineers (AMCE) of Helena, MT to prepare this PER. Financial assistance for this work was provided with a Montana Department of Natural Resources Planning Grant. This work is intended to address the requirements of a Preliminary Engineering Report and related funding agency requirements and to continue to evaluate other public health and safety priorities that have been identified by AMCE.

1.3 BASIS OF PLANNING

The Town of Alberton requested the evaluation of their water system in preparation for upgrading and or rehabilitating the system to continue providing high quality water to the Town. Estimates of population were obtained from United States Census data. The projected population was used to evaluate the estimated demands for the year 2040. Recommendations for the water system were developed considering the deficiencies of the system and the projected population growth through the 20 year planning period.

1.4 RECOMMENDATIONS FOR WATER SYSTEM IMPROVEMENTS

1.4.1 Summary Recommendations for Water System Improvements

An analysis of the existing water system was completed for this planning document, considering existing water demands and anticipated demands for a 20 year planning period. In Chapter 5, alternatives for needed improvements to the existing system include rehabilitation and replacement. Projects were prioritized to allow the Town to pursue funding for needed work in phases.

The highest priority need after the one currently in process (mentioned above) includes distribution system improvements and spring (the main water source) collection system improvements.

- The distribution system improvements would replace undersized mains, install loops in the mains to minimize stagnant water and improve hydraulic performance, and install new pressure reducing valves and new residential water meters.
- Spring rehabilitation would involve improvements to the integrity of the spring collection system and security fencing around the spring source to keep people and animals away from the spring to the extent possible.

1.4.2 Recommended Improvements

A prioritized list of projects is shown below. Financial assistance with grants from the Department of Natural Resources and Conservation Renewable Resource Grant and Loan program (RRGL) and Department of Commerce Treasure State Endowment (TSEP) are being sought to fund the Phase 1 improvements. It is recommended that the Town pursue additional financial assistance to secure funding for future project phases.

Distribution:

- Alt. #1.1 – Upsize Mains *(Phase 1)*
- Alt. #1.2 – Loop Mains *(Phase 1)*
- Alt. #1.3 – Replace ¾" & 2" diameter Mains North of Railroad Avenue *(Phase 1)*
- Alt. #1.4 – Install Central Pressure Reducing Valve Station for South End of River Street *(Phase 1)*

Residential Water Meters:

- Alt. #2 – Replace Existing Water Meters *(Phase 1)*

Spring Improvements:

- Alt #3 – Rehabilitate & Secure Spring Source Infrastructure *(Phase 1)*

Storage: Alt.

- #4.1 – Construct Additional 200,000 Gallon Storage Tank *(Phase 2)*
- #4.2 – Rehabilitate existing 300,000 Gallon Storage (if inspection indicates) *(Phase 2)*

Additional Water Supply:

- Alt. #5 – Develop Additional Source Capacity (New Water Well) *(Phase 2)*

1.4.3 Funding Strategy

A project budget strategy has been prepared which anticipates grant funding from the DNRC RRGL program in the amount of $125,000 and the TSEP program in the amount of $750,000 an SRF Loan for $876,480 (half of which could be forgiven) and local funds in the amount of $150,000. **Table 1.1** provides the project budget using the identified funding program resources and local funds.

Table 1.1
Town of Alberton
Project Budget - Water System Improvements

ADMIN/FINANCIAL COSTS	DNRC/ RRGL	TSEP	SRF-A Forgiven	SRF Loan	Local Res.	*May-20* TOTAL
Personnel Costs	$0	$0	$0	$0	$0	$0
Office Costs	$0	$0	$0	$0	$0	$0
Professional Services	$0	$0	$0	$32,000	$0	$32,000
Legal Costs	$0	$0	$0	$5,000	$0	$5,000
Bond Cost	$0	$0	$0	$13,000	$0	$13,000
Admin Fee	$0	$0	$0	$2,000	$0	$2,000
Loan Reserves	$0	$0	$0	$16,700	$0	$16,700
TOTAL ADMIN/FIN. COSTS:	$0	$0	$0	$68,700	$0	$68,700
						4%
ACTIVITY COSTS:	**DNRC/ RRGL**	**TSEP**	**SRF-A Forgiven**	**SRF Loan**	**Local Res.**	**TOTAL**
Final Engineering Design	$0	$0	$0	$0	$136,000	$136,000
Construction Inspection	$86,000	$50,000	$0	$0	$0	$136,000
Construction	$39,000	$700,000	$438,240	$179,960	$0	$1,357,200
Contingency	$0	$0	$0	$189,580	$14,000	$203,580
TOTAL ACTIVITY COSTS:	$125,000	$750,000	$438,240	$369,540	$150,000	$1,832,780
						96%
TOTAL PER FUNDING SOURCE:	**$125,000**	**$750,000**	**$438,240**	**$438,240**	**$150,000**	**$1,901,480**
Percentage of TPC	7%	39%	23%	23%	8%	TPC
			O&M Impact	**Debt Svc.**		
% Grant Funding	69.1%		$0.00	**Calculation**	**20-year SRF loan**	
				$438,240	***2.5% I=***	0.06415
				$28,113	217	EDU's
				$129.55	12	months
				$10.80	*Debt Svc.*	
				$1.08	*10% Coverage*	
				$11.88	*Total Debt Service*	
				$11.88	**User Rate Increase**	

User Costs – Based on the proposed funding plan the net cost per use on an equivalent dwelling unit (EDU) basis is anticipated to be $11.88 per month increase in the water rate. This rate will result in a new average water rate of $33.12 per EDU (total EDUs). And a new combined water and sewer rate of $80.53 per EDU (total EDUs). This compares to the target rate of $47.03 utilizing the Department of Commerce target rate calculator. **Appendix F** contains Alberton financial information, including rate structure, target rate analysis, and average rate calculations.

1.5 IMPLEMENTATION SCHEDULE

The following schedule provides an achievable timeline for implementation of the needed water system improvements, presuming that affordable project financing can be obtained.

Table 1.2
Project Schedule Alberton Phase 1

Task	Completion Date
Complete PER	APR 2020
Submit PER & Applications to funding Agencies	MAY/JUN 2020
Begin Final Design (Local Funding)	SEP 2021
Submit Design Plans to DEQ	MAY 2022
TSEP & RRGL Funding Available	JULY 2021
Advertise for Bids	JULY 2022
Award Contract	AUG 2022
Begin Construction	SEP 2022
Loan Closing	OCT 2022
Substantial Completion	AUG 2023
Final Completion and Begin Operation	SEP 2023

1.6 PUBLIC PARTICIPATION

Anderson-Montgomery Consulting Engineers gave a presentation via Zoom on May 5, 2020 at a public meeting of the Alberton Town Council. Mr. Paul Montgomery made the presentation at this meeting along with Marc Golz. The presentation provided detailed information regarding the need for the project, the alternatives to address those needs and the ways in which the alternatives could be funded. This included applying for grants and other public funding options to complete preliminary engineering analysis and conduct the studies necessary - as well as prepare the necessary documentation. **Appendix G** contains documentation of community engagement to date for this project.

Public hearings were also held with the Town Council to discuss water system needs on May 10th, 2016, May 1, 2018 and May 5, 2020 with participation from the public. Anderson-Montgomery made presentations regarding the project and answered numerous questions from the public. The presentation on May 1, 2018 outline is included in Appendix G. Notice of the hearing was included in the local paper.

References used in producing this PER:

Water Master Plan, Stelling Engineering, September 2000

Town of Alberton 2016 Water System Improvement Project, Anderson-Montgomery Consulting Engineers, May 2016

Town of Alberton 2018 Water System Improvement Project Technical Study, Anderson-Montgomery Consulting Engineers

Circular DEQ-1 Standards for Water Works, 2018 Edition

Independent Inspection Services 2019 Report regarding the water tank

2017 DEQ Sanitary Survey Report

CHAPTER 2

PROJECT PLANNING

CHAPTER 2 PROJECT PLANNING

2.1 Planning Area Jurisdiction and Existing Population

2.1.1 Description of Planning Area

Alberton is located approximately 30 miles to the west of Missoula, MT along interstate 90. The community is north of the interstate and the Clark Fork River. Locally Alberton is known as the "Alberton Gorge" and lies on the abandoned main line of the Chicago, Milwaukee, St. Paul and Pacific Railway.

Due to the local available timber resources, much of Alberton's economy is based on the timber industry. However the close proximity to Missoula allows many of the residents to commute for work. The residents who are not working in the timber industry or commuting to Missoula have historically worked for Stone Container Corporations located near Frenchtown, which has been closed since 2010. There are approximately 423 residents currently residing in Alberton.

The Planning Area for this Engineering Report includes the incorporated limits of the community and the adjacent areas feasible for municipal water service. A map of the planning area is shown in **Figure 2.1**.

2.1.2 Jurisdiction

Under its legal authority as an incorporated municipality and owner/operator of a public water system, the Town of Alberton has authorized Anderson Montgomery Consulting Engineers (AMCE) to prepare this PER. AMCE also evaluated the water system in 2016 and updated the evaluation in 2018 in an Engineering Technical Study. The Town's water and wastewater facilities are operated and maintained by a certified operator. The Town's accounting, billing, and record keeping is managed by the Town Clerk. The overall management of the Town's operation is governed by the Mayor/Council form of government.

2.1.3 Existing Population

The analysis of the past, current and future population trends provides the most efficient basis for future water system planning. By utilizing the past and current water usage data compared to the correlating population, future water needs can be predicted and implemented. **Table 2.1** shows the population trend as follows:

Table 2.1
Alberton Population Projections

1960	356
1970	363
1980	368
1990	354
2000	374

2010	420
2020	439
2030	472
2040	507

In general, Alberton and Mineral County have experienced a recent upswing in growth. The growth is influenced by the rise in development in the nearby Missoula and Ravalli Counties. The 2020 census has not been completed as of this writing so the 2020 figure and beyond are based on census estimates and past data. For this PER a growth rate of 4.5% was used from 2010 to 2020 based on the US Census estimate of 435 for 2018. Then for the 20 year planning horizon an average of 7.5% was used for the growth per decade from 2020 to 2040. In recent years the population has increased rapidly, the 10 and 20 year projections shown above indicate the population will continue to grow at a relatively steady rate.

2.2 PLANNING PERIOD AND LAND USE

The 20-year planning period will extend from 2020 through 2040. No major shifts from the present small commercial and moderate density residential development is foreseen during the planning period. Alberton has shown an increase in population over the last three decades and indications are that the trend will continue.

As the population of Alberton increases it is expected that occupancy of vacant properties in town will increase, while expansion outside of the planning boundary is not likely. Consequently, the existing water service area is not expected to expand significantly. There are no expected changes in the current land use patterns. The topography and Interstate 90 act as barriers limiting expansion of the Town and the service area, however there is some potential for infill development and limited growth in small areas around the perimeter of Alberton's current town-site.

2.3 ENVIRONMENTAL CONDITIONS

2.3.1 Climate

Alberton's climate follows the general trend of much of western Montana. A typical year will yield a warm summer and a mild winter. The average winter temperatures are not as cold as the eastern side of the state, however snowfall can still be quite heavy. Generally Alberton receives most of its precipitation in the late winter to early spring months.

The average annual temperature is 46 degrees, with the warmest month, July, having a daily average of 60 degrees and the coldest month, January, with a daily average of 25 degrees. A typical winter will consist of overcast skies, while the summer months include fair and clear skies. Alberton averages 18.5 inches of precipitation annually. Annual snowfall averages 43 inches. Approximately 100 miles due north of Alberton is the nearest evaporation recording station located at the Hungry Horse Dam. The recording station utilizes pan evaporation tests in order to determine how much precipitation is lost. From May to September, about 90% of the yearly evaporation occurs. During the winter, approximately 10% of the yearly

Revision	Date	By
Draft	5-1-20	MG
Final	5-26-20	MG

Revision: Draft
Plot Scale: 1:2
Drawn By: A.Eckhart, P.E.
Approved By
Checked By
Designed By

Engineer
Anderson~Montgomery
CONSULTING ENGINEERS
1064 N. Warren
Helena, Mt 59601
Phone (406) 449-3303
Fax (406) 449-3304

Owner: Town of Alberton

Project Title: Water System PER 2020

Sheet Title: Planning Area

Sheet: **Fig. 2.1**

X:\ALBERTON 2020\PER 2020\DRAWINGS\Alberton PER Figures.dwg SAVED: 5/26/20 PRINTED: 5/26/20 BY: ADAM

evaporation occurs. Taking into account the summer and winter evaporation evaluations, the result is approximately 24 inches of annual evaporation.

2.3.2 Topography

Alberton is bounded by several landmarks including interstate 90 to the south, mountainous terrain to the north, rocky outcrops to the west, and agricultural land to the east. The community can be roughly divided by Railroad Avenue, to the north lies the original townsite and to the south lies the newer section of the community. The older part of Alberton lies on the steep rising hillside, while the south side is on a relatively flat terrace.

2.3.3 Soils

The most current geological and soils mapping that includes the planning area was completed by the Forest Service. The study that includes the planning area is known as the Nine Mile Area. In the Alberton area the primary soil type is the Tally Fine Sandy Loam. The Tally Fine Sandy Loam can be found on the lake terraces within the main Clark Fork Valley and on the nearly flat to sloping areas next to streams. On the east side of town the soils are a grayish brown sandy loam and extend to a depth of 75+ inches.

2.3.4 Floodplains and Wetlands

The Town of Alberton is outside of the flood plain due to the community's geographical terrace and hillside location, therefore the Town was not included in the U.S. Department of Housing and Urban Development's analysis or the Flood Hazard Boundary Map (Community – Panel No. 300159 0014A dated 2/14/78) shown in **Figure 2.2**. Also, FEMA has not completed a study to determine flood hazard for the Town; therefore, a flood map has not been published at this time. The Montana DNRC Floodplain Management Section confirmed that the floodplains in the Alberton area are limited to the southern side of Interstate 90, therefore, the community is outside the floodplain. However, Mineral County participates in the National Flood Insurance Program which would provide coverage for the Town of Alberton in the event of a catastrophic flood. Mineral County and the Town of Superior are working with the Federal Emergency Management Agency (FEMA) and Montana Department of Natural Resources and Conservation (DNRC) to update and produce new Flood Insurance Rate Maps for the Clark Fork River, the St. Regis River, and tributaries. Updated floodplain maps will depict the latest, most accurate flood risk data, and will eventually replace FEMA's existing floodplain maps which are based on data from the 1970s.

New Flood Maps are not expected to be final for a while – the study information and maps must first go through a technical and public review process. However, the draft (see **Figure 2.3**) mapping also indicates that Alberton is well out of the 100-year floodplain.

2.3.5 Flora and Fauna

Flora – Vegetation in the District planning area falls into three broad categories: primarily coniferous forest, some riparian zone vegetation and some deciduous woodland units. Vegetation in riparian zones along the Clark Fork River and in wetlands typically consists of mixed deciduous and coniferous trees, willows, alder and dogwood, with an understory of numerous forbs and grasses.

Deciduous units are mixed within the coniferous forest and also occur as plantings on occupied properties within the district and in riparian areas. These areas may contain aspen, larch and sometimes cottonwood. The understory vegetation in deciduous woodlands may also include various shrubs. Coniferous forest occurs throughout the planning area. Species common to western Montana areas are Spruces, Firs, Pines, Cedars, Larch, and Cottonwood with an understory of grasses and shrubs.

See **Appendix A** for a listing of Montana plant Species of Concern.

Fauna **–** The District planning area supports a variety of wildlife species. Human development has disturbed considerable amounts of habitat in the immediate planning area and consequently influenced the types of wildlife species that may be found living there. However, the surrounding area is rich in wildlife and classifications found in the area surrounding the planning area include: large and small mammals; birds; reptiles; amphibians; insects; and fish. Some of the more prominent species found in surrounding forests include Black Bear, Bobcat, Mountain Lion, Mule Deer, White-Tailed Deer, Elk, Moose, Coyote, and Gray Wolf. Many species of bird are found in the surrounding area. Prominent bird species include: Bald Eagle, Osprey, American White Pelican, Belted Kingfisher, many corvids such as American Crow, Northern Raven, and Canada Jay, many species of hawks and falcons also frequent the area. Beaver, Pine Marten, Fisher and Yellow-bellied Marmot also occur in the surrounding area.

Six species of trout – Brook, Brown, Bull, Rainbow, Westlope Cutthroat and Yellowstone Cutthroat and Mountain Whitefish, Northern Pike, and Largemouth Bass occur in the area.

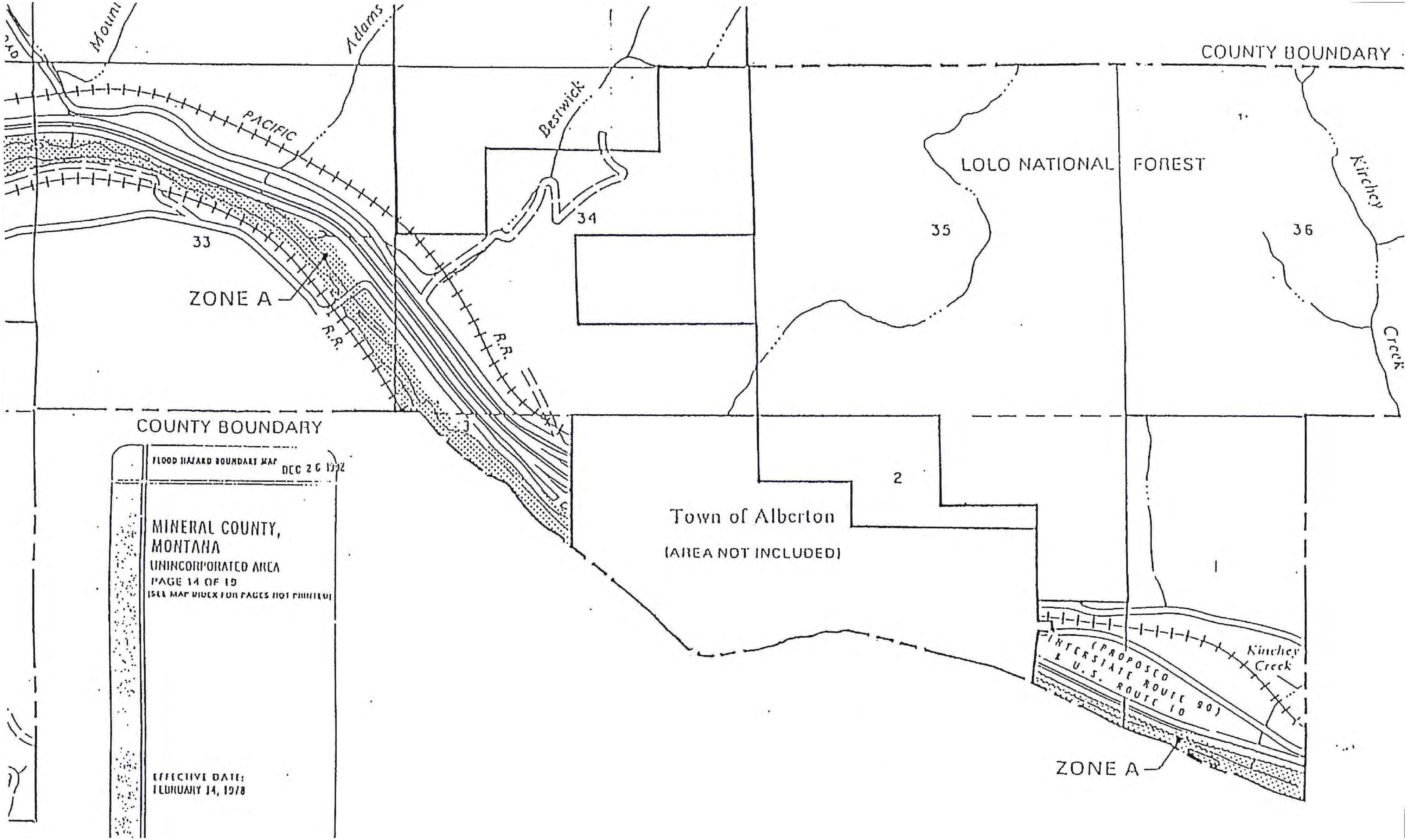
See **Appendix A** for Montana Animal (mammals, birds and fish) Species of Concern.

2.3.6 Historical and Archaeological Sites

According to the Montana Historical Society Historic Preservation Office (SHPO) there are historical or archaeological sites within the planning area that could be affected by the water system improvements project. The Historic Preservation Office last preformed an inventory on the area in 1998. The inventory indicated that the primary sites were related to the railroad history and three other cultural resources. The SHPO responded to inquiries regarding the proposed project area indicating that a recommendation for cultural resources inventory is unwarranted at this time (see **Appendix E**). However, if the projects were to occur within previously undisturbed ground, if structures need to be altered, or if cultural materials are inadvertently discovered during the project, then SHPO would be contacted regarding further actions.

2.3.7 Groundwater

The Montana Water Resources Board published the *Water Resources Survey for Mineral and Sanders Counties*. The publication indicated the available groundwater is limited to unconsolidated aquifers in the main valley and larger tributary valleys. The floodplain of the



Revision	Date	By
Draft	5-1-20	MG
Final	5-26-20	MG

Revision: Draft

Plot Scale: 1:2

Drawn By: A.Eckhart, P.E.

Approved By

Checked By

Designed By

Engineer

Anderson~Montgomery
CONSULTING ENGINEERS
1064 N. Warren
Helena, Mt 59601
Phone (406) 449-3303
Fax (406) 449-3304

Owner: Town of Alberton

Project Title: Water System PER 2020

Sheet Title: Flood Hazard Boundary Map

Sheet: **Fig. 2.2**

X:\ALBERTON 2020\PER 2020\DRAWINGS\Alberton PER Figures.dwg SAVED: 5/26/20 PRINTED: 5/26/20 BY: ADAM

MINERAL COUNTY CLARK FORK RIVER FLOODPLAIN WORKMAP

LEGEND

- Clark Fork River
- Roadway Crossings
- Backwater
- City Limits
- County Line
- Cross Section
- 10' Contour

Proposed Flood Hazard Area

- 0.2% AC (500 Yr)
- 1% AC (100 Yr)
- Floodway
- Effective Floodplain

Labels

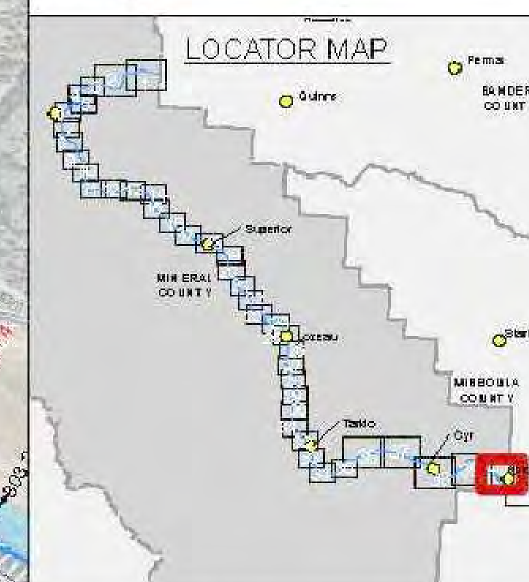
- Cross Section Letter — 10,087 River Station
- 2,605.9 Water Surface Elevation
- 100 Feet Along Profile Baseline

0 500 1,000 1,500 Feet

Hydraulic Work Map - Mineral County Floodplain Study-Ph II
Mineral County, MT Risk MAP - MAS No. 2017-04
Imagery: NAIP 2015
Topographic Data, LiDAR 2017
Horizontal Datum: NAD 83, Vertical Datum: NAVD 88, Feet
Date: 07/13/2018

est. 1914 MINERAL COUNTY MONTANA

Morrison Maierle



Clark Fork River Map 40 of 41

Revision	Date	By
Draft	5-1-20	MG
Final	5-26-20	MG

Revision: Draft

Plot Scale: 1:2

Drawn By: A.Eckhart, P.E.

Approved By

Checked By

Designed By

Engineer

Anderson~Montgomery
CONSULTING ENGINEERS
1064 N. Warren
Helena, Mt 59601
Phone (406) 449-3303
Fax (406) 449-3304

Owner: Town of Alberton

Project Title: Water System PER 2020

Sheet Title: New Flood Map

Sheet: **Fig. 2.3**

X:\ALBERTON 2020\PER 2020\DRAWINGS\Alberton PER Figures.dwg SAVED: 5/26/20 PRINTED: 5/26/20 BY: ADAM

Clark Fork River is known as an alluvial aquifer and is several miles wide in places with varying thicknesses. The alluvium that Alberton's groundwater is located in is a fresh water accumulation of sand, silt, clay and gravel of recent geologic age. The alluvium is considered to be weakly cemented or unconsolidated. This type of alluvium creates reservoirs for groundwater between the intervals of sand and gravel. The inferred outline of the ancient Glacial Lake Missoula contains the entire alluvial materials in the valley. Throughout the community the average well depth is approximately 100 feet and the quality of the groundwater is considered good, measured by the amount of total dissolved solids.

CHAPTER 3

EXISTING FACILITIES

CHAPTER 3 EXISTING FACILITIES

3.1 DESCRIPTION OF PLANNING AREA

Alberton is located approximately 30 miles west of Missoula, MT along interstate 90. The community is north of the interstate and the Clark Fork River. Locally Alberton is known as the "Alberton Gorge" and lies on the abandoned main line of the Chicago, Milwaukee, St. Paul and Pacific Railway.

Due to the local available timber resources, much of Alberton's economy is based on the timber industry. However the close proximity to Missoula allows many of the residents to commute for work. The residents who are not working in the timber industry or commuting to Missoula have historically worked for Stone Container Corporations located near Frenchtown, which has been closed since 2010. There are approximately 439 residents currently residing in Alberton.

The Planning Area for this Engineering Report includes the incorporated limits of the community and the adjacent areas feasible for municipal water service. A map of the planning area is shown in **Figure 2.1**.

3.2 HISTORY AND DESCRIPTION OF DRINKING WATER SUPPLY

The town of Alberton owns and operates a municipal water system with two groundwater sources, a steel storage tank, a transmission main from the storage tank, and a distribution network of ¾-inch to 8-inch mains. A schematic of the Town's existing water system is provided in **Figure 3.2**.

The Town has two water sources: a spring and a well; a 300,000-gallon ground level steel storage tank, an existing gaseous chlorine disinfection system for the spring water, and a distribution system.

The well was constructed in 1978 to a depth of 301 feet. A well log for this well is in **Appendix C** at the end of the Source Water Delineation and Assessment Report.

The main source of water during the cooler months is the underground spring collection structure which is located just to the north of the Town's storage tank. These are located at the northwest edge of town on a slope above town.

The well is utilized when the demand for water is high, generally during the summer months. Both sources of water currently provide water of similar high quality.

The spring water is disinfected due to its shallow nature. The well is untreated.

A new disinfection system is being implemented for the well and gas chlorination is being replaced at the spring source. The project was bid in May 2020 and will be completed by August. Sodium hypochlorite is much safer to operate and more suitable for a system of Alberton's size.

The spring water collection structure supplies the Town's storage tank by gravity. The well, located in the south part of Alberton, provides the additional water directly into the distribution system when the demand is at its peak (mostly during the summer). The at-grade storage tank provides pressure to the community distribution system in accord with the location and topography. Customers located on the north hillside experience the lowest pressures typically around 60 psi, while the customers located at the low-lying southeast corner of the community experience higher pressures around 100 psi.

3.3 CONDITION OF EXISTING FACILITIES

3.3.1 Municipal Well

As mentioned above, the groundwater well was completed in 1978 to a depth of 301 feet

X:\ALBERTON 2020\PER 2020\DRAWINGS\Alberton PER Figures.dwg SAVED: 5/26/20 PRINTED: 5/26/20 BY: ADAM

Revision	Date	By
Draft	5-1-20	MG
Final	5-26-20	MG

Revision: Draft
Plot Scale: 1:2
Drawn By: A.Eckhart, P.E.
Approved By
Checked By
Designed By

Engineer

Anderson~Montgomery
CONSULTING ENGINEERS
1064 N. Warren
Helena, Mt 59601
Phone (406) 449-3303
Fax (406) 449-3304

Owner: Town of Alberton

Project Title: Water System PER 2020

Sheet Title: Existing System

Sheet: **Fig. 3.2**

(**Appendix C**). The well consists of an 8-5/8 inch diameter steel casing installed to a depth of 203 feet. The top 30 feet of the well is grouted and the final 98 feet is an open hole. The static water level according to the well log is at 100 feet below ground surface.

The well was pump tested with a stabilized capacity of 100 gallons per minute (gpm) in order to ensure the performance of the well before being placed into service. After 4 hours of pumping the result was a drawdown of 145 feet below the ground surface. The test results provided information to select and place a permanent 20 hp, 6-inch, 7-stage submersible pump. The pump has a pumping capacity of 125 gpm and the intake for the pump was placed 215 feet below the ground surface. A 4-inch galvanized steel drop pipe was provided.

Circular DEQ-1 limits well pumping to no more than two-thirds of the tested well capacity. The pump records indicate that the pump is producing approximately 115 gpm, therefore, the Town is exceeding the standard operating at 115% of the tested flow. In order to meet the Circular DEQ-1 requirements the well would only be allowed to pump at 67 gpm. In the past 37 years there have been no reported issues with the well at the current pumping rate, suggesting that the yield for the well may be better than what the original driller's pump testing indicated. It may be worthwhile to perform another more extensive test on the well to get a more accurate indication of yield.

The well head is located inside of a masonry building. The discharge piping from the submersible pump is exposed inside the building. Operating conditions can be directly observed with the inline flow-meter and a pump motor elapsed time meter. Well piping also includes control valves, isolation valves, pressure gauges, and fittings. The flow-meter and pressure gauges located in-line are currently non-functional and need to be repaired or replaced. The piping within the well house is lacking a pressure release valve as well. In the event of a high pressure surge from the pump, the pressure relief valve would protect monitoring equipment and the distribution system.

Within the masonry building is a separate room for chlorination and gas storage, although, there is no chlorination equipment on site. The chlorination room is lacking necessary equipment for safe gas storage such as ventilators, leak detection, and an emergency chlorine neutralizing scrubber system. The ventilation louver in the well house currently does not properly operate. If disinfection equipment is added to the building, significant improvements and repairs will be necessary.

The well is manually operated during periods of high water demand since there are currently no controls linking well operation to the storage tank level. Manual well operation presents several problems due to the fact that the well head and storage tank are not located in close proximity and the demand for water is constantly changing. The well is equipped with a simple timer although it is not typically used due to its inaccuracy of anticipating changing water demand. A phone telemetry system was installed after the well in 1978, but has since been abandoned due to unreliability and cost. As mentioned previously, the first phase of improvements for Alberton's water system is currently being implemented and this includes upgraded telemetry and electronic controls to improve system operation.

3.3.2 Spring Collection Structure

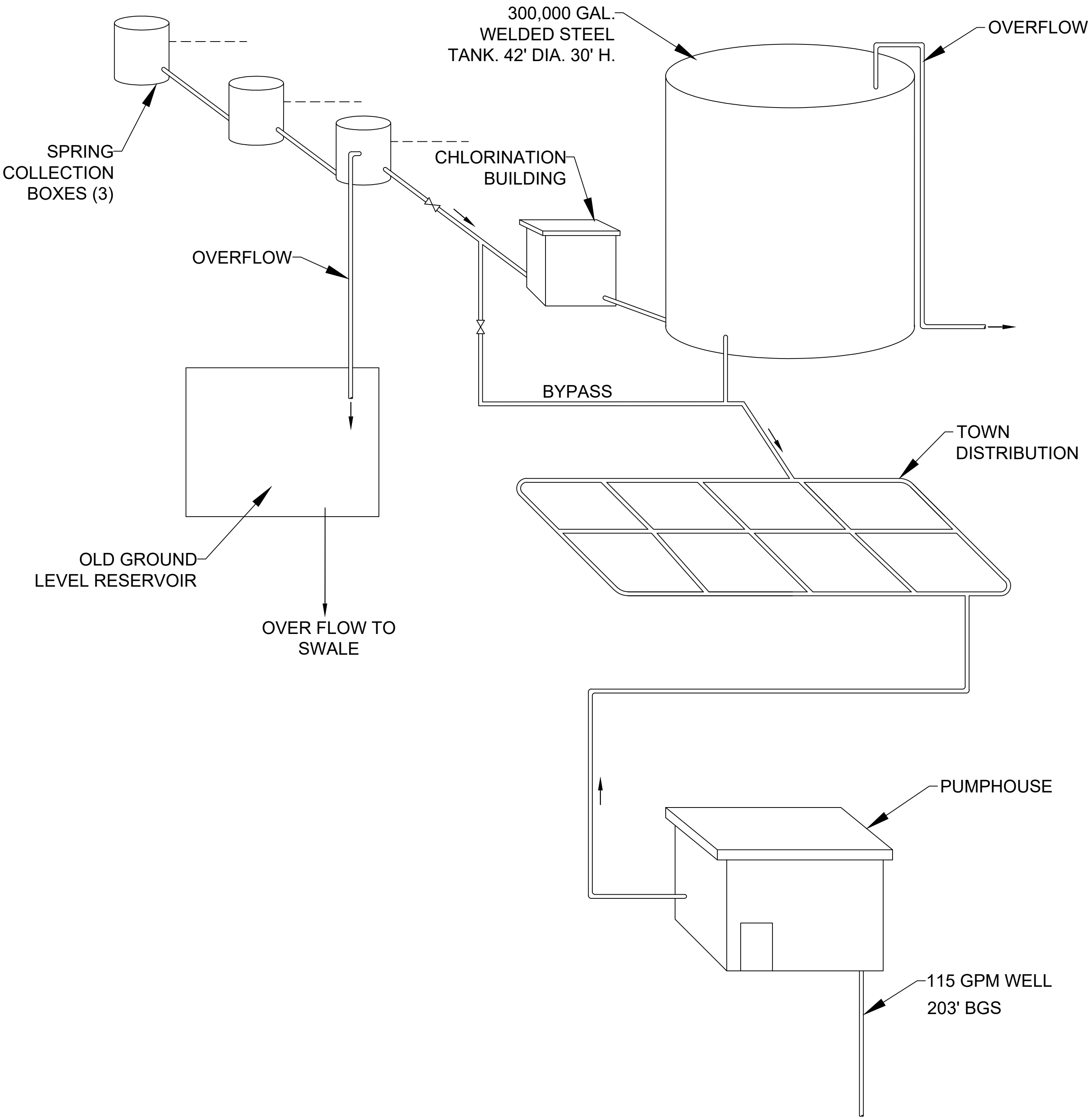
Alberton's main source of water is located just to the north of the existing storage tank, consisting of several spring water collection laterals and three corrugated metal manholes. Water is collected in all three metal manholes and directed through piping to the lowest metal manhole (60-inch diameter) by means of gravity. From the last collection manhole, the water then passes through a buried Cla-Val altitude valve and enters the chlorination room in the masonry building through an 8-inch cast iron pipe. Once the water has passed through the masonry building the water is then used to fill the storage tank. The purpose of the altitude valve is to divert flow from the storage tank to an overflow channel once the tank is full. The altitude valve has long-since quit functioning and now all spring water reports to the storage tank. The tank overflows to a separate overflow channel (see **Figure 3.1).**

The design drawings of the spring collection system do not provide any records on the construction or the materials that were used to assemble the system. Some of the materials used during construction are believed to be some combination of cast iron, concrete, and corrugated metal pipe, based on the visible pipe ends inside of the three metal manholes. Several of the pipe ends in the collection manholes are showing signs of deterioration. All three collection manholes are fitted and covered with lockable metal covers, however, the lids do not have a rubber seal.

Observation of the lower manhole has shown that the bottom of the manhole has a gravel floor with separate pipes leading to the (previously mentioned) chlorination building and to an old abandoned open reservoir. The piping to the reservoir is controlled by gate valve allowing the reservoir to be isolated from the rest of the water system. When the altitude valve between the chlorination building and the lower manhole was closed the water level in the lower collection manhole would rise until it reached the pipe leading to the reservoir serving as an overflow relief. The elevation of the reservoir is approximately 20 feet lower than the collection manhole, therefore limiting the risk of backflow.

There is an 8-inch main collection lateral that is up-gradient approximately 200-300 feet in length. The collection lateral enters the lower collection manhole, along with smaller 4-6 inch lateral branches. The 8-inch main appears to be buried relatively shallow (less than 5 feet of cover), due to some ground surface subsidence atop of the laterals and main.

Inside the masonry building next to the storage tank, the piping from the lower collection manhole is exposed for chlorination injection. There is no flow meter on the spring system source. In 1997 the flow rate from the spring was estimated in both June and September. The estimation was done by closing the outflow from the storage tank and measuring the change in the water level of the tank for a given period of time. The results of the test suggest that the springs were producing an average of 155 gpm. It should be acknowledged that there will be seasonal variation with the flows from the spring and an unverified local report suggests the spring flows to be as low as 100 gpm during drier



Anderson~Montgomery
CONSULTING ENGINEERS
1064 N. Warren
Helena, Mt 59601
Phone (406) 449-3303
Fax (406) 449-3304

Owner: Town of Alberton

Project Title: Water System PER 2020

Sheet Title: Water System Schematic

Sheet: **Fig. 3.1**

X:\ALBERTON 2020\PER 2020\DRAWINGS\Water System Schematic.dwg SAVED: 5/14/20 PRINTED: 5/26/20 BY: ADAM

parts of the year. Installation of a flow meter, being done with the 2020 project, will allow the operator to measure and record what the spring is producing on a day to day basis and greatly enhance management capabilities.

Spring collection structure (with normally sealed cover removed) 5 May 2020

3.3.3 Disinfection

The Town is in the process of upgrading its disinfection system to include chlorinating both the well and the spring sources with sodium hypochlorite.

Until the above-mentioned improvements are completed, the Town is disinfecting only the spring water by means of chlorine gas. The water produced by the municipal well is not currently being treated. The chlorine gas is currently contained in a chlorination building located next to the storage tank.

The current chlorinator on the spring is a *Wallace & Tiernan v-100* unit, with a 20 ppd manually adjustable rotameter. A dual cylinder scale is provided and the system uses 150-pound gas cylinders. The operator currently manually tests the water to measure the actual residual because there is not automatic on-line monitoring system. Upgrading the monitoring system will allow the Town to provide a more consistent chlorine dosage and save money by avoiding over chlorination. Recently the Operator installed an in-line valve after the chlorine injection site dedicated for testing the water.

The use of chlorine in the form of a gas requires several standards to be met for ventilation, leak detection, and emergency conditions. The building where chlorination is taking place does not meet applicable safety standards. The 1992 *Uniform Fire Code* requires a neutralizing gas scrubber sized for the largest chlorine gas container on site. Since Alberton uses 150-pound gas cylinders, a minimum requirement would be a 150-pound scrubber unit. Scrubber units use sodium hydroxide mist to neutralize any escaping gas. In the event of a chlorine gas leak, ducting and automatic activation from a chlorine leak detector are needed. A typical setup would house the scrubber in a separate room with sealed ducting from the chlorine storage area.

The chlorine building should also have an external alarm to indicate leaking chlorine to avoid operating personnel entering a contaminated environment without proper protection. Ventilation equipment shall be accessible from both inside and outside the building. The door to the building should also have an interior panic-bar exit feature with the addition of a chemical hazard placard on the outside of the building.

<u>The conversion – being done in 2020 – of gas chlorination system to the use of liquid chlorine (sodium hypochlorite) will provide a much safer environment for operators.</u> The electrical components and conductors within the building show signs of advanced corrosion due to the presence of chlorine gas, a problem that will be corrected with a sodium-hypochlorite system. The public will benefit from a more reliable water disinfection system and a reduction in energy use.

3.3.4 Water Use

To assess a water system, variations in water usage (demand) must be considered. The following are the typical types of demands and why they are important.

Average Daily Demand (ADD) – The average of the total amount used each day during a one year period. Ordinarily, the majority of usage occurs in the 16 hours between the hours of 06:00 and 22:00.

Maximum Daily Demand (MDD) – The maximum total amount of water used during a 24-hour period.

Peak Hourly Demand – The maximum amount of water used in any single hour of any day. The maximum hourly demand may be from 6 to 9 times the average daily demand for small water supply systems.

As expected, the typical high demand time of year is during the summer months and the lower demand times of the year are during the winter months. The ADD reflects two components: The low-usage daily demand over the entire year and the irrigation demand over the irrigation season. Due to the lack of reliability with the residential water meters and having no meter currently in place on the spring source, drinking water usage in Alberton must be estimated.

The seasonal daily demand was estimated in the Stelling study by measuring the outflow from the storage tank (with the spring inflow bypassed and the well turned off).

September 1997 – Representing fall usage with minimal irrigation.

February 1998 – Representing winter non-irrigation use.

July 1998 – Representing summer peak use with irrigation.

Data collected in February of 1998 can be seen in **Table 3.1** below. The February test represented the time of year that irrigation was not taking place. This reflects the average (winter or low-usage) demand and can be supplied by the spring source.

Table 3.1 Past Measured Use & Calculated Gallons per Capita per Day

Date	2/11/1998	2/12/1998	2/13/1998	Average	Population	GPCD
GPD	48,768	51,125	49,486	49,793	370	135

Even though the measurement data is quite old, the calculated figure of 135 gallons per capita per day is in good agreement with widely accepted and known values for domestic water use in Montana and the US. The current estimated population of Alberton is 439 (see **Chapter 2**) thus the domestic demand in 2020 is estimated to be:

439(135gpcd) = 59,265gpd

In order to accurately evaluate the Average Daily Demand, the Irrigation Demand must be calculated. The following assumptions for determining the Irrigation Demand were made based on a 2" per week demand.

150 residential lots

39 other lots (business, school, other)

Each lot has 7,500 square feet of lawn area to irrigate

These assumptions equate to 1,336 gallons per day per lot as follows:

7500 ft^2(2"/(12"/ft))(7.48gal/ft^3)(1wk/7day) = 1336 gpd irrigation per lot

Using 189 total lots yields:

(189 lots) x (1336gpd/lot) = 252,504 gallons per day for the Daily Irrigation Demand.

Combining the Domestic and Irrigation Demands will yield the Average summer day demand.

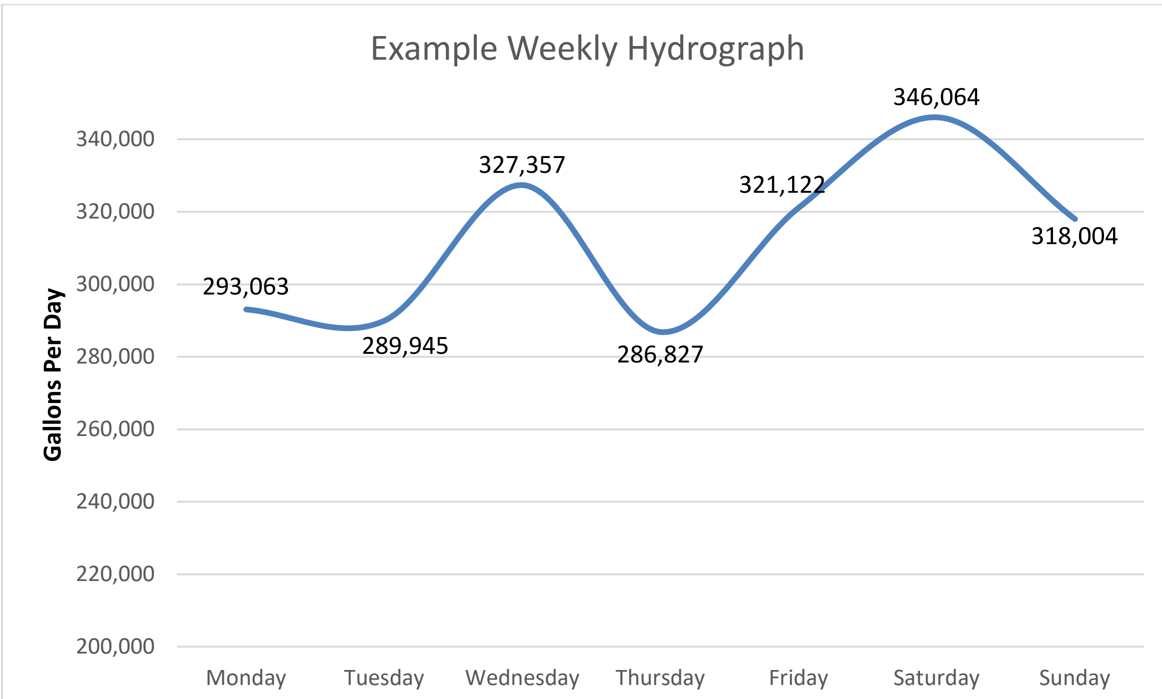
Average summer demand per day = 252,504gpd + 59,265gpd = 311,769 gpd

Total gallons per year are estimated by using 90 days of irrigation demand and 275 days of lower demand as follows:

90 days at 311,769 gpd + 275 days at 59,265 gpd = 44,357,085 gallons

Average Daily Demand = 44,357,085gal ÷ 365days = 121,526gpd

The Maximum Daily Demand must be estimated because Alberton doesn’t currently have reliable flow metering. Maximum Day could be taken as the sum of the domestic and irrigation demands as calculated above for the peak day. That method would under estimate Maximum Day because both domestic and irrigation are not evenly spread out. An example daily hydrograph for Alberton, shown below, illustrates this concept. This hydrograph was not created from daily measurements at Alberton but was synthesized from Alberton data and from the engineer's experience with similar water systems.



In the example shown, the weekly total gallons used equals the average summer daily demand for Alberton multiplied by seven days. However, because the demand is not a straight line the actual maximum day is higher than the average summer daily demand.

Average Summer Weekly Demand = (311,769gpd)(7d) = 2,182,383 gallons

In the example hydrograph, the Maximum Day occurs on a Saturday and is 111% of the average summer daily demand. Again, this is just an estimate, since reliable flow metering data does not currently exist at Alberton.

Estimated Maximum Day is 111% of 311,769 gallons:

Maximum Day = 1.11(311,769) = 346,064 gpd

Thus;

Max Day = 2.85 Avg Day

The assumptions made to calculate the Average Daily Demand and Maximum Daily Demand were compared to a spot check conducted in July of 1998. The spot check in 1998 was conducted by measuring the level of drop in the storage tank while bypassing the inflow from the spring and turning the well off. The test was 14 hours in total (noon to 2 a.m.) during the peak summer water use. The result was 274,000 gpd, which bears a reasonable comparison to the values from the example hydrograph – allowing for the population change from then to now and for the probability the spot check did not occur on the actual Maximum Day. A summary of the current and future estimated water demands for Alberton is shown below in **Table 3.2**.

Table 3.2
Alberton Public Water System
Estimated Demands

			Irrigation	Avg Day		Max Day	
Year	Pop	GPCD	gpd	gpd	gpm	gpd	gpm
2020	439	135	252,504	121,526	84	346,064	240
2040	507	135	265,129	133,819	93	381,071	265

*irrigation demand increase of 5% from 2020 to 2040

Hydraulic modeling has shown that the water distribution system is hydraulically adequate for Average Daily Demand and Maximum Daily Demand. Please see **Appendix H** for water modeling output data.

The business district's maximum required fire flow of 2,500 gpm for a 2-hour period is anticipated to remain unchanged in the future. If any new Alberton buildings follows the historic building types, they would likely not be a multi-story building type. However, if they were, the existing commercial building structures of this type would still require similar fire protection.

Any new institutional facilities constructed over the next 20 years, such as a new school, would also have no more than the 2,500 gpm for a 2-hour period fire flow requirement. Because new construction building codes require modern, fire resistive construction and automatic sprinkler systems.

3.3.5 Source Capacity

Either source alone is adequate to meet average day demand in Alberton. Both sources combined, however, are inadequate to meet the estimated maximum day demand when the assumed reliable yield of the spring (100gpm) is used in the calculation. The analyses follow.

Circular DEQ-1 3.2.1.1 a. requires that the total developed ground water source capacity for systems utilizing gravity storage or pumped storage, unless otherwise specified by MDEQ, must equal or exceed the design maximum day demand with the largest producing well out of service. Storage must comply with the requirements of Section 7.0.1 of DEQ-1.

Currently the Town's spring flow rate was measured at approximately 155 gpm according to the test done in 1997, however, undocumented historic reports indicate the spring to yield flows as low as 100 gpm. In order to ensure that the Town meets Circular DEQ-1 the lesser of the two yields from the spring will be used to show compliance.

100 gpm equals 144,000 gallons per day, which is well short of the 381,071 calculated above. Therefore, Alberton does not meet current minimum requirements for source capacity.

The well produces 115 gpm combined with the spring's 100 gpm the total capacity:

(115 gpm + 100 gpm) x 1440 min/day = 309,600 gpd < 381,071 gpd

This shows that even with both sources operating the system is not able to meet the estimated maximum day demand. This would seem to indicate that the system is only able to meet its maximum demands by depleting storage during high demand periods. If correct, this is not at all where the system should be operating.

Table 3.3 Alberton Source Capacity

Year	Spring Flow Reliable Yield (gpd)	Well (gpd)	Total of Sources Reliable Yield (gpd)	Avg Day (gpd)	Max Day (gpd)	Meets DEQ-1
2020	144,000	165,600	309,600	121,526	346,064	NO
2040	144,000	165,600	309,600	133,819	381,071	NO

It is possible that the spring is producing at a higher rate as mentioned above. If the spring were producing at 155 gpm the total system capacity would be:

(115 + 155) gpm x 1,440 min/day = 388,800 gpd > 381,071 gpd.

In either case, the source capacity does not meet the current minimum design standard, because it is calculated with the highest producing source out of service, and the analyses shown above indicate the source capacity is substandard.

In order to get a more accurate assessment of the demands, the Average Daily Demand should be recalculated when the Town has installed meters on both water sources and working domestic meters that can capture and record all the water being used.

3.3.6 Disinfection

As mentioned in **Section 3.2.3** the existing disinfection system is gas chlorine applied to the spring source only and is scheduled to be replaced in the spring/summer of 2020 with a modern sodium hypochlorite feed system that will disinfect both sources.

3.3.7 Storage

DEQ-1 7.0.1 requires storage capacity be equal to average day demand plus fire flow. Based on the following analysis the Town's storage capacity is substandard and additional storage capacity of 200,000 gallons is recommended for Alberton.

Using the maximum fire flows (2,500 gpm for a 2-hour period as determined in **Section 3.3.4.3**) requires a fire pool of 300,000 gallons. This is under the assumption that both the North and South Schools are equipped with a full sprinkler system. The required design year storage is the sum of the fire pool of 300,000 gallons plus the current average day demand of 121,526 gallons for a total required storage of 421,526 gallons without the contribution of the spring

Alberton will likely continue to utilize the spring as a (gravity) source of water, therefore the production rate from the spring could be used as a deduction in the total storage required. Using the spring's reliable yield of 100 gpm for a 2-hour period results in a total deduction of 12,000 gallons.

Table 3.4 Storage Required

Year	Fire Pool (gal)	Avg Day (gal)	Gravity Spring's Contribution (gal)	Storage Volume Req'd (gal)
2020	300,000	121,526	12,000	409,526
2040	300,000	133,819	12,000	421,819

The table above shows the Total Storage Required both currently and at the end of the planning period. Currently the Town has 300,000 gallons of storage capacity, falling short of the required 409,256 gallons. As can be seen, the future estimated storage would be 421,819 gallons. The addition of 200,000 gallons of storage would exceed the requirement and allow for some additional capacity if growth exceeds projections or if demand estimates are incorrect.

An expansion of storage capacity along with the addition of another water source would be needed for Alberton to comply with current design standards (DEQ-1, 2018 edition)

Again this volume of storage is based on the presumption that both the North and South Schools install a full sprinkler system for fire protection, if the schools do not add the sprinkler system the required storage would drastically increase. The *Uniform Fire Code* typically allows a 50% reduction in fire flows if a full sprinkler system is in place. Installing the sprinkler systems in the schools would shift the critical flow requirements to the business district (2,500 gpm for 2-hours) and alleviate the required storage capacity of 630,000 gallons to 300,000 gallons.

The expectation of providing full sprinkler systems in the school buildings is realistic for both public safety and economic reasons. A new 6-inch feed line is already in place in the tunnel connecting the two school buildings (North and South). During the installation of the sprinkler system in the basement of the North School provisions were added on to allow ease of expansion to the remainder of the building.

It will be more cost-effective for the Town to complete the sprinkler systems in the two schools rather than implement an additional 330,000 gallons of water storage. The remaining two floors of the North School plus the two floors of the South School equate to approximately 38,400 square feet. According to the *American Fire Sprinkler Association*, retrofitting an existing building with a sprinkler system cost approximately $1.50 to $2.50 per square foot. A full sprinkler system for both Schools would cost $57,600 to $96,000. Difficult access for installation of sprinklers could increase this estimate. The cost for an additional 330,000 gallon of water storage would come in around $600,000, which far exceeds the cost of the sprinkler system.

3.3.7.1 Storage Tank Condition

Alberton is currently using a 300,000-gallon steel water storage tank. The steel tank has a 42-foot diameter and stands 30 feet tall. Construction of the tank was completed in 1968.

The tank is a welded steel construction with a concrete ring wall foundation and a steel floor sheet. There is an un-caged steel ladder on the north side of the tank. Currently there are no roof railings or walkways around the access hatch and current safety standards require fall prevention equipment and railings. Nominally the tank is considered to have a capacity of 300,000 gallons but the actual capacity to overflow the tank is approximately 301,000 gallons. The tank typically operates in overflow condition.

The tank does not have internal baffles. There are two separate 8-inch inlet and outlet floor penetrations near the walls. The inlet and outlet are 180 degrees apart allowing some chlorine contact time in the flow path through the tank.

The tank is equipped with a dedicated overflow pipe on the interior wall and daylights near the roof knuckle at an invert elevation 29.0 feet above the tank floor. The overflow pipe is typically used most of the year due to the absence of a control system and the failure of a flow control valve (stuck in the open position), that would divert excess flow prior to the tank if functioning.

In September of 1997 the interior of the tank was evaluated by Liquid Engineering. The evaluation was completed by diver-inspection. Liquid Engineering rated the interior of the tank “good” to “excellent” with few areas showing corrosion. The areas of corrosion were noted to be on the welded seams and coating “holidays” (pinholes). There was approximately a ½” of accumulated silt on the floor of the tank. The exterior coating on the tank is showing signs of deterioration and needs to be prepped, primed and repainted.

The tank was again inspected by Independent Inspection Service of Helena in May of 2019 (see report in **Appendix D**) by remote operated vehicle (ROV). The tank was assessed to be in overall satisfactory condition with the main recommendations being to clean sediment from the interior of the tank, install a new screen on the vent and have it inspected again in 3-5 years.

The town should consider rehabilitating the tank by interior and exterior recoating, although according to the May 2019 inspection report this was not one of the recommendations.

The Town can meet the storage requirements by adding another storage tank or replacing the existing storage tank with a larger tank.

3.3.7.2 Storage Tank Controls

The storage tank overflows much of the year due to the disabled altitude valve and the lack of overall system controls. When the tank overflows the overflow pipe discharges chlorinated water down the hillside. Uncontrolled discharge of chlorinated water has been identified as a regulatory concern by the DEQ. The tank is not currently equipped with any automated level controls or high/low level alarms. The well must be manually operated to supplement the spring.

The spring flow is an unregulated gravity fed source. The tanks inlet piping from the spring contains an old Cla-Val altitude valve that allows influent flow to be diverted back to the reservoir when the tank is full. The valve however is no longer operable and is permanently stuck in the open position. Replacing the in-line valve would allow the operator to save the Town money by regulating the level in the tank and keeping the chlorinated water from being discharged through the overflow pipe. The new valve will also allow the spring's excess water to be diverted back to the reservoir for ground water recharge.

Currently the operator is monitoring the level in the tank with a static pressure gauge located in the chlorination building. The Operator has reported that the reading on the gauge is approximately 4.5 feet lower than the actual level. Operators account for the discrepancy when estimating the water level in the tank.

The deficiencies listed here in **Section 3.3.4.2** are to be addressed in the Spring and summer of 2020. Plans and specifications have been completed and are being advertised as of this writing, but the improvements have not been completed yet and therefore are still mentioned in the event the town is unable to complete them for whatever reason.

3.3.7.3 Fire Flow

Other than supplying the town with drinking water, an essential function of the water system is to provide adequate fire protection. The town of Alberton's distribution system is lacking the hydraulic capacity to provide adequate fire protection due to several factors including undersized piping (hydraulic restrictions), lack of looping within the distribution system and, a limited number of hydrants.

Another issue with the fire protection, especially during high demand periods, is the lack of available water storage as shown in **Table 3.5**. During the summer irrigation season the 300,000-gallon storage tank can run dry requiring the well to be turned on to supplement the water from the springs. According to the Operator, the well pump is used 12 hours a day for 2 months and 6 hours a day for an additional month during the summer. During this time there is little to no water in reserve for fire suppression. With the lack of automation in the water system, the well pump has to be turned on manually and shuts off automatically with a timer. Therefore, in order to use the pump continuously to supplement the springs, the operator has to reset the timer several times a day. Automated controls to rectify this situation will help and are scheduled to be installed in the spring/summer of 2020.

The Fire Flow demands for Alberton were calculated (*Stelling, 2000)* using the *Uniform Fire Code* method. The method uses the total fire area, defined as the total floor area within the exterior walls including all floor levels and any horizontal projections of the roof. The type of building structure correlates the amount of fire flow demand as prescribed under the *Uniform Building Code* and *Uniform Fire Code*. The more critical structures in the Town of Alberton were evaluated to establish fire flows. Those buildings include the North (Old) School, South School, Gymnasium, Residential Dwellings, and the Business's along Railroad Avenue (Business District).

- The North School has 3 floors with an average area of 9,600 square feet per floor, and is of Type II-N Construction. The basement currently has functioning sprinklers installed.

- The South School has 2 floors with an average area of 9,600 square feet per floor, and is of Type II-N Construction.
- The Gymnasium is a single floor with an approximate area of 7,854 square feet, and is of Type II-N Construction.
- The buildings along Railroad Avenue (Business District) have 2 floors with an average area of 4,313 square feet per floor, and are of Type V-N Construction.
- The average residential dwelling in Alberton is a one floor structure with a fire area of 2,480 square feet.

As noted above the basement of the North (Old) School is the only area of both schools that contain sprinklers. The basement sprinklers were installed in 1998 following a State Fire Marshall inspection. The Town Clerk verified that none of the schools have installed sprinkler systems following the Old School project in 1998.

The sprinkler system in the basement of the North School was installed due to the concern for limited means of egress and shop class facilities in the basement. When the sprinklers were installed provisions to expand the sprinklers to the rest of the North School and to the South School were included. There is a valved 4-inch feed line entering an underground utility tunnel between the two school buildings. The town also installed a new 6-inch water main up Third Street to this point to feed the sprinkler system.

According to the Fire Flow Chart in the 1994 *Uniform Fire Code* it is recommended that fire flows be delivered to critical points in the distribution system while a minimum system pressure of 20 psi is maintained. The *Uniform Fire Code* and the *Uniform Building Code* regulations that were used to determine the required fire flows can be seen in **Appendix I**. The following **Table 3.5** (from the Stelling report) summarizes the recommended fire flows for the Town of Alberton.

TABLE 3.5
REQUIRED FIRE FLOWS
RESIDUAL PRESSURE OF 20 PSI
MINIMUM SYSTEM PRESSURE OF 20 PSI

Building	Fire Flows without School Sprinkler Systems		Fire Flows with both Schools Containing Full Sprinkler Systems	
	Flow (gpm)	Duration (hrs)	Flow (gpm)	Duration (hrs)
North (Old) School	3,500	3	1,750	2
South School	3,000	3	1,500	2
Gymnasium	1,750	2	1,750	2
Residential	1,000	2	1,000	2
Business District	2,500	2	2,500	2
Required Fire Pool	**630,000 Gallons**		**300,000 Gallons**	

As seen in the table above, the two schools are the primary elements of the calculated fire demand. Adding sprinkler systems to the schools would drastically reduce the required fire flows and the amount of fire pool required. If sprinkler systems are not installed in the schools the current storage tank capacity is less than half of the required fire pool of 630,000 gallons.

Hydraulic modeling shows that the Alberton water system can deliver fire flows adequate to supply a 2,000 gpm fire flow for a two-hour duration (with both the spring and well sources active) and still maintain minimum system pressures of ≥ 20psi. See **Appendix H** for water modeling output data.

Installation of complete sprinkler systems in the North and South School buildings would significantly reduce the required fire demands in Alberton. Sprinkler systems would result in the Town having adequate fire storage available with the existing 300,000-gallon tank. The provisions to install the sprinkler systems have been initiated with the installation of the 6-inch water main and the 4-inch stub-out in the tunnel between the schools. With the added safety benefits and the reduced fire flow demands, a complete sprinkler system throughout both schools should be a high priority for the Town of Alberton.

3.3.8 Distribution System

The Town's current distribution system is fed by an 8-inch cast iron water main from the storage tank (**Figure 3.1**). At Railroad Avenue and Meadow View Lane the 8-inch transmission main connects to a 6-inch cast iron main. The two 6-inch mains then connect to a network of 6, 4", 2", 1¼" and ¾" lines. The older 4 and 6-inch pipes are cast iron while the newer 4 and 6-inch pipes are PVC, all pipes 2-inch and smaller are galvanized steel.

The laterals north of Railroad Avenue, at the east end of Adams Street and the west end of Parkway Drive are generally 2-inch dead-end lines with no looping. The dead-end lines can produce several problems such as flow restrictions and water quality degradation due to stagnation.

For distribution system sizing, the 2,500 gpm fire flows are expected to be the overriding demand exceeding any peak hourly domestic flow events. The domestic peak hourly flows for the current distribution system are much less than the required fire flows, hence, the distribution system needs are controlled by the fire flows and will be evaluated with the intent of meeting the 2,500 gpm for a 2-hour period.

The discussion in **Chapter 4** further defines the water distribution deficiencies in order to develop alternatives to address those that endanger public health and safety, such as: stagnant water, low pressures/contamination, ageing infrastructure and inadequate fire flows. The recommendations presented remain applicable throughout the 20-year planning period.

3.3.8.1 Fire Hydrant Spacing

An essential part of fire protection is the spacing between fire hydrants in the distribution system. Proper fire hydrant spacing criteria can be found in the 1994 edition of the *Uniform Fire Code* (UFC). The following criterion was taken from the UFC:

- For fire flows of 1,750 gpm or less, there must be one fire hydrant available per building, spaced 500 feet apart.
- For fire flows of 2,500 gpm, there must be three fire hydrants available per building, spaced 450 feet apart.
- In the event of a dead end street or road the average spacing between hydrants will be reduced by 100 feet.

The majority of the fire hydrant spacing in Alberton does not meet the criteria from the UFC (**Appendix I**). **Table 3.6** shows the current spacing of the existing fire hydrants.

Table 3.6 Existing Fire Hydrant Spacing		
Hydrants	Location	Distance Between Hydrants (ft)
1R & 2R	Railroad Avenue	700
2R & 3R	Railroad Avenue	700
3R & 4R	Railroad Avenue	450
4R & 5R	Railroad Avenue	450
5R & 6R	Railroad Avenue	400
6R & 7R	Railroad Avenue	450
7R & 8R	Railroad Avenue	600
6R & 5P	Railroad Avenue	500
7R & 5P	Railroad Avenue	150
8R & 1A	Adams Street	350
1A & 2A	Adams Street	700
2A & 3A	Adams Street	200
1P & 2P	Parkway Drive	900
2P & 3P	Parkway Drive	800
3P & 4P	Parkway Drive	1,000
4P & 1F	Parkway Drive	250
1F & 5R	Parkway Drive	400

As seen in the table above, the hydrants along Railroad Avenue from Fourth Street to Eighth Street, hydrant pairs at the east and west ends of Adams Street, and the area between Fifth and Sixth Streets south of Railroad Avenue are the only combinations that currently meet the UFC spacing criteria. The remaining western, eastern, and northern areas in the Town do not currently meet the spacing goals. The areas around the schools have very few hydrants to go along with the lack of a sprinkler system. This represents a significant concern in the event of a fire within or around the school buildings. Additionally, hydrants fed with 2" or 4" diameter leads typically cannot provide sufficient flow and do not meet current design standards that require 6-inch diameter leads (DEQ-1 8.4.3).

3.3.8.2 Fire Protection

Often, it is thought that adequately sizing a distribution system for hydraulic performance is primarily driven by the need to provide water for domestic and commercial use; however, another important goal is to provide enough flow for adequate fire protection. In a typical town the fire flow demands are much higher than the demands created by domestic and commercial use. Alberton is no different than the typical town, therefore, the distribution system was originally designed and planned using the required fire flows.

According to the definition by the *American Water Works Association* (AWWA), the required fire flow is the rate of water flow, at the residual pressure of 20 psi and for a specified duration of time, that is necessary to control a major fire in a specified structure. The method for determining how much water is enough to suppress a fire can be found in the 1994 *Uniform Fire Code*. The *National Fire Protection Association* (NFPA 291) recommends that a minimum residual pressure of 30 psi be maintained at hydrants while delivering fire flow. Maintaining sufficient residual pressure is important so that a negative pressure does not develop at any point throughout the mains. If a negative pressure develops in the mains, back-siphonage of polluted water from some other interconnected source can occur, which is the primary concern if the pressure drops too low. **Table 3.7** shows the existing flows and pressures of the fire hydrants in Alberton (see **Figure 3.2** for hydrant locations).

Table 3.7 Hydrant Flows and Pressures 2 1/2 inch diameter nozzle			
Fire Hydrant No	Location	Static psi	Existing Flow (gpm)
1R	Railroad Ave & Meadow View Lane	80	N/M*
2R	Railroad Ave & Second Street	82	960
7R	Railroad Ave & Eighth Street	76	N/M
8R	Railroad Ave East of Adams Street	74	691
3A	Adams & River Street	N/M	730
2P	Parkway Drive by Lagoons	87-90	N/M
4P	Parkway Drive by Well House	81	N/M
1F	Parkway Drive and Fifth Street	N/M	730
5P	Park by Tennis Courts	N/M	520

*N/M = Not Measured

These data, in addition to other public health, regulatory and hydraulic efficiency factors were used in Chapters 4 & 5 to determine adequacy of the distribution system and to determine where the distribution system is in need of upgrading.

3.3.9 Water Rights

Currently Alberton's water rights for the municipal well are 300 gpm (up to 300 acre-feet per year). The Town's water rights for the spring are 50 gpm (up to 82 acre-feet per year). The combined existing water rights are more than sufficient to meet the anticipated supply demands. However, the spring is being utilized as the main source of water with an estimated average of 155 gpm yield. With the spring inflow exceeding the water right of 50 gpm and the municipal well not producing 300 gpm, the Town's existing water rights are not consistent with the current system configuration and need to be reevaluated. Flow measurement is being installed at both sources in 2020 in order to quantify and perfect the Town's water rights. Further coordination with DNRC's Water Rights Bureau will be necessary to square the Town's usage with its rights. If Alberton wishes to continue using their system as they currently are, the water rights for the spring should be amended to show the spring as the primary source of water, averaging 155 gpm. A copy of both existing water rights and abstracts are included in **Appendix C**.

In the event of Alberton expanding and raising the demand for water, the existing 300 gpm groundwater right suggests that another well of up to 185 gpm capacity could be added in the vicinity of the existing well. Combining the current volume being utilized and comparing it to the existing volume rights (382 acre-feet per year) also shows that the Town's water rights could accommodate an additional well.

Changes in water rights could include the following:

- Increase the spring right to at least 155 gpm to be consistent with the actual diversion.
- Decrease the existing well right to around 115 gpm to accurately reflect its yield.
- Addition of another well, in the event of expanding the current system and drilling another well.
- Alternatively, use of the spring could be reduced to 50 gpm and the well pump could be operated more often.

The installation of flow meters at both sources will determine total annual diversion volumes from the spring and well individually. This data can be used to refine and reconcile the Town's legal rights to water in the Clark Fork Basin.

3.3.10 Irrigation Restrictions

The Town enforces sprinkling restrictions during high demand periods in the summer in order to limit domestic water usage. The sprinkling restriction system adopted by the Town Council includes an "even/odd day" watering schedule. The schedule is used to alternate sprinkling between different geographic areas of the town. In addition to the watering days being regulated, water times are also stipulated. The time of day stipulation prevents watering during midday hours. A copy of the current Sprinkling Regulations appears in **Appendix J**. The existing water use estimates occurred with these regulations already in effect.

3.4 Financial Status of Existing Facilities

Appendix F contains the financial documents provided by Town of Alberton. These include: Income and expense statement for state fiscal year 2020 through April 2020 (July 1, 2019 through April 2020); and a Statement of Net Position for Fiscal year 2019.

3.4.1 Water User Rates

The Water Usage Rates were last updated August of 2014. Current residential water rates are usage dependent, measured by water meters installed during the recent wastewater improvement project. Montana Rural Water Systems assisted the Town in developing the water rates. A reapportionment of rates and charges will occur to pay fixed system costs through a base water rate. A varied rate will be assessed based on metered water use. Increases in rates will likely be necessary to accommodate any future capital construction. The current Water Usage Rates and calculations can be seen in **Appendix F**.

CHAPTER 4

NEED FOR PROJECT

CHAPTER 4 NEED FOR PROJECT

4.1 Health, Sanitation and Security

The town of Alberton is facing several public health, environmental and safety issues regarding their water system that need to be addressed. The first group, bulleted, is being addressed currently and the project to do so is scheduled to be completed in the spring/summer of 2020.These include:

- Limited system control capability
- Lack of consistent disinfection (at the tank and well house)
- Discharge of chlorinated water into the ground (tank overflow)

Second, are the deficiencies that are the primary focus in this report, and these include:

- Distribution system age, undersized mains and configuration (water pressures, flows, and dead end mains)
- Lack of fire protection (water mains, hydrants, and fire suppression sprinkler systems)
- Storage capacity (does not meet current design standards, fire suppression and maximum daily demand)
- Source capacity (does not meet current design standards, maximum day with the largest source out of service)
- Lack of security (protecting the springs, chlorine building, and tank)

The Town does not have the financial resources to tackle all of these issues at once, but the Town is aware of them and by necessity must address the deficiencies in phases. The discussion that follows in this chapter first focuses on existing water quality and source water protection and what has been done with regard to those. Second, the chapter looks at specific water system components and their condition and needs.

4.1.1 Water Quality

Alberton's water system is a Public Water Supply (PWS) regulated by the Department of Environmental Quality. The PWS is required to have a certified operator and currently the manager/operator of the water system is James Claxton, Operator Certificate #8376, level 4AB 3C and the Town has a backup operator Doug Lausch #8377 level 4AB 3C. According to sampling records and the consumer confidence reporting (see **Appendix B**) required under the State of Montana's public water supply rules and regulations, Alberton's water is in substantial compliance. Some monitoring violations have occurred but these are minor at present and easily rectified. Maximum Contaminant Levels

(MCL's) have not been exceeded for any regulated parameters over the last 4 years. The most recent sanitary survey was conducted by DEQ in 2017 (see **Appendix B**) was reviewed for this report. The results of the sanitary survey were largely satisfactory with only two significant deficiencies noted, those being:

- an incorrect/inadequate backflow prevention device in place on the main underground sprinkler supply line in the underground vault in the Park; and
- no backflow protection in place on one underground automatic irrigation supply line in the same vault.

The sanitary survey mentioned other concerns regarding sources, storage, treatment and distribution and those very much agree with the engineer's assessment of the water system needs.

A summary of the water quality sampling results in accordance with the PWS rules follows:

- Calcium and magnesium hardness are present in low to moderate levels.
- pH ranges from 7 to 8.
- Nitrate levels are variable from non-detectable to 2.3 parts-per-million, well below the MCL of 10 parts-per-million. The likely sources of Nitrates are from runoff from fertilizer use, leaching from septic tanks (sewage), and erosion of natural deposits.
- Haloacetic Acids (HAA5) levels were measured at 0.62 parts-per-billion, well below the MCL of 60 parts-per-billion. The detected levels are a by-product of drinking water disinfection.
- Trihalomethane concentrations ranged from non-detectable to 4.8 parts-per-billion, well below the MCL of 80 parts-per-billion. The detected levels are a by-product of drinking water disinfection.
- Lead and copper concentrations in distribution system samples remain well below the action levels for these contaminants.
- No Volatile Organics (VOCs) have been detected in routine sampling.
- Arsenic concentrations are consistently below 4 parts-per-billion, well below the MCL of 10 parts-per-billion. The detected levels are likely from erosion of natural deposits.
- Other Phase II inorganics (metals) concentrations are generally below detection limits. Barium and Selenium are noted periodically in samples from both water sources but at levels less than half of the MCL's.
- An occasional trace amount of natural fluoride is detected but below any beneficial dental threshold.

Analytical test results for the well and spring are from a Consumer Confidence Report filed with DEQ public water system data base and provided by Alberton's Clerk. Consumer Confidence information can be found in **Appendix B**.

4.1.2 GWUDISW Determination for Well and Spring

Alberton's well and spring sources are classified as groundwater. This is an important classification for the Town of Alberton because it means the water remains protected from surface contamination and potential disease causing microorganisms.

The well was comparatively easy to evaluate and classify as groundwater.

By contrast, a lengthy assessment process – involving on-site inspections, sampling, and scientific analyses – was utilized to determine that the spring would be classified as groundwater.

A summary of the process to make these determinations is included below.

In 1999, the Montana Bureau of Mines and Geology prepared a *Hydro Geologic Assessment of the Alberton Public Water Supply for Ground Water Under the Direct Influence of Surface Water* (September 1999, Alan English). The Bureau tested Alberton's well and spring collection system for potential surface water influence and/or contamination. The assessment concluded that the municipal well is not under direct influence of surface water and that no further actions would be required on this water source. However the spring is at risk for influence and DEQ advised the Town to test the spring for Microscopic Particulate Analysis (MPA). In November of 1999 the Town preformed the MPA test and 5 factors contributing to the risk designation were cited, as shown below. The full assessment from DEQ can be seen in **Appendix B**.

- Shallow collection laterals.
- Spring box construction.
- High infiltration rates in the colluvium.
- Lack of surface drainage above the collection laterals.
- Possible cross contamination with the old collapsed (in-ground) storage tank.

Following the initial tests performed in 1999 DEQ directed that two more additional MPA tests to be conducted in May and June of 2000. Through a contract established by DEQ, Bill Engle of South Hills Environmental Consulting would perform the two MPA tests. The first test took place May 16th and 17th and the results showed "low risk" for direct surface water influence. Further explanation of the test results is talked about in **Section 4.2.1.2** below. After the results of the first test DEQ stalled the second test scheduled for June of 2000 to the following year (June 2001) due to the unseasonably dry conditions and absence of runoff. A second test was performed in 2011 and the DEQ indicated in 2012 that the source was not groundwater under the direct influence of surface water and rather could be classified as groundwater.

4.1.3 Wellhead Protection

The Town has adopted a Wellhead Protection Program. The plan identifies zones of influence for five and ten year migration distances. Bill O'Connell from Montana Rural Water Systems (MRWS) prepared the plan for Alberton.

The results for the Wellhead Protection Program show that Alberton can exercise a reasonable amount of control over what happens with their water based on the fact that most of the potential contaminants contributing to the well are within the limits of the Town. This allows the Town to regulate and control potential contaminant sources. The existing septic tanks are one of the potential contributing sources. If the town mandates that all new development be connected to the Town's sewer system, all potential contamination from new septic tanks could be eliminated. Managing weed control measures used by the County may be another way to reduce contamination along with storm water runoff from the storm sewer system. Ensuring that the above ground fuel storage tanks are in working condition without leaks would be another way to prevent contamination. Due to the location of the spring on the steep undeveloped area north of town, contamination risks due to logging and GWUDISW are considerably reduced for both the well and spring. In order to maintain a high quality of water with a low level of contamination, all potential contamination sources should be cataloged, monitored and controlled. The Wellhead Protection Program results can be seen in **Appendix C**.

4.1.4 Source Water Protection

In May of 2005, DEQ completed a Source Water Delineation and Assessment Report for the Town of Alberton. Source Water Protection is intended to help protect drinking water supplies from contamination. Quoting the report (which can be found in its entirety in **Appendix C)**:

"A major component of the Montana Source Water Protection Program is 'delineation and assessment'. Delineation is a process of mapping source water protection areas, which contribute water used for drinking. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported, and then determining the relative susceptibility to contamination of drinking water. The primary purpose of this source water delineation and assessment report is to provide information that helps the Town of Alberton continue to provide high quality drinking water."

The report meets the technical requirements for the Town of Alberton required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182).

Conclusions drawn from the report include:

- Some potential contaminant sources exist in the Town of Alberton including fuel storage tanks, old contamination from a railroad roundhouse site, sewer mains, and the interstate highway adjacent to town, and fire in the watershed.
- Susceptibility to contamination from the potential sources ranges from low to moderate for the well.

- Susceptibility to contamination from a fire in the watershed is listed as high for the Spring source.
- Recommendations for the Town include vigorous monitoring of the potential contaminant sources and development of a source water protection plan.

Not mentioned in the report is the potential for wildlife or human activity to contaminate the spring source. A site visit on May 4, 2020 was conducted by the engineer. Conclusions from that visit are:

- There is sufficient groundcover and woody vegetation to discourage wildlife from the area, but not eliminate it entirely. The area is definitely good habitat for wildlife. However, evidence of significant quantities of large wildlife such as deer and elk was not high in the immediate spring collection area. Nevertheless, the potential exists for that to change in time and seasonally.
- People hike in the area mostly on existing semi-abandoned roads tracing the area around the spring and leading into the mountains.
- The Town has installed security cameras in the area around the tank and near the spring.
- The Town has signs posted indicating it is the water source and discouraging access in the immediate spring area.
- No fencing exists around the spring collection area – roughly an acre – although the road the Town uses to access the immediate spring area is gated and signed.
- Security fencing in the spring area and around the storage tank is recommended.

4.1.5 Treatment

During months when water demand is low, maintaining consistent chlorine residuals in the water is straightforward; however during high demand months when the well is being utilized, the chlorination is more of a problem. The reason for this is because chlorine is currently only being added to the spring water source before it enters the tank, in high demand times the chlorinated spring water from the tank becomes diluted by the well within the distribution system. Lack of consistent chlorine residual in the distribution system is undesirable since protection against potential pathogenic microorganisms will be inconsistent.

Also the current distribution system has numerous dead end mains. Dead ends create an area where chlorine residuals can diminish to zero and water stagnation can occur. More detailed evaluations of the distribution system are included later in this Chapter.

4.2 Water System Infrastructure Status and Aging

4.2.1 Water Supply

The well and spring have adequate capacity to easily meet average day demand (**Section**

3.3.4). Average day is estimated at 121,526 gallons per day (gpd) and the spring can produce between 144,000 gpd and 223,200 gpd; while the well can produce 165,600 gpd. The lower number for the spring must be used to assess its reliable yield – allowing for dry years and uncertainty in flow measurements. As **Section 3.3.5** concludes, however, the source capacity does not meet current design standards. Therefore, one needed improvement is expanded source capacity.

4.2.1.1 Municipal Well

As discussed above, the town had a Wellhead Protection Plan for its municipal well prepared by Bill O'Connell of Montana Rural Water Systems (MRWS). The Wellhead Protection Plan can be seen in **Appendix C**. In the report, O'Connell states that, "…the depth of the water bearing formation, the distance to the nearest surface water, and the bacteriological history of the source indicates Alberton's well is not under the direct influence of surface water." The Montana Bureau of Mines and Geology (Sept. 1999, Alan English) and the MDEQ directive (Nov. 1999), in **Appendix B**, support O'Connell's findings. The well water is scheduled to have a sodium hypochlorite disinfection system installed in 2020.

4.2.1.2 Spring Collection Structure

The collection structure consists of a main collection structure (pictured in **Chapter 3**) and at least two upstream collection structures. All appear to be made of large diameter corrugated galvanized metal.

Due to its nature, evaluating a spring to see if it is susceptible to surface water contaminants is very important. Alan English of the Montana Bureau of Mines and Geology designated the Town's spring "at risk for influence by surface water". This designation resulted in an MDEQ directive (Nov. 1999) to conduct two MPA tests in the spring of 2000, shown in **Appendix B**.

The MPA tests were taken May 16th and 17th and evaluated by CHD Diagnostic. CHD Diagnostic determined the springs to be a "low risk", scoring a 1. Anything scoring less than 9 is deemed low risk, showing that Alberton's spring source is at low risk for surface water influence. An additional MPA test was conducted in 2011. The results of the test (can be seen in **Appendix B**) deemed the spring to "not be under the direct influence of surface water".

Nonetheless, the physical conditions around the spring and collection site should be improved to further minimize the risk of surface water contamination. There is no fencing around any of the structures allowing access by people and or animals. Signs of vandalism indicate the concern for additional security measures being needed. The operator has installed an ingenious and reasonably effective seal for the spring collection boxes; however, the lids can warp and may make them susceptible to forming an imperfect seal.

Currently there are two pad locks per lid as the only security measure. The main collection box is showing signs of deterioration and rehabilitation of the box is needed.

The inlet and outlet pipe penetrations are also deteriorating and need rehabilitation as well. The thick vegetation around the upper two spring boxes is an area of concern, thinning the vegetation would help the operator have easy access to monitor the source and perform routine maintenance for the collection structures. The vegetation must be recognized also as a benefit since among many benefits it prevents erosion and discourages large animals from traversing or even bedding down in the area.

Another possible source of contamination is the abandoned piping from the lower collection structure to the abandoned concrete reservoir. However, in the event that the valve between the chlorine building and the main collection structure is closed the overflow piping from the collection box to the reservoir needs to be there in order to send the water to the abandoned reservoir. The concrete reservoir originally had a wooden roof, which has collapsed down into the reservoir. If this reservoir were to be used it would need to be cleaned, inspected, and rehabilitated. The piping leaving the concrete reservoir branches to an even older reservoir site adjacent to the steel tank. The piping between the reservoirs is presumably controlled by a valve, which is currently closed. There are some uncertainties pertaining to the second abandoned reservoir, but the reservoir is isolated from the current system.

The long term outlook for Alberton's compliance utilizing its two existing water sources is good. Particularly with the improvements already under way and if those recommended in this PER are funded and constructed. The water quality from the well and springs is excellent.

If the Town expands its source capacity, which is one of the recommendations of this report, by developing a new groundwater source, the new source may need to update its requirements under DEQ Circular PWS-6 for a Source Water Delineation and Assessment.

4.2.2 Storage Capacity

Alberton's storage volume of 300,000 gallons falls short of the current design standards by approximately 110,000 gallons.

The required capacity of a storage facility is needed to meet both domestic, lawn irrigation, and fire flow demands. Circular DEQ-1 currently requires storage volume be available to meet the Average Day Demand plus the recommended fire pool. Lower volumes may be allowed if a Storage Sizing Engineering Analysis indicates sufficient storage exists for a water system's particular circumstances.

As discussed in **Section 3.3.7**, the required minimum amount of storage recommended to meet the demands for the Town is currently 409,526 gallons and is projected to be 421,819 gallons at the end of the planning period. The amount of storage required is under the assumption that the Town installed a full sprinkler system in both the North and South Schools, if not the required amount of storage would drastically increase.

The current 300,000 gallon storage tank is approximately 110,000 gallons less than the Town needs to effectively fight a fire and simultaneously supply other system demands. Potential health and safety risks are summarized below:

- In the event of the storage tank being depleted due to a fire demand, pressure at some of the higher points throughout the distribution system could become negative. When a negative pressure occurs the distribution becomes at risk for infiltration of groundwater through leaking pipe joints, or backflow from unprotected domestic sources creating a public health risk.
- Negative pressures can also cause pipes to collapse, entirely disabling sections of a water system until repairs can be made.
- In the event of a fire, public safety is a major concern if there is insufficient fire pool available. This situation would be most concerning during peak demand periods (summer), which also occurs during the drier parts of the year.
- As discussed in **Chapter 3**, the limited number of fire hydrants around the school buildings and the lack of a sprinkler system within the schools might create a double jeopardy in the event of a fire at or near the school buildings while students are in attendance.

4.2.3 Storage Tank Condition

Several deficiencies were identified with the water storage tank in the 2018 Anderson-Montgomery Technical Study; and the foremost of those are being addressed by the Town with a project scheduled to be completed in 2020. These are briefly mentioned here: the storage tank does not have an automatic level control system. The lack of level controls combined with a non-functioning cla-valve results in constant overflow from the tank. There are several concerns that result from this deficiency: mainly discharge of chlorinated water and wasting money on treated water that overflows from the tank. This deficiency is being addressed by the current project mentioned previously in this report.

The existing 300,000 gallon ground level steel storage tank was inspected in August of 1997 by Liquid Engineering and again in 2019 by Independent Inspection Services (see **Section 3.3.7.1** and **Appendix D**). The 1997 report stated that the structure of the tank and interior coating are in good condition. The 2019 report found that the tank was in overall satisfactory condition and primarily needed cleaning. The operator said the tank was cleaned last year. The 50-year old tank should be recoated inside and out in the near future to maximize the remaining useful life of the tank.

The Operator stated that the seal on the tank lid appears to be in good overall condition with a few areas starting to deteriorate. He believes the seal will need to be replaced within a reasonable amount of time before the seal fails and the tank becomes compromised. During peak times of the year the tanks capacity will not support the peak demand and fire flows compromising the Town’s fire protection.

The lack of security around the tank is a hazard. Vandalism to the tank is a common problem as far as graffiti and even going as far as to try and breech the metal mesh covering the vent on the top of the tank. The tank does not have a containment rail system on the top, therefore, there is an additional falling hazard to the Operator and trespassers. The lower portion of the ladder has been removed in attempt to detour trespassers from climbing onto the tank, but it is very evident that a better more reliable security system is a MAJOR concern and need.

A fence encompassing the storage tank and spring collection zone should be a priority for the Town.

4.2.4 Disinfection

As mentioned throughout this report, the Town has a current project and that project will address some immediate deficiencies with the disinfection system briefly discussed here:

- Currently Alberton is only disinfecting the spring source. Chlorine residuals fluctuate significantly in the distribution system when the well is in use because the well is not chlorinated. The addition of a chlorination system at the well has been identified as a need by DEQ and is part of the current project scheduled to be completed in 2020.
- The chlorination building also poses as a potential health and safety hazard. The building is not properly equipped to handle gaseous chlorine putting the operator and unauthorized visitors at risk. This will be rectified by the current project by installing a sodium hypochlorite disinfection system.

4.2.5 Distribution System

4.2.5.1 System Pressures

According to Circular DEQ-1, the minimum working pressure in the distribution system should be 35 psi and recommends normal working pressures of approximately 60 psi. If static pressures exceed 100 psi, Circular DEQ-1 recommends the use of pressure reducing devices located on the mains in the distribution system.

Hydraulic modeling has shown that Alberton's distribution system has working pressures between 60 and 105 psi. The static pressures throughout town generally increase in the distribution system toward the east and south due to lower topographic elevations. The static pressure at the southern end of River Street is in excess of 105 psi. There are approximately six residents lying at the lowest elevation that are experiencing the elevated pressures. The high pressures increase the risks for system leakage and wear and tear on the residents plumbing.

Adequate working and static pressures are the result of the high topographic relief (elevation differences) existing in Alberton and should not be directly confused with the hydraulic flow potential of the system under all needed flow conditions. The discussion under flow capacity in **Section 4.2.5.4** below bears this out and demonstrates the inadequacy of pipe sizes and flow configuration in Alberton's distribution system.

4.2.5.2 Distribution Piping

Asbestos Cement Piping – There is roughly 2,500 lineal feet of asbestos cement (AC) pipe currently in Alberton. The AC pipe was installed in 1978. Asbestos fibers were later found to be considered a hazard to respiratory organs, therefore, the use of AC pipe is prohibited for domestic use. Special requirements exist for abandonment and handling of AC pipe in a construction or replacement scenario. Due to the hazards created by demolition of AC pipe, the pipe can usually be abandoned in place to avoid inhalation of airborne particles by construction workers. In order to avoid airborne particles, OSHA currently prohibits saw-cutting AC pipe. Another concern is that residents served by the AC pipe could be at risk for ingestion of the asbestos fibers. National records provide evidence that the fibers in the AC pipe typically do not release from the interior walls of the pipe. In the event that the pipe does release fibers from the interior walls, replacement of the pipe will be required.

AC pipe was first used in the United States in the 1930's and quickly gained popularity leading to millions of feet of AC pipe being installed throughout the country. Since the discovery of the hazards of using AC pipe, the AWWA has approved and reactivated standards for the use of other materials. DEQ has also taken a similar approach with the use of AC pipe. Currently the use of existing AC pipe in the state of Montana has been allowed to continue by the DEQ. In an effort to avoid the costs of properly removing and disposing of AC pipe in a safe manner, DEQ allows the pipe to be abandoned in place when it is replaced.

Aside from the health hazards AC pipe creates, the pipe is very fragile. AC pipe has a very low flexural strength compared to the common ductile iron or PVC pipes that are now being used throughout the United States. When installing the AC pipe the bedding material had to be properly placed or the pipe would break in the future. Luckily this has not been an issue for Alberton.

4.2.5.3 Other Pipe Materials

Fortunately for Alberton not all of the piping in the distribution system is AC pipe. Some of the transmission mains are cast iron pipe. However cast iron pipe has its own issues as it ages. In Alberton's case the age of the cast iron pipe is considered "leaded". This means that the joints used for the cast iron piping are poured molten lead joints. The lead joints are not causing any lead exceedances due to the minimal exposure and the excellent water quality produced by the spring and well. The issue with this type of pipe jointing is the vulnerability to leakage when being disturbed. Also repairing the joints once they have been compromised typically leads to cutting out the section of pipe and replacing it with a new section of pipe.

Many of the smaller mains in the Town are composed of galvanized steel pipe. Due to the non-aggressive nature of the soils in Alberton this is a suitable material. Having non corrosive soils should limit corrosion-induced leakage of the mains.

More recent main installations throughout the Town have been completed with modern

PVC pipe materials. The pipe installation has followed the proper guidelines for bedding material, helping to extend the life of the new mains.

4.2.5.4 Flow Capacity

Flow capacity design where fire protection is provided is controlled by the required fire flows. The Town of Alberton's distribution system fails to meet the required fire flows. The existing 6-inch main along Railroad Avenue through the business district cannot carry the required 2,500 gpm, as shown by the Stelling Water Hydraulic Model in the 2000 Water System Master Plan. This poses a direct public safety hazard in the event of a fire. In order to meet the required fire flows and minimum pressure of 20 psi the Town would need to install larger mains.

Stelling modeled the water system (see **Appendix H**) which was calibrated using flows and pressures from the existing systems fire hydrants using the 2-1/2 inch nozzles. Then flows from the 4-1/2 inch nozzles can be modeled including the contributions of the spring, the storage tank and with the well either on or off.

Critically undersized mains, lack of or ineffective looping, lack of hydrants, water loss and inefficient hydraulic design were identified by Stelling's modeling effort.

Modeling results in Stelling's Table 4.4 indicate all modeled hydrants would have substandard flows especially where a 2,500 gallon per minute fire flow is needed. Flows ranged from a low of 701 gpm to a high of 2025 gpm along Railroad Avenue with the well off and from 828 gpm to 2277 gpm with the well on in the same locations. All less than the required fire flow. In the areas with needed fire flow of 1,000 gpm the model gave results ranging from 661 gpm to 771 gpm with the well off and 786 gpm to 982 gpm with the well on. Within the margin of error, only two (identified as 4P and 1F) of the fire hydrants out of 17 came close to meeting the needed fire flows which occurred with the well on. It is important to note that there is a lack of hyrants on the west side of town where the critically undersized watermains exist.

DEQ-1 Section 8.2.1 requires that "minimum pressure under all conditions of flow (e.g. fire flows, hydrant testing, and water main flushing) must be 20 psi."

Stelling's Table 4.5 contains the results from modeling if multiple hydrants are used simultaneously to fight a fire – a common occurrence in firefighting. This table indicates in all cases the required fire flows, if those were even possible, would result in pressures below 20 psi in the distribution system – the required minimum pressure under all conditions of flow.

Circular DEQ -1 requires that the minimum diameter of water-mains providing fire protection and serving fire hydrants shall be 6-inches. The mains north of Railroad Avenue do not meet the minimum requirements, as much of the area is restricted by 2-inch mains and even ¾-inch mains.

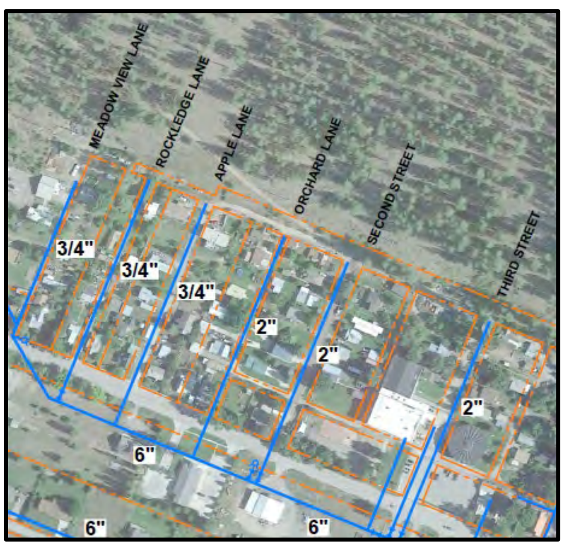
The small diameter mains mentioned above are substandard for any municipal system and completely inadequate for fire flow and not even recommended for domestic purposes: DEQ-1 Section 8.2.2 reads "The minimum size of water main in the distribution system where fire protection is not to be provided should be a minimum of three inches in diameter. Any departure from minimum requirements must be justified by hydraulic analysis and future water use and will be considered only in special circumstances."

North of Railroad Avenue, the east end of Adams Street, and the west end of Parkway Drive also contain dead end mains. This lack of looping reduces flow distribution to these areas leading to stagnant water health concerns, inefficient fire flows, and again creates a reduced fire protection for the public.

4.2.5.5 Distribution System Configuration

As previously mentioned, residents north of Railroad Avenue, along Adams Street, and Parkway drive are all served by dead end mains. The un-looped dead end mains can collect sediment and allow water to become stagnant. This has the potential to create water quality issues. Circular DEQ-1 requires all dead end mains to have a flushing hydrant, (not available in Alberton). Flushing hydrants would allow the Town to maintain the dead end lines, but do require regular flushing in order to eliminate stagnant water. Circular DEQ-1 recommends looping all dead end mains whenever possible.

In addition, the dead-end mains and lack of looping prevent efficient delivery of water during high demands such as fire flows or other high demand uses. This is especially true where the dead-end mains occur on already undersized mains which would be inadequate even if they were looped, see snip below. The mains need to be replaced with larger mains and looped where appropriate.



4.2.5.6 Water Meters

Master Meters – The current project will install meters for the spring and well. Alberton currently does not have continuous water metering of either water source. The addition of water meters on both the well and spring are important for the Town's ability to properly treat and account for water throughout the distribution system. By the time final engineering is done for the projects recommended in this report, there should be more reliable data from the new meters to assist in that design work.

Customer Meters – Customer meters were installed in 2000. The Operator stated that approximately 30 percent of the water meters are not properly working and an additional 20 percent of the water meters are not providing automatic readings. The Operator also noted that some of the residences frost free hydrants are on the main prior to the water meter, allowing the use of un-metered water. Currently the residents of Alberton are paying based on their water use, but the residents that have the un-metered frost free hydrants are not paying for the water coming out of the frost free hydrants.

With the lack of metering on the two water sources and the areas in the distribution system that are not being metered, the Town has no way to monitor and quantify leaking in the system (unaccounted for water). By adding meters to the sources and updating the meters throughout the distribution system, the Town has a better opportunity to quantify "unaccounted for water" and implement repairs/replacements where the losses are occurring.

4.2.6 Emergency Power

Circular DEQ-1 requires auxiliary power when power failure would result in cessation of minimum essential service. However auxiliary power is not required when:

- Documentation is provided which shows power outages are infrequent and of short duration.
- Fire protection is not diminished by power failure.

Alberton's current system configuration does not require emergency power because the spring supply is a constant gravity-flow source that does not require power to fill the tank. According to the limitations under the water rights the Town currently has, the well should be the primary water source. If the Town were to use the well as the primary water supply, then emergency power provisions would be beneficial. Emergency power for the well would improve the ability of the water system to supply fire flows.

4.3 Reasonable Growth

Both source capacity and storage capacity are limited with respect to what the current DEQ design standards (DEQ-1 3.2.1.1 a) would require for the current population. These design standards are not usually imposed retrospectively, but they serve as an indication of the viability of the system currently and should be the basis for future considerations.

The estimated 2020 population of Alberton is 439. Projected forward, utilizing the past 6 and a half decades of data from the census bureau and recent growth in western Montana, to the end of the planning period, the 2040 population is estimated to grow to 507.

Based on that relatively modest growth the distribution upgrades that are anticipated will have more than adequate capacity to accommodate the flows required by that population.

However, as mentioned both the source and storage systems will need to be upgraded in the future. As can be seen by revisiting **Tables 3.3** and **3.4:**

Table 3.3 Alberton Source Capacity

Year	Spring Flow Reliable Yield (gpd)	Well (gpd)	Total of Sources Reliable Yield (gpd)	Avg Day (gpd)	Max Day (gpd)	Meets DEQ-1
2020	144,000	165,600	309,600	121,526	346,064	NO
2040	144,000	165,600	309,600	133,819	381,071	NO

Table 3.4 Storage Required vs Available

Year	Fire Pool (gal)	Avg Day (gal)	Gravity Spring's Contribution (gal)	Storage Volume Req'd (gal)	Current Storage Available (gal)
2020	300,000	121,526	12,000	409,526	300,000
2040	300,000	133,819	12,000	421,819	

Source capacity should be expanded in the future to meet the DEQ-1 design standard and this would be a benefit to the Town with a more failsafe water source. If storage capacity is also expanded in the future by the recommended 200,000 gallons, both of the above deficiencies would be addressed for the planning horizon. It should be noted that rehabilitating the spring could result in a significant increase in capacity from the spring which would alleviate some of the source capacity shortfall.

In summary, the Town of Alberton does have many important public health and system integrity needs to bring the water system up to date and make it reliable for the future. In fact, the needs are a bit surprising when looked at in summary: source capacity, storage, and distribution all can use upgrading. Due primarily to fiscal constraints, the Town must take a phased approach in order to balance immediate needs with user rate impacts and funding opportunities. This shall be discussed in the following Chapter considering alternatives.

CHAPTER 5

ALTERNATIVES CONSIDERED

CHAPTER 5 ALTERNATIVE ANALYSIS AND RECOMMENDATIONS

INTRODUCTION

The planning basis for the Alberton water system was presented in **Chapter 2**, the condition of existing facilities was discussed in **Chapter 3**. In **Chapter 4**, regulatory, health and safety issues and details related to the existing facilities were considered to identify system deficiencies.

In this chapter, the deficiencies are summarized in **Section 5.1**, alternatives for mitigating these deficiencies are developed and discussed in **Section 5.2**, and potential water right changes are discussed in **Section 5.3**. The alternatives are summarized in **Section 5.4** and the estimated costs for the alternatives are shown in **Section 5.5**.

5.1 SUMMARY OF DEFICIENCIES

5.1.1 Spring Collection System Improvements

- Security of the spring collection manholes needs to be fortified in order to avoid possible contamination from animals, trespassers or vandals.
- Influent and effluent pipes in the spring water collection manholes are deteriorated and need to be rehabilitated or replaced.
- The spring box culvert on the lower spring needs to be rehabilitated, as the lower portion of the manhole is showing signs of deterioration.
- Lids on the collection manholes need the addition of a sanitary seal to reduce the risk of contamination.
- The debris in the reservoir needs to be removed so the reservoir can be used in the event of replacing the existing Cla-valve with an automatic valve. The reservoir would then be used to replenish the springs when the tank is at full capacity.

5.1.2 Distribution System Improvements

- Undersized mains throughout the distribution system create issues for proper flow rates during peak use. The restricted flows create a safety hazard in the event of a fire.
- Lack of looped mains creates flow reduction and raises the risk for chlorine residual buildup and water stagnation.
- Pressure reduction at the east end of the distribution system is needed to protect the mains and residential plumbing. The high pressures are due to the change in elevation.
- Lack of adequate hydrants and proper spacing limits fire protection.

- Water Service Meters - The current residential flow meters are showing signs of deterioration. According to the Operator, approximately 30% of the meters are not properly working and an additional 20% of the meters no longer provide automatic readings.
- Several residents' frost free hydrants are located on the main before their water meter. This is allowing the residents to use water unaccounted for.

5.1.3 Water Storage

- Inadequate storage capacity for current fire pool requirements and will become more deficient with population growth during the planning period.
- Inadequate storage capacity for average domestic use will occur during the planning period as population growth occurs.
- The existing water storage tank needs an interior inspection, exterior painting and security/safety upgrades.

5.1.4 Water Sources

- The two sources – spring and well are sufficient to meet average day demands, but do not meet current DEQ-1 standards for water source capacity.

  The current standard requires the remaining source capacity be sufficient to meet maximum day demand with the largest source out of commission. The spring has variable yield ranging from 100 to 155 gallons per minute, while the yield from the well is consistent at 115 gpm. Maximum day is estimated to be 240 gpm. In either case, the requirement to meet maximum day with the largest producing source out of service is not met.
- Currently maximum day is able to be met with both sources operating and some depletion of storage.

5.1.5 Water Rights

- The current water rights for the Town suggest the well as the primary water source, however, Alberton is currently utilizing the springs as the primary water source. The spring's water rights are set at 50 gpm, which is being exceeded by the estimated maximum 155 gpm actual usage. Installing meters on both sources and maintaining records will help in resolving water rights issues.

5.1.6 Previous Deficiencies

The following system deficiencies were identified as the highest priority in the 2018 Anderson-Montgomery Technical study. These are being addressed by a project scheduled for completion in 2020. The following will not be considered further in the alternative analyses since they are already being addressed.

Control System

- Lack of control system to operate the well pump based on tank level.
- Lack of an operating altitude valve and communication between the tank and automatic valve to divert the water from the springs to the existing reservoir when the tank is at full capacity.
- Flow meters are needed on both sources to determine water production, operate flow-paced equipment, assess unaccounted for water use and for overall improved system management.

Disinfection

- The gas chlorination system at the springs presents a safety hazard for the Operator, is deteriorated and is not reliable.
- No chlorination system at the groundwater well.

5.2 WATER SYSTEM ALTERNATIVES

Alternatives to address the five identified significant deficiencies will be considered in the following sub-sections. Where appropriate, more than one alternative will be evaluated to ensure that the most cost-effective solution has been identified.

5.2.1 Spring Improvements

- ***Spring Alt. #1 (Alt. SP1) No Action***

The current well and springs would remain unchanged as would production rates, and the spring collection manholes would remain unimproved. Existing abandoned piping and reservoirs would be left in their current condition.

This alternative may create negative impacts on public health and welfare. If population growth occurs, water shortages will develop, especially during high demand periods (summer). A shortage of water during these high demand times creates an additional safety concern. The fire pool will have been diverted to serve the domestic demands and in the event of an emergency there will not be adequate fire pool available. There is also a potential health risk from the abandoned cross connections with the reservoirs and the risk will continue to increase as the reservoirs and piping continue to deteriorate.

Since the spring is naturally occurring and was not being captured before the collection pipes were installed, abandoning the springs and returning the water to the environment could be deemed as a neutral impact. Restoration of lost surface water resources does not appear to be a realistic result of abandoning the springs. There would be no construction related impacts such as noise, traffic diversions, soil disruption, surface water disturbances, etc. Typically construction related impacts are temporary and create more positive results in the end.

Overall the effects of not improving or expanding the water sources for Alberton have a negative impact. The benefits of improving the well and spring and adding an additional water source in the future far outweigh the negative impacts. There would be some costs associated with construction materials and fuels to complete the work, however, these inconveniences would be easily offset by the advances in reliability, public health hazards, and the availability of a larger volume of water.

- ***Spring Alternative #2 (Alt. SP2) – Rehabilitate Spring***

The current spring would be retained and improved. This alternative recommends several upgrades to the spring supply, all aimed at sustaining water quality and improving yield. In order to protect the spring collection manholes from trespassers and animals, the entire area surrounding the collection manholes should be contained with an 8 foot wildlife fence, signing, and a locked gate. Debris and brush surrounding the collection manholes should be evaluated for thinning to create a workable area for the Operator while maintaining sufficient vegetation for erosion protection. The ground around the collection system could be graded to provide positive surface drainage and aid in the reduction of surface water influence. Influent and effluent pipe penetrations within the collection manholes would be sealed and rehabilitated. All pipes leaving the lower collection manhole other than the transmission main and overflow pipe shall be removed and sealed off. The addition of a concrete floor in the collection manholes would help reduce potential contamination hazards.

The existing metal lids on the collection manholes are currently only secured by two padlocks. Retrofitting the lids to have hinges, gaskets, and screened air vents would be beneficial to both the Operator and the Town.

The reservoir closest to the lower collection manhole would be cleaned and inspected for connections to the existing water system. Any connections to the water system that were identified during the inspection other than the overflow pipe from the lower collection manhole shall be removed and sealed. The reservoir would be used as a way to replenish the spring when the spring water is being diverted from the storage tank.

In an attempt to deter trespassing or vandalism and aid the Operator in future maintenance and testing, permanent 110/220-volt single phase power would be installed at the site from the existing three-phase power pole nearby. The new service pole would be by the lower collection manhole and contain a security light and motion-alert system.

This alternative would benefit public health protection. The current risks of source contamination would be drastically reduced. The fence would prevent unauthorized persons and wildlife from accessing the collection system. The likelihood of surface water contaminating the source would be effectively mitigated. With the addition of the rubber gasket seals, insects and rodents would be excluded from the water supply. The life span of the springs would be significantly lengthened, resulting in a positive public economic benefit.

Removing all the debris from the reservoir will allow the diverted water to be directed into the reservoir to replenish the source, extending the life of the springs. Removing the abandoned piping from the reservoir other than the overflow pipe from the lower collection manhole will ensure that the reservoir is isolated from the water system promoting public health and safety.

This alternative generally has positive overall effects on the environment and natural resources. The environmental consequences of continued use of the spring are considered a neutral effect with respect to surface water resources. Abandoning the spring would not likely restore any lost surface water, and without the spring additional groundwater resources would need to be developed.

Overall the effects of rehabilitating the spring for Alberton have a positive impact. The benefits of improving the spring water sources far outweigh the negative impacts created due to construction activities. There would be some costs associated with construction materials and fuels to complete the work, however, these inconveniences would be easily offset by the advances in reliability, public health hazards, and the availability of a larger volume of water. Any negative impacts from disposing the debris in the reservoir can be eliminated by using a designated landfill as a repository.

This alternative is recommended as a high priority for the town of Alberton. The operator could complete some of the work items as time permits, including cleaning out the recharge reservoir. Since the water supply capacity has been identified as substandard, rehabilitation of the spring should be considered for a Phase 1 project and will be evaluated for cost purposes that way. Rehabilitating the spring to include a new main collection box and cleaning of the main laterals should result in increased source capacity, enhanced public health protection, and would improve longevity and reliability of the spring.

5.2.2 Distribution

- ***Distribution Alt. #1 (Alt. D1) – No Action***

The existing distribution piping, valves, and hydrants would remain as they currently exist. The 8-inch and 6-inch cast iron mains from the tank down Railroad Avenue would remain incapable of providing the required fire flows. Small and un-looped mains would still be present and restrict flows for peak domestic use and fire protection. Fire hydrant spacing would remain inadequate for proper fire protection.

Public health and safety have a negative outcome if this option is selected. Fire protection for the North and South Schools as well as the Business District is lacking considerably as well as some residential areas. Water quality is at risk with the continued use of dead end mains.

Environmental impacts also would be fairly negative even without impacts from construction activities. The risks for substandard water quality and availability are elevated.

There would be no resource benefits present by following through with this alternative. Water availability would remain restricted in major portions of the Town including inadequate fire protection. The risks associated with inadequate fire protection could result in property losses. While not specifically quantified, the high per capita water usage rate as estimated would suggest that the old distribution system is leaking.

This option is NOT recommended and will not be a viable solution for the future of the system.

- ***Distribution Alt. #2 (Alt. D2) – Upsize Mains***

The existing 8-inch cast iron transmission main from the tank would be replaced with new 12-inch PVC, the 6-inch cast iron main down Railroad Avenue from Meadow View Lane to Seventh Street would be replaced with new 10-inch PVC, new 8-inch PVC would replace the 6-inch asbestos cement (abandoned in place) along Railroad Avenue from Seventh Street to the junction of Adams Street, the existing 2-inch galvanized lines around the North and South Schools and the Gymnasium would be replaced by new 10-inch PVC, and a new 8-inch line would be installed to allow the Railroad Avenue main to run the fire hydrant in the park. Fire hydrants would be added along all new mains in order to meet the specified Hydrant Spacing requirements lined out in the *Uniform Fire Code*.

This option would provide sufficient fire flows down Railroad Avenue through the Business District, for the Gymnasium, and for the North and South Schools drastically improving public safety. The upsized mains would improve flow delivery and fire protection throughout the core of the distribution system, allowing flow delivery to improve even during peak demands. The sufficient fire flows for the school buildings directly benefits the safety of the occupants.

Environmental effects are both positive and negative in nature, but the overall outcome would be positive. Significant construction disruption would occur with the excavation and installation of the new mains. Installation of the mains around the Schools should be scheduled during the summer while school is not in session as to avoid any disturbances. Impacts to traffic, business and residential access would result. Temporary noise and air (dust) pollution will occur as a result of construction activities. However, many of the negative outcomes due to construction activities can be mitigated by observing sound construction practices such as traffic flagging, watering for dust control, etc. Overall the enhanced fire protection outweighs any negative results from selecting this alternative.

Resource benefits would also result from this alternative. Improved water delivery and fire protection promote resource conservation. Resource utilization of construction materials and fuels will be necessary to complete the alternative.

- ***Distribution Alt. #3 (Alt. D3) – Loop Mains***

The dead end line on the east end of Adams Street would be looped with a new 8-inch PVC main running through the existing sewer main corridor and down Railroad Avenue to near the junction with Adams Street. A new 8-inch main would be installed along the west end of Railroad Avenue to Parkway Drive and the Clark Fork Heights Subdivision. The dead end mains north of Railroad Avenue would be tied together at their north ends with new 6-inch PVC. The majority of the mains north of Railroad Avenue are composed of 2-inch galvanized steel pipe, this alternative would not include upsizing the mains. Fire hydrants would be added along all new mains in order to meet the specified Hydrant Spacing requirements lined out in the *Uniform Fire Code*.

Health and safety benefits are significant with this alternative. The potential health risks from water stagnation and chlorine residual buildup will be removed by looping the mains. The water quality delivered to the residents will be higher and more consistent in nature. Fire protection will also be improved with the introduction of looping, although still limited by the size of the mains.

Temporary environmental impacts would be moderate during construction, primarily associated with excavation and traffic disruption. Many of the construction impacts can be mitigated by observing sound construction practices. Better water circulation and quality will generally mitigate any negative outcomes of this alternative.

Improved water delivery and quality outweigh any resource consumption in the form of construction materials and fuel.

- ***Distribution Alt. #4 (Alt. D4) – Replace 2-inch Mains North of Railroad Avenue***

The 2-inch laterals north of Railroad Avenue (mentioned in the previous alternative) would be replaced with new 6-inch PVC mains. Additional fire hydrants would be added along the new 6-inch mains (typically mid-block) in order to meet the specified Hydrant Spacing requirements lined out in the *Uniform Fire Code.* This alternative closely relates to the previous one where looping is occurring in the same area of Town, both of these alternatives could conceivably be completed simultaneously barring financial support.

The completion of this alternative along with the previously mentioned alternatives would correct the remaining health and safety problems on the north side of the Town associated with undersized mains and fire flow restrictions.

This alternative overall would have a positive outcome environmentally with water delivery improvements offsetting construction activities. Again the construction activities can be mitigated by observing sound construction practices.

Resource benefits are also a positive outcome due to the readily available water for domestic use and fire protection.

- ***Distribution Alt. #5 (Alt. D5) – Install Central Pressure Reducing Valve Station for South End of River Street***

Due to the natural terrain in Alberton, the further south you go within the distribution system the static pressures get higher. On the south end on River Street beyond Adams Street the users experience static pressures around 105 psi, which is well above the recommended static pressure of 75 psi. These high pressures stress residential plumbing and use far more water, since more water flows from open taps due to the high pressure. Installing a central pressure reducing valve (PRV) in a vault station located on the 6-inch main along River Street would control the high pressures.

The vault station would be constructed out of concrete located on top of the existing main. The vault would contain multiple valves to handle high and low flows as well as providing redundancy. A PRV will still allow proper fire flows by recognizing a large pressure drop, in the event of a fire hydrant being opened, and fully opening the valve. During normal operation the valve will open and close partially to maintain the desired operating pressure downstream from the valve.

A PRV station will provide modest health and safety benefits. Risk of pipe breakage and failure is reduced significantly by lowering the static pressure. Reliability of water service improves for the whole distribution system, because a break in the main caused by excessive pressures would be felt throughout the system until the break was fixed.

Environmental impacts of this alternative are again positive by mitigating negative construction outcomes by practicing sound construction.

Conserving water would be a resource benefit and this will be accomplished by lowering the waste of water coming through the tap.

- ***Distribution Alt. #6 (Alt. D6) – Install Individual Pressure Reducing Valves in South River Street Residences***

Under the same principles discussed in the previous alternative another option to reduce the high static pressures would be to install individual pressure reducing valves in each residents plumbing. Approximately six structures would require the PRVs and any additional structures added in the future would also require PRVs to be installed during construction. The individual PRVs would be installed inside the existing structures where the piping enters the structure. The individual PRVs are a spring loaded valve that can be set to a desired downstream pressure and they are relatively maintenance free.

The health and safety benefits are closely related to the prior alternative. Existing household plumbing would be better protected with the reduced static pressure and water waste would drop significantly. The static pressures in the mains would still be 105 psi, but the majority of pipe materials are rated for 150 psi, therefore the mains should not be at risk.

There would be no environmental impacts as construction would take place inside the existing structures. Resource benefits associated with better water conservation and reduced risk of leakage would result.

Figure 5.1 provides a drawing indicating recommended improvements.

The Distribution System Improvements outlined in Alternatives #2 through #5 are all recommended for construction as a high priority. The work is needed primarily to improve hydraulic capacity for fire protection and public health protection. Looping of lines will improve hydraulics, reduce stagnation of water and improve chlorine dispersion. A secondary benefit of the distribution work would be to reduce leakage, a suspected problem with the existing mains.

Potential Construction Issues – *replacing some of the 4-inch to 8-inch mains will* *require the disturbance of a small amount of asbestos-cement (AC) pipe. This material has special handling requirements. First, the lengths of AC pipe will be abandoned in place. However, small amounts where crossings occur will have to be cut out and properly disposed of in compliance with existing regulations. These activities require special construction methods in order to protect workers health and safety under the Occupational Safety and Health Act (OSHA); and the environment, under several regulations including National Emission Standards for Hazardous Air Pollutants (NESHAPS) and the DEQ Asbestos Control Program. The extra costs of this work have been accounted for in the cost estimates for the distribution work.*

5.2.3 Storage Capacity

- ***Alt. #1 (Alt. STO1) – No Action***

In this alternative the 300,000 gallon storage tank would be left as it currently is. Currently the existing storage tank does not provide enough storage capacity to meet the average day demand and fire flows. As population increases throughout the planning period the need for additional storage will increase as well.

As stated in Chapter 3 the required fire pool of 2,500 gpm for 2 hours plus the Average Daily Demand of 121,526 gallons minus the 12,000 gallons produced by the gravity fed spring supply equates to a total of 409,526 gallons of required storage. At the end of the 20 year planning period the total storage required is 421,819 gallons (see **Chapter 3, Table 3.4**). Alberton's calculated lack of storage will become more important as population increases. These numbers are based on the assumption that a full sprinkler system has been installed in both the North and South Schools. If not installed, the required storage for the fire pool increases by 330,000 gallons.

Public safety outcomes of going with the no-action alternative are negative in nature. The ability to meet the current demands during peak flows and to handle any fire emergencies during that time could put the public at a severe risk.

By not completing any construction activities the environment benefits from not being impacted, however, the environment will suffer in the event that a fire occurs and there is not adequate water supply to fight the fire. Typically environmental impacts due to construction are only temporary and can be mitigated by following sound construction activities.

The water in the tank provides a positive pressure throughout the distribution system, therefore if the tank supply is drained and the hydraulic grade line drops below the pipe elevations in the distribution system a negative pressure will occur. The negative pressure puts the public at risk as contamination can occur through any breech in the piping network.

The resource benefits also have a negative outcome without the expansion of water storage. The expansion would require construction materials and fuel to complete the work, but the losses from such activities would be more than offset by the availability of a greater volume of water. Additional storage would enhance water resources available to the Town for domestic use and fire protection.

The no-action alternative is not recommended for storage capacity.

- ***Storage Alt. #2 (Alt. STO2) – Replace Existing Storage Tank with New 500,000 Gallon Storage Tank***

This alternative explores the option of demolishing the current 300,000 gallon storage tank and replacing it with a new 500,000 gallon storage tank at the same location. The new tank would be constructed adjacent to the current tank, allowing the current tank to remain in operation during construction. The new tank would also be cylindrical and contain an overflow similar to the current tank.

The 500,000 gallon storage capacity of the new tank would meet the domestic and fire pool demands at the end of the 20 year planning period, again under the assumption that a full sprinkler system has been installed in both the North and South Schools.

The new storage tank would be approximately 60 feet in diameter and stand 24 feet high. The tank would be composed of carbon bolted steel with a low profile roof, a drain, a side shell man-way, and anchors. The shell and floor are 3/16” carbon steel with baked powder coating inside and out. Vandalism and trespassing issues that Alberton is currently experiencing will be minimized with an OSHA caged ladder with a roof hatch. The top of the tank would have a railing that extends 5 feet to each side of the ladder for Operator’s fall protection. The tank would also contain an overflow pipe with a down corner and a flap gate.

This alternative would benefit health and safety. Proper security measures will deter trespassers from climbing onto the tank. The larger capacity of water storage available will provide adequate fire protection during peak demand.

Environmental impacts would have an overall positive outcome by meeting peak domestic water demands and providing adequate fire pool to deter fire losses. Construction related impacts such as soil disturbance, air quality, surface water runoff, noise, traffic, and consumption of construction materials can be mitigated by observing sound construction activities. There will be some negative outcomes when demolishing the existing tank, but the materials from the existing tank could be recycled to help mitigate the negative impacts.

Resource benefits for this alternative are mixed due to the fact that the existing tank has not reached its design life. Potable water supply to users would be enhanced providing a more reliable water supply.

This alternative is not recommended. Abandoning and demolishing the existing tank represents an unnecessary waste of structure with remaining life.

- ***Storage Alt. #3 (Alt. STO3) – Construct Additional 200,000 Gallon Storage Tank***

A second storage tank could be added to supplement the existing storage tank. A 200,000 gallon storage tank would be added to the 300,000 gallon tank to provide a total of 500,000 gallons of storage similar to the previous alternative. The new storage tank would be of the same construction as the tank in Alternative #2.

The new storage tank would be approximately 33 feet in diameter and stand 32 feet high. The tank would be composed of carbon bolted steel with a low profile roof, a drain, a side shell man-way, and anchors. The shell and floor are 3/16" carbon steel with baked powder coating inside and out. Vandalism and trespassing issues that Alberton is currently experiencing will be minimized with an OSHA caged ladder with a roof hatch. The top of the tank would have a railing that extends 5 feet to each side of the ladder to add fall protection for the Operator. The tank would also contain an overflow pipe with a down corner and a flap gate.

The new tank would be located adjacent to the existing tank below the spring. Piping for the new tank would be installed to allow isolation from the existing tank. This would allow one of the tanks to be taken offline for maintenance. Once the new tank was constructed and put into service the existing tank should be drained and inspected. Any maintenance required to extend the life of the existing tank should be completed at this time, this would include the recommendation for recoating the exterior and interior of the tank.

This alternative would benefit health and safety. Proper security measures will mitigate trespassers from climbing onto the tank. The larger capacity of water storage available will provide adequate fire protection even during peak demand times. The ability to drain one tank at a time for maintenance will aid in getting the most life out of the tanks.

Environmental impacts would be very similar to the previous alternative by meeting peak domestic water demands and providing adequate fire pool to deter fire losses. Construction related impacts such as soil disturbance, air quality, surface water runoff, noise, traffic, and consumption of construction materials can be mitigated by observing sound construction activities.

Resource benefits for this alternative would be positive by retaining the existing tank. Potable water supply to users would be enhanced providing a more reliable water supply for both domestic use and fire protection.

This alternative is recommended primarily to provide storage for fire flows. It is suggested as a Phase 2 project because the distribution improvements are needed before additional storage becomes of value for fire protection.

5.2.4 Residential Water Meters

- ***Meter Alt. #1 (Alt. M1) – No Action***

In this alternative the existing residential water meters would remain in place and current use would continue. According to the Operator approximately 30 percent of the water meters are not working properly and an additional 20 percent of the meters do not provide automatic readings. The Operator also noted that some of the resident's frost free hydrants are located on the main prior to the water meter.

The people in Alberton are currently paying for their water based on how much they use, monitored by the residential water meters. It is safe to say at least 30 percent of the residents are being over or under charged on a monthly basis because their meters are not properly recording how much water is being used. An additional unknown percentage of customers are getting free water out of their frost free hydrants due to the location of the water meters.

No action results in no change in public health and safety by selecting this alternative.

There would be no environmental impacts with this alternative as there would be no construction activities taking place.

There are negative resource outcomes with this alternative. By not accurately recording how much water is being used by the consumers the Town has no way to measure unaccounted for water to determine if there are leaks within the distribution network. *This alternative is not recommended.*

- ***Meter Alt. #2 (Alt. M2) – Replace Existing Water Meters***

The existing water meters throughout the Town would be replaced in this alternative. While replacing the water meters, the frost free hydrants that are currently on the wrong side of the meter should be re-plumbed to be downstream of the new meters in order to capture all the water being used. Residents should be responsible for the cost of making this change in plumbing. There are approximately 205 existing meters that would need to be replaced.

There are indirect public health and safety benefits by selecting this alternative. Accurate metering will allow the Town to know where and how much water is being used and if any areas are in need of leak repair. Also, disinfection can be better adjusted when accurate use is known.

There would be minimal environmental impacts where the frost free hydrants are re-plumbed to be on the downstream side of the new water meters. The impacts can be mitigated by performing sound construction activities.

The resource benefits would be positive by allowing the Town to monitor unaccounted for water more closely. Alberton will be able to find and fix potential leaks in the distribution system and thereby minimizing water losses.

This alternative is recommended to be included with the distribution system upgrades to properly account for water being used by the Town's residents for accurate billing and to quantify unaccounted for water lost in the water system.

5.2.5 Additional Water Supply

- ***Water Supply Alt. #1 (Alt. WS1) No Action***

The current water supply capacity would not be increased. Just the existing spring and existing well would remain. Existing production rates would remain substandard; neither source alone can meet maximum day demand as is needed to meet current design standards.

This alternative may create negative impacts on public health and welfare. Water shortages could develop, especially during high demand periods (summer) and especially if this occurs if one of the sources goes out of production temporarily. A shortage of water during these high demand times creates an additional safety concern. The fire pool will have been diverted to serve the domestic demands and in the event of an emergency there will not be adequate fire pool available.

Overall the effects of not improving or expanding the water sources for Alberton have a negative impact. The benefits of improving the well and spring and adding an additional water source in the future far outweigh the negative impacts. There would be some costs associated with construction materials and fuels to complete the work, however, these inconveniences would be easily offset by the advances in reliability, public health hazards, and the availability of a larger volume of water.

- ***Water Supply Alt. #2 (Alt. WS2) – Drill Additional Water Well***

This alternative is recommended as a Phase 2 project. An additional water source is needed but is recommended in Phase 2 because it is likely not feasible that the Town can afford all the needed improvements at once. The addition of water supply capacity to supplement the existing spring and well should be pursued by the Town in the near future and construction of a new well is very likely the most economical strategy. Information from the *Water Resources Survey for Mineral and Sanders Counties*, published by the Montana Water Resources Board, states the Clark Fork Valley and larger tributary valleys available groundwater is limited to unconsolidated aquifers. Using the information from the Montana Water Resources Board, the wells location would have to be in close proximity to the existing well on the town-site bench.

In order to maximize yield of the new well there will need to be ample separation from the existing municipal well and any other private wells in the area. Also a new well will need to be separated from any septic systems or any other sources of contamination that were identified in the Wellhead Protection Program, this is critical to aid in the addition of another water source producing good quality water. There is a Town Park approximately 1000 feet to the east of the existing municipal well that would be a great site for the new well. Locating the new well on the Town's property would provide land use control around the wellhead. The new well would likely tie into the mains along Railroad Avenue and Adams Street. Before drilling the new well, a thorough hydro-geologic investigation and test drilling is highly recommended. Previous discussion from Chapter 3 about obtaining a delineation plan for the existing well would also apply to the new well. The delineation plan would have to conform to *Circular PWS-6*.

The goal of the new well should be to supply enough additional water source capacity such that the system can meet the Maximum Day Demands of 346,064 gpd needed now and 381,071 gpd at the end of the planning period with the largest well out of service.

The cost of drilling and fitting the new well to increase the Town's overall water supply capacity would bring the system up to current standards and provide the Town with surplus water for future expansion. However groundwater exploration is currently not precise enough to determine new well yield, but based on the existing supplies they seem quite reasonable.

Once the new well is drilled a new well building would be needed in order to secure all the appurtenant equipment needed. It is anticipated that the new well will utilize a 15-hp submersible turbine pump connected to discharge piping containing a flowmeter, pressure gage, valves, and motor controls. The building would also house a liquid hypochlorite chemical feed system, complete with controls and duplex injection pumps to provide disinfection.

This alternative is important due to the fact that the current water supply capacity is not in line with the current standards. However, it is recommended as a Phase 2 project for two reasons: feasibility of affording the project in conjunction with the other high priority projects; and, the spring which is currently a reliable source, and is anticipated to remain so, can provide the Town's average day demand by itself.

Environmentally, this would also pose as a benefit by promoting adequate water supply with limited environmental impacts. The negative environmental outcomes could be avoided given proper well siting, design, and following sound construction practices.

Provided that the well has an ample yield and the disinfection process is put in place the resource benefits would be positive as more safe potable water would be available for use. There would be limited resources consumed other than what is needed for construction materials and fuel to complete the alternative.

5.3 WATER RIGHTS

Currently, Alberton has water rights for the municipal well of 300 gpm up to 300 acre-feet per year and 50 gpm up to 82 acre-feet per year for the spring.

As discussed in Chapter 3, Section 3.2, the spring supply to the north of the town is Alberton's main source of water. The spring is estimated to produce, at maximum yield, 155 gpm. The production rate of the springs is exceeding the current water right of 50 gpm. On the other hand the current water right for the well is 300 gpm, but the well is only producing 115 gpm. If Alberton wishes to continue using the spring as the main water source, it is recommended that the Town modify and/or pursue additional water rights for the spring.

The changes to the water rights will need to be discussed with the DNRC Water Rights Bureau. One option may be to use a Change in Point of Diversion for the portion of the 300 gpm not being used by the well and appropriating the remaining 105 gpm to the springs. The rights for the well could safely be reduced closer to the 115 gpm well yield. The Town is installing flow meters on both of the water sources which will allow measurement and documentation of the actual usage. The collected data can be used to demonstrate how much water is being used to obtain appropriate water rights, among other important uses.

Other than change in point of use, obtaining additional water rights do not appear necessary during recommended Phase 1 projects. If a new well is constructed in Phase 2, an additional water right or adjustment to the point of use may be necessary.

5.4 SUMMARY OF ALTERNATIVES

The viable alternatives to correct each of the deficiencies cited in the Alberton water system are summarized below.

Spring Improvements:

- Alt. #SP1 – No Action (Not Recommended)
- Alt. #SP2 – Rehabilitate Spring (see **Figure 5.1**) *(Recommended Phase 1)*

Distribution: (see Figure 5.1)

- Alt. #D1 – No Action
- Alt. #D2 – Upsize Mains *(Recommended Phase 1)*
- Alt. #D3 – Loop Mains *(Recommended Phase 1)*
- Alt. #D4 – Replace 2-Inch Mains North of Railroad Avenue *(Recommended Phase 1)*
- Alt. #D5 – Install Central Pressure Reducing Valve Station for South End of River Street *(Recommended Phase 1)*
- Alt. #D6 – Install Individual Pressure Reducing Valve Station in South River Street Residences

Storage Capacity:

- Alt. #STO1 – No Action
- Alt. #STO2 – Replace Existing Storage Tank with New 500,000 Gallon Tank
- Alt. #STO3 – (see **Figure 5.2**) Construct Additional 200,000 Gallon Storage Tank *(Recommended Phase 2)*

Residential Water Meters:

- Alt. #M1 – No Action
- Alt. #M2 – Replace Existing Water Meters *(Recommended Phase 1)*

Additional Water Supply:

- Alt. #WS1 – Drill Additional Water Well (see **Figure 5.2)** *(Recommended Phase 2)*

5.5 ESTIMATED COSTS

The following tables show a breakdown of the estimated costs for the alternatives that are being recommended for further consideration.

DISTRIBUTION SYSTEM, SPRING REHABILITATION and WATER METERS

TABLE 5.1
Alberton
Alternatives D1 through D5, SP2 and M2

Recommended Phase 1: Upgrade Distribution System & Rehabilitate Spring

Recommended Improvements

Capital Costs	Unit	Quantity	Unit Cost	Capital Cost
ITEM				
Mobilization, Bonding & Insurance	LS	$1,357,135	10%	$135,714
Upsize Mains				
10" C-900 PVC	LF	4,475	$68	$304,300
12" C-900 PVC	LF	1,000	$74	$74,000
Valves, Pipe Connections	EA	6	*$3,100*	$18,600
Hydrants	EA	4	*$5,210*	$20,840
Loop Mains				
6" C-900 PVC	LF	2,500	$53	$132,500
8" C-900 PVC	LF	2,950	$60	$177,000
Valves, Pipe Connections	EA	8	$3,100	$24,800
Hydrants	EA	6	$5,210	$31,260
Replace 2" Mains North of Railroad Avenue				
6" C-900 PVC	LF	4,415	$40	$176,600
Valves, Pipe Connections	EA	6	$3,100	$18,600
Hydrants	EA	6	$5,210	$31,260
PRVs				
New Pressure Reducing Valve Station	LS	1	$16,800	$16,800
Water Meters				
New Residential Water Meters	EA	205	$515	$105,575
Service Line Connections				
Reconnect Service Lines	EA	100	$1,500	$150,000
Rehabilitate Spring				
New Main Collection Box and Clean Laterals	EA	1	$75,000	$75,000
Total Estimated Construction Cost:				**$1,357,135**
Contingency:	15%			**$203,570**
Engineering:	20%			**$271,427**
Legal, Bonding, Administration, DEQ Fees:	7%			**$94,999**
TOTAL ESTIMATED PROJECT COST:				**$1,927,132**

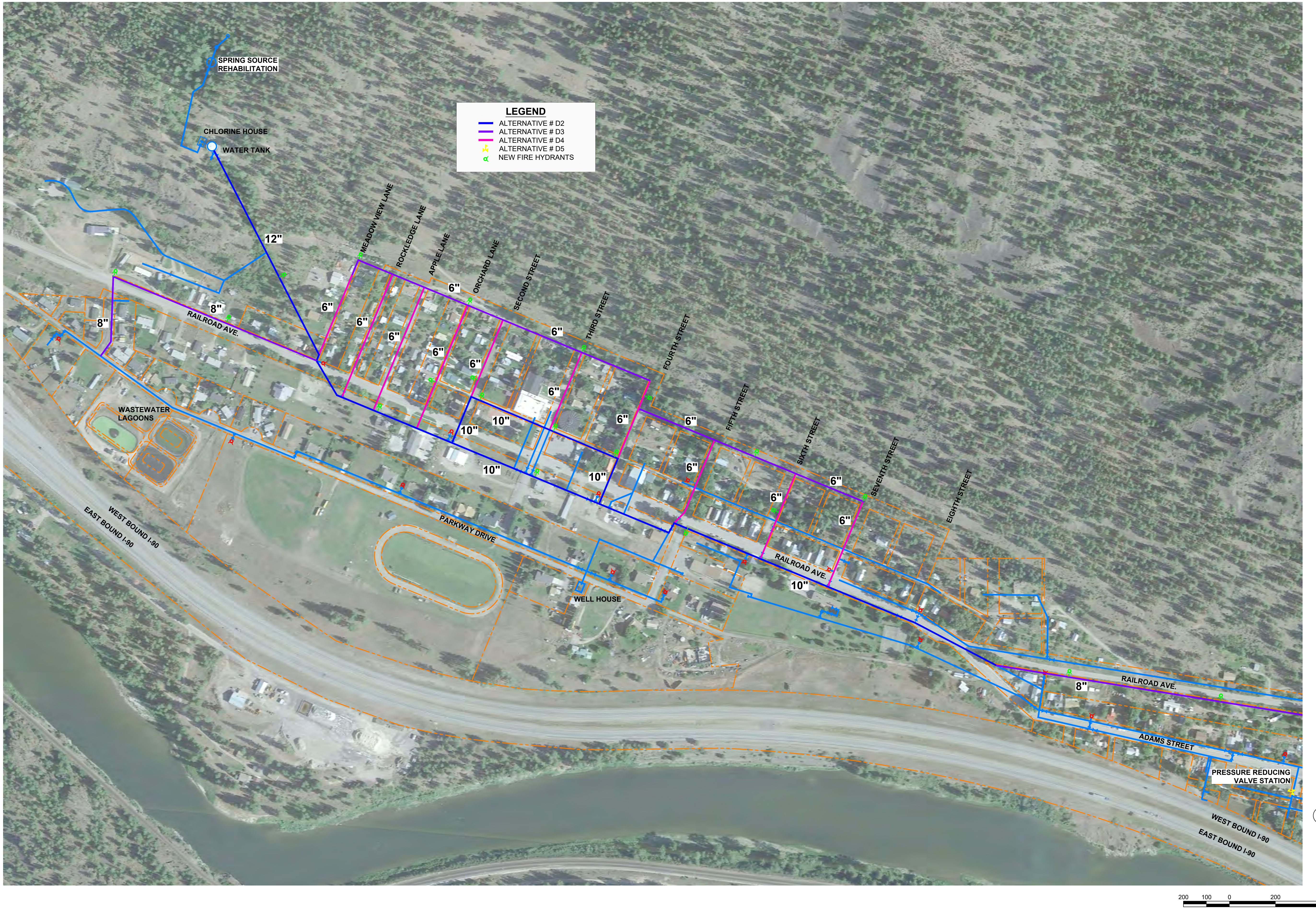
STORAGE IMPROVEMENTS

TABLE 5.2 Alberton Alternative STO3				
Recommended Phase 2: Upgrade Storage Volume				
Recommended Improvements				
Capital Costs	**Unit**	**Quantity**	**Unit Cost**	**Capital Cost**
ITEM				
Mobilization & Bonds	LS	$715,000	12%	$85,800
Storage Tank				
New 200,000 Gallon Tank	LS	1	$510,000	$510,000
Site Work	LS	1	$74,000	$74,000
Telemetry & Controls	LS	1	$21,000	$21,000
Piping, Appurtenances	LS	1	$110,000	$110,000
Total Estimated Construction Cost:				**$800,800**
Contingency:	15%			**$120,120**
Engineering:	20%			**$160,160**
Legal, Bonding, Admin, DEQ Fees:	7%			**$56,056**
TOTAL ESTIMATED PROJECT COST:				**$1,137,136**

WATER SUPPLY IMPROVEMENTS

TABLE 5.3 Alberton Alternative WS2				
Recommended Phase 2: Upgrade Existing Water Sources				
Recommended Improvements				
Capital Costs	**Unit**	**Quantity**	**Unit Cost**	**Capital Cost**
ITEM				
Mobilization & Bonds	LS	$279,000	10%	$27,900
Improve Water Sources				
Rehabilitate Existing Well	LS	1	$20,000	$20,000
Drill Additional Well	VF	200	$190	$38,000
Water Rights Filing	LS	1	$18,500	$18,500
Pump, Motor, Drop Pipe	LS	1	$31,000	$31,000
Pump Testing, Documentation	LS	1	$18,000	$18,000
Telemetry & Controls	LS	1	$28,500	$28,500
Pump House, Disinfection, Piping	LS	1	$125,000	$125,000
Total Estimated Construction Cost:				**$306,900**
Contingency:	15%			**$46,035**
Engineering:	20%			**$61,380**
Legal, Bonding, Administration, DEQ Fees:	7%			**$21,483**
TOTAL ESTIMATED PROJECT COST:				**$435,798**

Chapter 6 will further evaluate and recommend an alternative for improvements to the Alberton public water system.



Revision	Date	By
Draft	5-1-20	MG
Final	5-26-20	MG

Revision: Draft
Plot Scale: 1:2
Drawn By: A.Eckhart, P.E.
Approved By
Checked By
Designed By

Engineer

Anderson~Montgomery
CONSULTING ENGINEERS
1064 N. Warren
Helena, Mt 59601
Phone (406) 449-3303
Fax (406) 449-3304

Owner: Town of Alberton

Project Title: Water System PER 2020

Sheet Title: Distribution System Alternatives

Sheet: **Fig. 5.1**

X:\ALBERTON 2020\PER 2020\DRAWINGS\Alberton PER Figures.dwg SAVED: 5/26/20 PRINTED: 5/26/20 BY: ADAM

X:\ALBERTON 2020\PER 2020\DRAWINGS\Alberton PER Figures.dwg SAVED: 5/26/20 PRINTED: 5/26/20 BY: ADAM

Revision	Date	By
Draft	5-1-20	MG
Final	5-26-20	MG

Revision: Draft
Plot Scale: 1:2
Drawn By: A.Eckhart, P.E.
Approved By:
Checked By:
Designed By:

Engineer

Anderson~Montgomery
CONSULTING ENGINEERS
1064 N. Warren
Helena, Mt 59601
Phone (406) 449-3303
Fax (406) 449-3304

Owner: Town of Alberton

Project Title: Water System PER 2020

Sheet Title: Source and Storage Alternatives

Sheet: **Fig. 5.2**

CHAPTER 6

SELECTION OF AN ALTERNATIVE

CHAPTER 6 SELECTION OF ALTERNATIVE

INTRODUCTION

This engineering report identifies needed water system improvements and recommended solutions. This chapter will assess the present worth of the alternatives. The proposed project and final recommendations as well as methods for funding the proposed project are presented in **Chapter 7**.

The water system is operated by the Town of Alberton. FY 2021 annual water fund revenue budgeted is $56,300 and total water fund expenses budgeted is $40,700.

The alternatives evaluated in this Chapter include: upgrading the drinking water distribution system, rehabilitating the existing spring, expanding water storage capacity and expanding water supply capacity. These 4 alternatives for improving and securing Alberton's drinking water supply were developed in **Chapter 5** and are summarized below. A net present value cost analysis of the recommended phases is presented as well as a non-monetary cost discussion.

The no-action alternatives are not considered further because they will not solve the deficiencies in the existing water system. However, the alternatives are being considered for a phased approach and therefore actions for a specific alternative may be recommended to be postponed until previous phases are completed. A phased approach is being considered because the Alberton water system has needs throughout all parts of its infrastructure and tackling all the needs at once may not be feasible.

6.1 ALTERNATIVES EVALUATED

6.1.1 DISTRIBUTION SYSTEM

- ***Distribution Alternative D2 – Upsize Mains***

The existing 8-inch cast iron transmission main from the tank would be replaced with new 12-inch PVC, the 6-inch cast iron main down Railroad Avenue from Meadow View Lane to Seventh Street would be replaced with new 10-inch PVC, new 8-inch PVC would replace the 6-inch asbestos cement (abandoned in place) along Railroad Avenue from Seventh Street to the junction of Adams Street, the existing 2-inch galvanized lines around the North and South Schools and the Gymnasium would be replaced by new 10-inch PVC, and a new 8-inch line would be installed to allow the Railroad Avenue main to run the fire hydrant in the park. Fire hydrants would be added along all new mains in order to meet the specified Hydrant Spacing requirements lined out in the Uniform Fire Code.

This option would provide sufficient fire flows down Railroad Avenue through the Business District, for the Gymnasium, and for the North and South Schools drastically improving public safety. The upsized mains would improve flow delivery and fire protection throughout the core of the distribution system, allowing flow delivery to improve even during peak demands. The sufficient fire flows for the school buildings directly benefits the safety of the occupants.

Environmental effects are both positive and negative in nature, but the overall outcome would be positive. Significant construction disruption would occur with the excavation and installation of the new mains. Installation of the mains around the Schools should be scheduled during the summer while school is not in session as to avoid any disturbances. Impacts to traffic, business and residential access would result. Temporary noise and air (dust) pollution will occur as a result of construction activities. However, many of the negative outcomes due to construction activities can be mitigated by observing sound construction practices such as traffic flagging, watering for dust control, etc. Overall the enhanced fire protection outweighs any negative results from selecting this alternative.

Resource benefits would also result from this alternative. Improved water delivery and fire protection promote resource conservation. Resource utilization of construction materials and fuels will be necessary to complete the alternative.

- ***Distribution Alternative D3 – Loop Mains***

The dead end line on the east end of Adams Street would be looped with a new 8-inch PVC main running through the existing sewer main corridor and down Railroad Avenue to near the junction with Adams Street. A new 8-inch main would be installed along the west end of Railroad Avenue to Parkway Drive and the Clark Fork Heights Subdivision. The dead end mains north of Railroad Avenue would be tied together at their north ends with new 6-inch PVC. The majority of the mains north of Railroad Avenue are composed of 2-inch galvanized steel pipe, this alternative would not include upsizing the mains. Fire hydrants would be added along all new mains in order to meet the specified Hydrant Spacing requirements lined out in the *Uniform Fire Code*.

Health and safety benefits are significant with this alternative. The potential health risks from water stagnation and chlorine residual buildup will be removed by looping the mains. The water quality delivered to the residents will be higher and more consistent in nature. Fire protection will also be improved with the introduction of looping, although still limited by the size of the mains.

Temporary environmental impacts would be moderate during construction, primarily associated with excavation and traffic disruption. Many of the construction impacts can be mitigated by observing sound construction practices. Better water circulation and quality will generally mitigate any negative outcomes of this alternative.

Improved water delivery and quality outweigh any resource consumption in the form of construction materials and fuel.

- ***Distribution Alternative D4 – Replace 2-inch Mains North of Railroad Avenue***

The 2-inch laterals north of Railroad Avenue (mentioned in the previous alternative) would be replaced with new 6-inch PVC mains. Additional fire hydrants would be added along the new 6-inch mains (typically mid-block) in order to meet the specified Hydrant Spacing requirements lined out in the *Uniform Fire Code.* This alternative closely relates to the previous one where looping is occurring in the same area of Town, both of these alternatives could conceivably be completed simultaneously barring financial support.

The completion of this alternative along with the previously mentioned alternatives would correct the remaining health and safety problems on the north side of the Town associated with undersized mains and fire flow restrictions.

This alternative overall would have a positive outcome environmentally with water delivery improvements offsetting construction activities. Again the construction activities can be mitigated by observing sound construction practices.

Resource benefits are also a positive outcome due to the readily available water for domestic use and fire protection.

- ***Distribution Alternative D5 – Install Central Pressure Reducing Valve Station for South End of River Street***

Due to the natural terrain in Alberton, the further south you go within the distribution system the static pressures get higher. On the south end on River Street beyond Adams Street the users experience static pressures around 105 psi, which is well above the recommended static pressure of 75 psi. These high pressures stress residential plumbing and use far more water, since more water flows from open taps due to the high pressure. Installing a central pressure reducing valve (PRV) in a vault station located on the 6-inch main along River Street would control the high pressures.

The vault station would be constructed out of concrete located on top of the existing main. The vault would contain multiple valves to handle high and low flows as well as providing redundancy. A PRV will still allow proper fire flows by recognizing a large pressure drop, in the event of a fire hydrant being opened, and fully opening the valve. During normal operation the valve will open and close partially to maintain the desired operating pressure downstream from the valve.

A PRV station will provide modest health and safety benefits. Risk of pipe breakage and failure is reduced significantly by lowering the static pressure. Reliability of water service improves for the whole distribution system, because a break in the main caused by excessive pressures would be felt throughout the system until the break was fixed.

Environmental impacts of this alternative are again positive by mitigating negative construction outcomes by practicing sound construction.

Conserving water would be a resource benefit and this will be accomplished by lowering the waste of water coming through the tap.

The Distribution System Improvements outlined in Alternatives #2 through #5 are all recommended for construction as a high priority. The work is needed primarily to *improve hydraulic capacity for fire protection and public health protection. Looping of lines will improve hydraulics, reduce stagnation of water and improve consistency in chlorine residual throughout the system.. A secondary benefit of the distribution work would be to reduce leakage, a suspected problem with the existing mains*.

Potential Construction Issues – *replacing some of the 4-inch to 8-inch mains will require the disturbance of a small amount of asbestos-cement (AC) pipe. This material has special handling requirements. First, the lengths of AC pipe will be abandoned in place. However, small amounts where crossings occur will have to be cut out and properly disposed of in compliance with existing regulations. These activities require special construction methods in order to protect workers health and safety under the Occupational Safety and Health Act (OSHA); and the environment, under several regulations including National Emission Standards for Hazardous Air Pollutants (NESHAPS) and the DEQ Asbestos Control Program. The extra costs of this work have been accounted for in the cost estimates for the distribution work.*

- ***Meter Alternative M2 – Replace Existing Water Meters***

The existing water meters throughout the Town would be replaced in this alternative. While replacing the water meters, the frost free hydrants that are currently on the wrong side of the meter should be re-plumbed to be downstream of the new meters in order to capture all the water being used. Residents should be responsible for the cost of making this change in plumbing. There are approximately 205 existing meters that would need to be replaced.

There are indirect public health and safety benefits by selecting this alternative. Accurate metering will allow the Town to know where and how much water is being used and if any areas are in need of leak repair. Also, disinfection can be better adjusted when accurate use is known.

There would be minimal environmental impacts where the frost free hydrants are re-plumbed to be on the downstream side of the new water meters. The impacts can be mitigated by performing sound construction activities.

The resource benefits would be positive by allowing the Town to monitor unaccounted for water more closely. Alberton will be able to find and fix potential leaks in the distribution system and thereby minimizing water losses.

This alternative is recommended to be included with the distribution system upgrades to properly account for water being used by the Town's residents for accurate billing and to quantify unaccounted for water lost in the water system.

6.1.2 Spring Rehabilitation

- ***Spring Alternative SP2 – Rehabilitate Spring***

Retain and improve the existing spring. This alternative recommends several upgrades to the spring supply, all aimed at sustaining water quality and improving yield. In order to protect the spring collection manholes from trespassers and animals, the entire area surrounding the collection manholes should be contained with an 8 foot wildlife fence, signing, and a locked gate. Debris and brush surrounding the collection manholes should be evaluated for thinning to create a workable area for the Operator while maintaining sufficient vegetation for erosion protection. The ground around the collection system could be graded to provide positive surface drainage and aid in the reduction of surface water influence. Influent and effluent pipe penetrations within the collection manholes would be sealed and rehabilitated. All pipes leaving the lower collection manhole other than the transmission main and overflow pipe shall be removed and sealed off. The addition of a concrete floor in the collection manholes would help reduce potential contamination hazards.

The existing metal lids on the collection manholes are currently only secured by two padlocks. Retrofitting the lids to have hinges, gaskets, and screened air vents would be beneficial to both the Operator and the Town.

The reservoir closest to the lower collection manhole would be cleaned and inspected for connections to the existing water system. Any connections to the water system that were identified during the inspection other than the overflow pipe from the lower collection manhole shall be removed and sealed. The reservoir would be used as a way to replenish the spring when the spring water is being diverted from the storage tank.

In an attempt to deter trespassing or vandalism and aid the Operator in future maintenance and testing, permanent 110/220-volt single phase power would be installed at the site from the existing three-phase power pole nearby. The new service pole would be by the lower collection manhole and contain a security light and motion-alert system.

This alternative would benefit public health protection. The current risks of source contamination would be drastically reduced. The fence would prevent unauthorized persons and wildlife from accessing the collection system. The likelihood of surface water contaminating the source would be effectively mitigated. With the addition of the rubber gasket seals, insects and rodents would be excluded from the water supply. The life span of the springs would be significantly lengthened, resulting in a positive public economic benefit.

Removing all the debris from the reservoir will allow the diverted water to be directed into the reservoir to replenish the source, extending the life of the springs. Removing the abandoned piping from the reservoir other than the overflow pipe from the lower collection manhole will ensure that the reservoir is isolated from the water system promoting public health and safety.

This alternative generally has positive overall effects on the environment and natural resources. The environmental consequences of continued use of the spring are considered a neutral effect with respect to surface water resources. Abandoning the spring would not likely restore any lost surface water, and without the spring additional groundwater resources would need to be developed.

Overall the effects of rehabilitating the spring for Alberton have a positive impact. The benefits of improving the spring water sources far outweigh the negative impacts created due to construction activities. There would be some costs associated with construction materials and fuels to complete the work, however, these inconveniences would be easily offset by the advances in reliability, public health hazards, and the availability of a larger volume of water. Any negative impacts from disposing the debris in the reservoir can be eliminated by using a designated landfill as a repository.

This alternative is recommended as a high priority for the town of Alberton. The operator could complete some of the work items as time permits, including cleaning out the recharge reservoir. Since the water supply capacity has been identified as substandard, rehabilitation of the spring should be considered for a Phase 1 project and will be evaluated for cost purposes that way. Rehabilitating the spring to include a new main collection box and cleaning of the main laterals should result in increased source capacity, and would improve longevity and reliability of the spring.

Alternatives to upgrade the distribution system and rehabilitate the existing spring are D2-D5 and SP2. The life cycle cost analysis for these alternatives is shown below in **Table 6.1:**

Table 6.1 Cost Analysis
Alberton 2020
Distribution & Spring Rehabilitation & Water Meters
Alternatives D2 - D5, SP2 & M2

	Current	D2-D5,SP2 & M2
Capital Cost of Alternatives	$0	$1,927,132
O&M Costs		
Legal	500	500
Salaries & Wages etc	18,500	18,500
Employer Contributions	1,200	1,200
Office Supplies & Materials	1,500	1,500
Operating Supplies	7,500	7,500
Purchased Services	19,800	19,800
Repair and Maintenance	1,800	1,800
Elec. Utilities	5,500	5,500
Water Purification & Treatment	2,000	2,000
Total O&M Costs/YR	$58,300	$58,300
Present Worth of O&M Costs	$908,848	$908,848
Salvage Value @ 20yr	$182,320	$364,641
PW of Salvage Value	$111,265	$222,530
Net Present Value	$797,583	$2,613,450

6.1.3 Additional Storage

- ***Storage Alternative STO3 – Construct Additional 200,000 Gallon Storage Tank***

A second storage tank could be added to supplement the existing storage tank. A 200,000 gallon storage tank would be added to the 300,000 gallon tank to provide a total of 500,000 gallons of storage similar to the previous alternative. The new storage tank would be of the same construction as the tank in Alternative #2.

The new storage tank would be approximately 33 feet in diameter and stand 32 feet high. The tank would be composed of carbon bolted steel with a low profile roof, a drain, a side shell man-way, and anchors. The shell and floor are 3/16" carbon steel with baked powder coating inside and out. Vandalism and trespassing issues that Alberton is currently experiencing will be minimized with an OSHA caged ladder with a roof hatch. The top of the tank would have a railing that extends 5 feet to each side of the ladder to add fall protection for the Operator. The tank would also contain an overflow pipe with a down corner and a flap gate.

The new tank would be located adjacent to the existing tank below the spring. Piping for the new tank would be installed to allow isolation from the existing tank. This would allow one of the tanks to be taken offline for maintenance. Once the new tank was constructed and put into service the existing tank should be drained and inspected. Any maintenance required to extend the life of the existing tank should be completed at this time, this would include the recommendation for recoating the exterior and interior of the tank.

This alternative would benefit health and safety. Proper security measures will mitigate trespassers from climbing onto the tank. The larger capacity of water storage available will provide adequate fire protection even during peak demand times. The ability to drain one tank at a time for maintenance will aid in getting the most life out of the tanks.

Environmental impacts would be very similar to the previous alternative by meeting peak domestic water demands and providing adequate fire pool to deter fire losses. Construction related impacts such as soil disturbance, air quality, surface water runoff, noise, traffic, and consumption of construction materials can be mitigated by observing sound construction activities.

Resource benefits for this alternative would be positive by retaining the existing tank. Potable water supply to users would be enhanced providing a more reliable water supply for both domestic use and fire protection.

This alternative is recommended primarily to provide storage for fire flows. It is suggested as a Phase 2 project because the distribution improvements are needed before additional storage becomes of value for fire protection.

Alternative STO3 would increase storage capacity by constructing an additional 200,000 gallon steel storage tank. The life cycle cost analysis for this alternative is shown below in **Table 6.2**:

Table 6.2 Cost Analysis
Alberton 2020
200,000 Gallon Storage Tank (Alternative STO3)

	Current	STO3
Capital Cost of Alt. ST03	$0	$1,137,136
O&M Costs		
Legal	500	500
Salaries & Wages etc	18,500	18,500
Employer Contributions	1,200	1,200
Office Supplies & Materials	1,500	1,500
Operating Supplies	7,500	7,750
Purchased Services	19,800	20,000
Repair and Maintenance	1,800	2,000
Elec. Utilities	5,500	5,750
Water Purification. & Treatment	2,000	2,100
Total O&M Costs/YR	$58,300	$59,300
Present Worth of O&M Costs	$908,848	$924,437
Salvage Value @ 20yr	$42,500	$168,900
PW of Salvage Value	$25,937	$173,317
Net Present Value	$882,911	$1,888,256

6.1.4 Additional Water Supply

- ***Water Supply Alternative WS2 – Drill Additional Water Well***

This alternative is recommended as a Phase 2 project. An additional water source is needed but is recommended in Phase 2 because it is likely not feasible that the Town can afford all the needed improvements at once. The addition of water supply capacity to supplement the existing spring and well should be pursued by the Town in the near future and construction of a new well is very likely the most economical strategy. Information from the *Water Resources Survey for Mineral and Sanders Counties*, published by the Montana Water Resources Board, states the Clark Fork Valley and larger tributary valleys available groundwater is limited to unconsolidated aquifers. Using the information from the Montana Water Resources Board, the wells location would have to be in close proximity to the existing well on the town-site bench.

In order to maximize yield of the new well there will need to be ample separation from the existing municipal well and any other private wells in the area. Also a new well will need to be separated from any septic systems or any other sources of contamination that were identified in the Wellhead Protection Program, this is critical to aid in the addition of another water source producing good quality water. There is a Town Park approximately 1000 feet to the east of the existing municipal well that would be a great site for the new well. Locating the new well on the Town's property would provide land use control around the wellhead. The new well would likely tie into the mains along Railroad Avenue and Adams Street. Before drilling the new well, a thorough hydro-geologic investigation and test drilling is highly recommended. Previous discussion from Chapter 3 about obtaining a delineation plan for the existing well would also apply to the new well. The delineation plan would have to conform to *Circular PWS-6*.

The goal of the new well should be to supply enough additional water source capacity such that the system can meet the Maximum Day Demands of 346,064 gpd needed now and 381,071 gpd at the end of the planning period with the largest well out of service.

The cost of drilling and fitting the new well to increase the Town's overall water supply capacity would bring the system up to current standards and provide the Town with surplus water for future expansion. However groundwater exploration is currently not precise enough to determine new well yield, but based on the existing supplies they seem quite reasonable.

Once the new well is drilled a new well building would be needed in order to secure all the appurtenant equipment needed. It is anticipated that the new well will utilize a 15-hp submersible turbine pump connected to discharge piping containing a flowmeter, pressure gage, valves, and motor controls. The building would also house a liquid hypochlorite chemical feed system, complete with controls and duplex injection pumps to provide disinfection.

This alternative is important due to the fact that the current water supply capacity is not in line with the current standards. However, it is recommended as a Phase 2 project for two reasons: feasibility of affording the project in conjunction with the other high priority projects; and, the spring, which is currently a reliable source and is anticipated to remain so, can provide the Town's average day demand by itself.

Environmentally, this would also pose as a benefit by promoting adequate water supply with limited environmental impacts. The negative environmental outcomes could be avoided given proper well siting, design, and following sound construction practices.

Provided that the well has an ample yield and the disinfection process is put in place the resource benefits would be positive as more safe potable water would be available for use. There would be limited resources consumed other than what is needed for construction materials and fuel to complete the alternative.

Alternative WS2 would expand the water supply capacity by drilling and constructing an additional well and well house and disinfection and telemetry equipment. The alternative includes costs for minor rehabilitation of the existing well to the extent that would be necessary. The life cycle cost analysis for these alternatives is shown below in **Table 6.3**:

Table 6.3 Cost Analysis Alberton 2020 Expand Water Supply (Alternative WS2)		
	Current	WS2
Capital Cost of Alternative	$0	$432,798
O&M Costs		
Legal	500	500
Salaries & Wages etc	18,500	18,500
Employer Contributions	1,200	1,200
Office Supplies & Materials	1,500	1,500
Operating Supplies	7,500	7,800
Purchased Services	19,800	19,800
Repair and Maintenance	1,800	1,900
Elec. Utilities	5,500	6,500
Water Purification. & Treatment	2,000	2,100
Total O&M Costs/YR	$58,300	$59,800
Present Worth of O&M Costs	$908,848	$932,232
Salvage Value @ 20yr	$0	$79,825
PW of Salvage Value	$0	$48,715
Net Present Value	$908,848	$1,316,315

6.2 Non-Monetary Factors

All the remaining alternatives are needed for the Town of Alberton. Briefly recapping the needs:

- The distribution system has undersized pipes and dead-ends that limit delivery of adequate quantities of water and endangers public health.
- Storage capacity does not meet current standards and does not provide adequate volume for fire protection
- Water Source capacity does not meet current design standards and limits reliability of the supply in the event of failure of one of the two sources.

Because of deficiencies in all three major elements of the water system (source, storage, and distribution) the Town is presented with a challenge to its drinking water infrastructure.

All the improvement alternatives being considered are within the existing developed footprint of the Town, so environmental impacts are not significant for any of the alternatives. Population growth within the system is moderate with no major changes in growth patterns predicted. This should allow the recommended project to qualify for a categorical exclusion (CatEx) subject to agency concurrence. Or, if not a CatEx, a finding of no-significant impact may result. See the environmental checklist in **Appendix E**.

6.3 Conclusions

A phased approach is recommended to solve the deficiencies in the water system. This phased approach could occur in 2 or 3 phases. For this report, the approach is to recommend a Phase 1 project and treat the 2 remaining projects as a Phase 2 project. It must be noted that the Phase 2 project could be further broken down into a Phase 2 and a Phase 3.

The distribution system has the most deficient infrastructure and therefore is considered for Phase 1 improvements. The spring rehabilitation is recommended also with the Phase 1 improvements because the spring is the main water source for the Town, it may improve the capacity of the spring moderately, and it should provide enhanced public health protection.

Finally, increasing storage capacity and source capacity to accord better with current design standards and provide greater reliability of the system are recommended for future consideration in Phase 2.

The proposed project and future considerations are presented in **Chapter 7**.

CHAPTER 7

PROPOSED PROJECT

Chapter 7 Proposed Project

7.1 Preliminary Project Design

7.1.1 Introduction

Chapter 6 evaluated the alternatives considering costs, non-monetary factors, and regulatory concerns. In this chapter, the proposed project and preliminary design concerns are presented. Also the financial impacts of the proposed water improvement project and methods to finance the improvements are evaluated and presented. A proposed project budget is provided. Project sustainability is also considered in this section.

Town of Alberton has the necessary legal authority and financial capability to operate its existing drinking water system and construct improvements to that system. The Town officials recognize the need to upgrade the water system according to the needs identified in this Preliminary Engineering Report. The PER identified needed water system upgrades and developed and evaluated cost and non-monetary concerns for alternatives to address those needs, culminating in recommendations in this chapter. A proposed Phase 1 project is the result. Recommendations for a future Phase 2 are also summarized.

The recommended Phase 1 project includes improvements to the spring source and the distribution system. Phase 1 project elements are summarized below and they are drawn from the detailed descriptions of the **alternatives** number **D2 through D5**, **SP2** and **M2** developed and evaluated in **Chapter 5** and **Chapter 6**.

7.1.2 Water Supply (Alternative SP2)

The proposed Phase 1 project includes rehabilitating the existing spring to increase protection and security of the source and provide for increased reliability and public health protection. Spring collection boxes and inflow and outflow pipes will be upgraded; the old concrete spring box will be cleaned out and utilized for overflow from the main collection box; and the area around the spring fenced off for security and to exclude wildlife. Some clearing of vegetation, shrubs, and trees is recommended to ease access for the water operator. However, vegetation should be selectively cleared while giving consideration to maintaining as much as possible to prevent erosion and maintain soil stability in the area.

This alternative recommends several upgrades to the spring supply, all aimed at sustaining water quality and improving yield. In order to protect the spring collection manholes from trespassers and animals, the entire area surrounding the collection manholes should be contained with an 8 foot wildlife fence, signing, and a locked gate. Debris and brush surrounding the collection manholes should be evaluated for thinning to create a workable area for the Operator while maintaining sufficient vegetation for erosion protection. The ground around the collection system could be graded to provide positive surface drainage and aid in the reduction of surface water influence. Influent and effluent pipe penetrations within the collection manholes would be sealed and rehabilitated. All pipes leaving the lower collection manhole other than the transmission main and overflow pipe shall be removed and sealed off. The addition of a concrete floor in the collection manholes would help reduce potential contamination hazards.

The existing metal lids on the collection manholes are currently only secured by two padlocks. Retrofitting the lids to have hinges, gaskets, and screened air vents would be beneficial to both the Operator and the Town.

The reservoir closest to the lower collection manhole would be cleaned and inspected for connections to the existing water system. Any connections to the water system that were identified during the inspection other than the overflow pipe from the lower collection manhole shall be removed and sealed. The reservoir would be used as a way to replenish the spring when the spring water is being diverted from the storage tank.

In an attempt to deter trespassing or vandalism and aid the Operator in future maintenance and testing, permanent 110/220-volt single phase power would be installed at the site from the existing three-phase power pole nearby. The new service pole would be by the lower collection manhole and contain a security light and motion-alert system.

7.1.3 Distribution (Alternatives D2 though D5)

The bulk of the proposed Phase 1 project consists of distribution system upgrades to correct deficiencies in pipe sizes and lack of looping of water mains to provide adequate flows for domestic consumption and fire protection purposes. One part of the distribution system has excessive pressures and this would be corrected by the installation of a pressure reducing station. Aged iron pipes and asbestos cement pipes in the distribution system would be replaced and upsized to meet current design standards. Deficient fire hydrant spacing will be addressed. Installing pipes to create looping in the system will eliminate dead-ends and stagnant water thereby allowing for a more consistent disinfectant residual and increased public health protection.

- **Alternative D2 – Upsize Mains**

The existing 8-inch cast iron transmission main from the tank would be replaced with new 12-inch PVC, the 6-inch cast iron main down Railroad Avenue from Meadow View Lane to Seventh Street would be replaced with new 10-inch PVC, new 8-inch PVC would replace the 6-inch asbestos cement (abandoned in place) along Railroad Avenue from Seventh Street to the junction of Adams Street, the existing 2-inch galvanized lines around the North and South Schools and the Gymnasium would be replaced by new 10-inch PVC, and a new 8-inch line would be installed to allow the Railroad Avenue main to run the fire hydrant in the park. Fire hydrants would be added along all new mains in order to meet the specified Hydrant Spacing requirements lined out in the Uniform Fire Code.

- **Alternative D3 – Loop Mains**

  The dead end line on the east end of Adams Street would be looped with a new 8-inch PVC main running through the existing sewer main corridor and down Railroad Avenue to near the junction with Adams Street. A new 8-inch main would be installed along the west end of Railroad Avenue to Parkway Drive and the Clark Fork Heights Subdivision. The dead end mains north of Railroad Avenue would be tied together at their north ends with new 6-inch PVC. The majority of the mains north of Railroad Avenue are composed of 2-inch galvanized steel pipe, this alternative would not include upsizing the mains. Fire hydrants would be added along all new mains in order to meet the specified Hydrant Spacing requirements lined out in the Uniform Fire Code.

- **Alternative D4 – Replace 2-inch Mains North of Railroad Avenue**

  The 2-inch laterals north of Railroad Avenue (mentioned in the previous alternative) would be replaced with new 6-inch PVC mains. Additional fire hydrants would be added along the new 6-inch mains (typically mid-block) in order to meet the specified Hydrant Spacing requirements lined out in the Uniform Fire Code. This alternative closely relates to the previous one where looping is occurring in the same area of Town, both of these alternatives could conceivably be completed simultaneously barring financial support.

- **Alternative D5 – Install Central Pressure Reducing Valve Station for South End of River Street**

  Due to the natural terrain in Alberton, the further south you go within the distribution system the static pressures get higher. On the south end on River Street beyond Adams Street the users experience static pressures around 105 psi, which is well above the recommended static pressure of 75 psi. These high pressures stress residential plumbing and use far more water, since more water flows from open taps due to the high pressure. Installing a central pressure reducing valve (PRV) in a vault station located on the 6-inch main along River Street would control the high pressures.

  The vault station would be constructed out of concrete located on top of the existing main. The vault would contain multiple valves to handle high and low flows as well as providing redundancy. A PRV will still allow proper fire flows by recognizing a large pressure drop, in the event of a fire hydrant being opened, and fully opening the valve. During normal operation the valve will open and close partially to maintain the desired operating pressure downstream from the valve.

- **Alternative M2 – Replace Existing Water Meters**

  The existing water meters throughout the Town would be replaced in this alternative. While replacing the water meters, the frost free hydrants that are currently on the wrong side of the meter would be re-plumbed to be downstream of the new meters in order to capture all the water being used. Residents should be responsible for the cost of making this change in plumbing. There are approximately 205 existing meters that would need to be replaced.

7.2 PROJECT SCHEDULE

The following schedule provides an estimated timeframe for the proposed improvements and would be able to be implemented if funding is secured for the project.

Table 7.1
Project Schedule Alberton Phase 1

Task	Completion Date
Complete PER	APR 2020
Submit PER & Applications to funding Agencies	MAY/JUN 2020
Begin Final Design (Local Funding)	SEP 2021
Submit Design Plans to DEQ	MAY 2022
TSEP & RRGL Funding Available	JULY 2021
Advertise for Bids	JULY 2022
Award Contract	AUG 2022
Begin Construction	SEP 2022
Loan Closing	OCT 2022
Substantial Completion	AUG 2023
Final Completion and Begin Operation	SEP 2023

7.3 Regulatory Requirements

Plans and specifications for the proposed project must be designed and submitted by a Montana registered Professional Engineer and those plans and specifications must comply with Montana Department of Environmental Quality Circular DEQ-1 Design Standards For Water Works. The project may require a source water protection plan or permit from DEQ. Construction contract documents will contain provisions requiring all permits related to construction of the project, except plan and specification approval, to be obtained by the general contractor. The existing water rights for the project may require a change of place of use or other update to bring the Town's sources in accordance with State water right requirements administered by the Department of Natural Resources and Conservation. Removal of the small amounts of asbestos-cement pipe will require compliance with NESHAP and the DEQ Asbestos Control Program rules and regulations.

7.4 Sustainability Considerations

- ***Water and Energy Efficiency***

The project being constructed in 2020 will result in an ability to meter the water supply at both existing sources and will also allow the use of less energy and chlorine to be utilized for disinfection. The repair of an altitude valve will prevent chlorinated water from being discharged to the ground.

By the time the proposed project in this PER is in final design, many months to a year or more of flow data will be available for analysis. This flow data will allow final design of the proposed project to be fine-tuned. Rehabilitation of the spring could result in increased yield from the spring which would allow the well to be pumped less thereby reducing energy use and costs from the well. Keeping the spring operational and rehabilitated it will increase its reliability and integrity as a source. The spring and water from the existing tank is entirely gravity flow so maintaining the spring is extremely energy efficient. The only energy use associated with the spring is for monitoring, security cameras and lighting, and running the disinfection equipment – all of which are minor in comparison to pumping costs from the well.

The distribution system upgrades in the proposed project will result in lower friction factors and better efficiency overall in the system which will reduce pumping costs as well when the well does have to operate.

Also retaining and upgrading the spring will keep operation of the system very straightforward and improving the security around the spring will increase public health protection and minimize erosion within the fenced area. In addition, the spring and the well provide for a diverse and resilient source of water for the Town.

7.5 Total Project Cost Estimate (Engineer's Opinion of Probable Cost)

A project budget strategy has been prepared which anticipates grant funding from the TSEP and RRGL programs matched by an SRF loan with the possibility of loan forgiveness as shown. **Tables 7.2, 7.3** and **7.4** provide the project budget using the identified funding program sources, amounts applied for and the ultimate user rate impacts based on an "Equivalent Dwelling Unit" calculation. Three possible funding scenarios have been analyzed and are presented in the Tables in the following pages. Possible funding sources include Montana Department of Commerce Treasure State Endowment Program (TSEP) and Community Development Block Grant program (CDBG), Montana Department of Natural Resources and Conservation Renewable Resource Grant and Loan program (RRGL), Montana Department of Environmental Quality State Revolving Fund Loan (SRF). SRF has qualified and limited amounts of funding available for loan forgiveness.

It is anticipated that Alberton qualifies for SRF loan forgiveness. When a town qualifies for SRF loan forgiveness, half of the amount of the loan may be forgiven up to $500,000. RRGL grants are capped at $125,000, TSEP at $750,000 and CDBG is variable depending upon the project and availability of funds.

Each of the scenarios includes an estimated local commitment of reserve funds of $150,000. The preferable scenario for Alberton includes funding with grants from TSEP, DNRC and an SRF loan (with forgiveness if available) in the amounts shown in **Table 7.2.** This scenario would result in an average residential water user rate increase of an estimated $11.88 per month per EDU for debt. The current water rate is $21.24. With

Table 7.2
Town of Alberton
Project Budget - Water System Improvements

ADMIN/FINANCIAL COSTS	DNRC/ RRGL	TSEP	SRF-A Forgiven	SRF Loan	Local Res.	May-20 TOTAL
Personnel Costs	$0	$0	$0	$0	$0	$0
Office Costs	$0	$0	$0	$0	$0	$0
Professional Services	$0	$0	$0	$32,000	$0	$32,000
Legal Costs	$0	$0	$0	$5,000	$0	$5,000
Bond Cost	$0	$0	$0	$13,000	$0	$13,000
Admin Fee	$0	$0	$0	$2,000	$0	$2,000
Loan Reserves	$0	$0	$0	$16,700	$0	$16,700
TOTAL ADMIN/FIN. COSTS:	$0	$0	$0	$68,700	$0	$68,700
						4%
ACTIVITY COSTS:	**DNRC/ RRGL**	**TSEP**	**SRF-A Forgiven**	**SRF Loan**	**Local Res.**	**TOTAL**
Final Engineering Design	$0	$0	$0	$0	$136,000	$136,000
Construction Inspection	$86,000	$50,000	$0	$0	$0	$136,000
Construction	$39,000	$700,000	$438,240	$179,960	$0	$1,357,200
Contingency	$0	$0	$0	$189,580	$14,000	$203,580
TOTAL ACTIVITY COSTS:	$125,000	$750,000	$438,240	$369,540	$150,000	$1,832,780
						96%
TOTAL PER FUNDING SOURCE:	**$125,000**	**$750,000**	**$438,240**	**$438,240**	**$150,000**	**$1,901,480**
Percentage of TPC	7%	39%	23%	23%	8%	TPC
			O&M Impact	**Debt Svc.**		
% Grant Funding	69.1%		$0.00	**Calculation**	**20-year SRF loan**	
				$438,240	***2.5% I=***	0.06415
				$28,113	217	EDU's
				$129.55	12	months
				$10.80	*Debt Svc.*	
				$1.08	*10% Coverage*	
				$11.88	*Total Debt Service*	
				$11.88	**User Rate Increase**	

the estimated increase, the new water rate for Alberton would be a user rate of $33.12 per month per EDU.

Table 7.3 shows a funding scenario and estimated outcome with grants from TSEP, RRGL, CDBG and an SRF loan. The resulting rate increase in this scenario is estimated to $12.05 resulting in a new water rate of $31.85 per month.

Table 7.3
Town of Alberton
Project Budget - Water System Improvements

ADMIN/FINANCIAL COSTS	DNRC/ RRGL	TSEP	CDBG	SRF Loan	Local Res.	*May-20* TOTAL
Personnel Costs	$0	$0	$0	$0	$0	$0
Office Costs	$0	$0	$0	$0	$0	$0
Professional Services	$0	$0	$0	$50,000	$0	$50,000
Legal Costs	$0	$0	$0	$5,000	$0	$5,000
Bond Cost	$0	$0	$0	$13,000	$0	$13,000
Admin Fee	$0	$0	$0	$2,000	$0	$2,000
Loan Reserves	$0	$0	$0	$16,900	$0	$16,900
TOTAL ADMIN/FIN. COSTS:	$0	$0	$0	$86,900	$0	$86,900
						5%
ACTIVITY COSTS:	**DNRC/ RRGL**	**TSEP**	**CDBG**	**SRF Loan**	**Local Res.**	**TOTAL**
Final Engineering Design	$0	$0	$0	$0	$136,000	$136,000
Construction Inspection	$50,000	$50,000	$0	$36,000	$0	$136,000
Construction	$75,000	$700,000	$450,000	$132,200	$0	$1,357,200
Contingency	$0	$0	$0	$189,580	$14,000	$203,580
TOTAL ACTIVITY COSTS:	$125,000	$750,000	$450,000	$357,780	$150,000	$1,832,780
						95%
TOTAL PER FUNDING SOURCE:	**$125,000**	**$750,000**	**$450,000**	**$444,680**	**$150,000**	**$1,919,680**
Percentage of TPC	7%	39%	23%	23%	8%	TPC
			O&M Impact	**Debt Svc.**		
% Grant Funding	69.0%		$0.00	**Calculation**	**20-year SRF loan**	
				$444,700	***2.5% I=***	0.06415
				$28,528	217	EDU's
				$131.46	12	months
				$10.96	*Debt Svc.*	
				$1.10	*10% Coverage*	
				$12.05	*Total Debt Service*	
				$12.05	**User Rate Increase**	

Table 7.4 shows a funding scenario with grants from TSEP, RRGL and a loan from SRF. This scenario results in an estimated rate increase of $23.97 resulting in a new water rate of $43.77 per month.

Table 7.4 Town of Alberton Project Budget - Water System Improvements					
ADMIN/FINANCIAL COSTS	**DNRC/ RRGL**	**TSEP**	**SRF Loan**	**Local Res.**	*May-20* **TOTAL**
Personnel Costs	$0	$0	$0	$0	$0
Office Costs	$0	$0	$0	$0	$0
Professional Services	$0	$0	$28,500	$0	$28,500
Legal Costs	$0	$0	$5,000	$0	$5,000
Bond Cost	$0	$0	$13,000	$0	$13,000
Admin Fee	$0	$0	$2,000	$0	$2,000
Loan Reserves	$0	$0	$28,400	$0	$28,400
TOTAL ADMIN/FIN. COSTS:	$0	$0	$76,900	$0	$76,900
					4%
ACTIVITY COSTS:	**DNRC/ RRGL**	**TSEP**	**SRF Loan**	**Local Res.**	**TOTAL**
Final Engineering Design	$0	$0	$0	$136,000	$136,000
Construction Inspection	$50,000	$50,000	$36,000	$0	$136,000
Construction	$75,000	$700,000	$582,200	$0	$1,357,200
Contingency	$0	$0	$189,580	$14,000	$203,580
TOTAL ACTIVITY COSTS:	$125,000	$750,000	$807,780	$150,000	$1,832,780
					96%
TOTAL PER FUNDING SOURCE:	**$125,000**	**$750,000**	**$884,680**	**$150,000**	**$1,909,680**
Percentage of TPC	7%	39%	46%	8%	TPC
		O&M Impact	**Debt Svc.**		
% Grant Funding	45.8%	$0.00	**Calculation**	**20-year SRF loan**	
			$884,700	***2.5% I=***	0.06415
			$56,754	217	EDU's
			$261.54	12	months
			$21.79	*Debt Svc.*	
			$2.18	*10% Coverage*	
			$23.97	*Total Debt Service*	
			$23.97	**User Rate Increase**	

7.6 Annual Operating Budget

The Town's Financial Statements are included in **Appendix F**, including the Income and Expense Statement and the Balance Sheet for fiscal year 2020 as of May 2020. Water enterprise income comes almost entirely from water user fees, which are currently assessed an average of $21.68 per month per residential user. Current year budget includes income of $56,500 from user fees plus $2,000 from interest bearing accounts for a total of $58,500 and expenses of $58,300.

There is currently no debt for the water system enterprise fund. However, wastewater debt includes two SRF loans: one with an outstanding balance of $255,000 and average annual payment of $21,687.50; and the other SRF loan with an outstanding balance of $168,000 and average annual payment of $12,441.45. Both of these loans mature in 2034.

If an SRF loan is used for the Phase 1 water system improvements the Town would be required to have an amount set aside equivalent to 110% of the semi-annual loan payment amount. Roughly, if the project cost was as shown above in **Table 7.2**, $1,901,480, and the Town received both RRGL and TSEP funding (both discussed below), a loan would be required to adequately fund the project. TSEP requires matching funds and so the maximum grant from that program would be $750,000. If $125,000 is awarded by RRGL and the Town contributes $150,000 that leaves a loan of $876,480 to complete the project. If half of the loan can be forgiven that would leave $438,240 to be repaid. Estimated twice yearly loan payment at 2.5% for 20 years on that amount is $14,056. Of course the amount of a loan will depend upon grant amounts awarded and the twice yearly payment amount will depend on whether or not SRF forgiveness is granted.

Annual O&M Costs

Itemized annual operation and maintenance costs are shown below in **Table 7.5**

Table 7.5
Alberton
Annual O&M Costs

Category	$
Legal	500
Salaries & Wages etc	18,500
Employer Contributions	1,200
Office Supplies & Materials	1,500
Operating Supplies	7,500
Purchased Services	19,800
Repair and Maintenance	1,800
Elec. Utilities	5,500
Water Purification & Treatment	2,000
Total O&M Costs/YR	$58,300

Debt Repayments

If no grants were awarded and the project were funded with only loans, the amount of debt for this water system improvement project with a total cost of $1,901,480 minus the local contribution of $150,000 would be $1,751,480. If all funding came from a low-interest loan of 2.5% from the SRF program, the annual debt payment – usually payable in semi-annual payments – would total $112,352 per year.

Coverage of 110 percent required by SRF would require an estimated reserve account of $123,587 either funded by the town or borrowed with the loan.

7.7 Financial Assistance Programs and Funding Strategy

7.7.1 Local Revenues

Local revenues that support capital improvements generally come in the form of user charges associated with rates assessed for use of the water and sewer system or general funds. General funds revenues include taxes, special fees, grants, interest earnings and other sources of assistance. System reserves should be generated from user charges to replace or offset the costs of water or sewer system components, particularly equipment items with limited design life. Revenues should also be adequate to support a sound maintenance program sufficient to optimize the design life of existing capital improvements and defer the need for premature replacement. Local revenues in the form of user charges, assessments or special fees can be used to support incurring debt as required to pay for capital improvements with significant cost. System development, connection or impact fees are often charged by communities for new users of an existing capital improvement. The fees are based on the proportionate share of the "general benefit" of facilities that are utilized by the new user. It should be noted that the 2005 Legislature passed SB 185 which defined criteria for assessment and use of impact fees. Impact fees cannot be used for replacement of existing structures unless portions of the replacement facilities are also required to serve new development. The legislation calls for defined procedure that must be established by the local government for assessment of impact fees.

Documentation related to the rates and rate structure can be found in **Appendix F**.

7.7.2 Financing with Loans

Although grant assistance is generally sought, very rarely does a utility implement significant improvements to their infrastructure systems without borrowing some portion of the project costs. Most financial assistance programs require some type of local match for grant funds. Communities have three primary mechanisms by which Montana Statutes allow incurring and securing debt. The SRF program and a more traditional issuance of debt through the public bond markets both rely on the following methods to secure debt:

GO Bonds – General obligation bonds may be issued by local governments as provided in **Montana Code Annotated (MCA) Title 7.** A Town may issue general obligation bonds for a term of up to 40 years to provide funds to pay the costs of acquisition, construction, or improvement of facilities; or refund any bonds issued for the acquisition, construction, or improvement of facilities. General obligation bonds must be authorized, sold, and issued, with provisions for their payment, in the manner and subject to the conditions prescribed for bonds in **Title 7 MCA.**

Revenue Bonds **–** Revenue bonds may be issued by local governments as provided in **MCA Title 7 Chapter 7 Part 44**. This type of debt is secured by the pledging of user charges. The debt generally requires the collection of coverage which means that 110-125% of the annual debt service must be collected and that one principal and interest payment must be placed in reserve. The rates and charges for revenue bonds would apply only to connected users and would be based on actual use although recent legislation allowed revenue bonds to be supported by an assessment placed upon measurable property values such as square footage. Specifically a municipality may: construct, reconstruct, improve, or extend any undertaking, within or outside of the municipality or partially within or partially outside of the municipality, and acquire by gift, purchase, or the exercise of the right of eminent domain pursuant to Title 70, chapter 30, any undertaking and land or rights in land or water rights in connection with the undertaking; operate and maintain any undertaking and furnish the service, facilities, and commodities of the undertaking for its own use and for the use of public and private consumers within or outside of the territorial boundaries of the municipality; and prescribe and collect rates, fees, and charges for the services, facilities, and commodities furnished by the undertaking.

The Town may authorize the issuance of bonds payable from all or a portion of the revenue of the Town or from special assessments levied against benefited property to finance the acquisition, construction, improvement, or extension of any facilities of the Town benefiting all or any portion of the Town for other authorized corporate purposes of the Town, to refund bonds issued for those purposes, to fund a debt service refund for the security of the bonds, to pay interest on the bonds during the estimated period of construction or improvement of facilities, and to pay costs of the bond issuance.

Levy Of Special Assessments **–** Creation of a special improvement district (SID) is allowed by law but is not anticipated for Town of Alberton in this instance since the recommended improvements serve and benefit the entire Town.

7.7.3 Financial Assistance with Federal & State Grants or Low Interest Loans

Montana Treasure State Endowment Program **-** The Treasure State Endowment Program (TSEP) is a state-funded grant and loan program, administered by the Department of Commerce (DOC) designed to assist cities, districts, and counties in financing wastewater systems, drinking water systems, sanitary or storm sewer systems, solid waste disposal and separation systems, and bridges. The legislature awarded approximately $16 million dollars for grants for water and wastewater infrastructure projects during the last legislative session. Those funds are committed to specific projects. The 2021 session will determine how much is available during the period beginning state fiscal year 2022. Individual grant amounts from this program are capped at $750,000 and generally require a 50% match. Projects submitted for assistance by this program must be submitted in June of 2020 and require legislative approval, the earliest coming in spring of 2021. Grant funds would not be available until July of 2021 **at the**

earliest. Town of Alberton is preparing to submit a TSEP application in 2020 for this project. The application due date for 2020 project grants is June 12, 2020.

DNRC Renewable Resource Grant and Loan Program - This grant and loan program is administered by the Montana Department of Natural Resources and Conservation. The DNRC grants are limited to $125,000. Projects that conserve or reuse natural resources or promote the sound use of water tend to do well in competing for these grant funds. Applications to this program are currently due June 1, 2020. Town of Alberton is preparing to submit an RRGL application by that date.

USDA Rural Development Program (RD) -The RD loan and grant program is administered by the Rural Utilities Services of the US Department of Agriculture, formerly known. RD has grants and loans available with the mixture of the two dependent on the community's residential income and target user rates. Loan terms for as much as 40 years are possible. Water and sewer systems are often funded with financial assistance from this program. As of this writing, Town of Alberton is not planning to apply to the RD program. However, RD has an open application process and a final decision can be made in the future.

Montana Water Pollution Control and Drinking Water State Revolving Fund Loan Programs - These funding sources can provide low interest loans generally below market rates. Effectively the reduced interest cost equates to a grant component in a combined funding package. Loan rates are currently 2.5% for communities and terms can be as long as 30 years for qualifying "hardship" communities. These two programs can loan money for drinking water and wastewater improvement projects. Other types of water pollution control projects have been funded with the wastewater SRF program. For high cost projects in needy communities, the SRF program can forgive principal on some loans, essentially equating to a grant. Forgiven principal can be in an amount up to $500,000.

CDBG (Community Development Block Grant Program) -This grant program is administered by the Montana Department of Commerce. All CDBG applications must document that at least 51 percent of the non-administrative funds requested for a CDBG project are clearly designed to meet the needs for low and moderate-income families. Having a high percentage of low and moderate-income people in the community and the presence of a high potential health threat helps a community compete for a CDBG grant. Good local involvement in the planning process also helps grant competitiveness. Applications are made to this program on an annual basis. Planning grants for engineering and grant preparation expenses are also available from the CDBG Program. Town of Alberton may submit a CDBG application depending on the success of funding with sources that must receive legislative approval first.

Intercap Loan Program - The Montana Board of Investments of the MDOC administers this loan program which is available to communities for paying for capital improvements. The Intercap Program is a low cost, variable-rate program that lends money to Montana local governments, state agencies and the university system for the purpose of financing or refinancing the acquisition and installation of equipment or personal and real property and infrastructure improvements. The Board of Investments issues tax-exempt bonds and loans the proceeds to eligible borrowers. In addition to long-term financing, Intercap is an excellent source for interim financing. The loan term is up to 10 years or the useful life of the project. The funding is always available and is not subject to a funding cycle. Maximum loan amount per project depends on the borrower's legal debt authority. The Town could consider utilizing Intercap funds in the event that TSEP and/or DNRC funds are received in order to expedite design on the water improvements under this PER. Project Eligibility includes the following:

Real property improvements
New and used equipment of all kinds
New and used vehicles of all kinds
Water, wastewater, and solid waste projects
Preliminary engineering and grant writing work
Interim financing for construction or cash-flow loans
Energy retrofit projects
100% financing acceptable, equity or matching money not required

7.7.4 Short-lived Assets

The following table represents reserve/replacement funds to address equipment that has a limited life and would require replacement through a means other than long-term capital financing. The specific item, design life and replacement cost should be identified to determine annual cost to collect to fund the replacement of the asset. The following table was developed for the Town's existing equipment. Annual cost is the cost total divided by the anticipated design life.

TABLE 7.6 Short Lived Assets					
Short Lived Asset	Total Units	Estimated Replacement Cost per Unit	Total Cost	Useful Life (yrs)	Annualized Cost
Disinfection Equip	2	$8,500	$17,000	10	$1,700
Control Valve	1	$10,000	$10,000	15	$667
Control valve	1	$5,000	$5,000	15	$333
Well pump	1	$2,200	$2,200	15	$147
Vehicle	1	$12,000	$12,000	15	$800
Small equip (test kit, misc)	1	$500	$500	5	$100
Estimated Annual Short Lived Asset Cost					$3,647

The current Town budget includes maintenance and repair costs (see **Appendix F**). It is recommended that the Town of Alberton evaluate if the budget amounts include and are sufficient to cover the estimated annual cost for replacement of the short lived assets listed above.

7.7.5 Affordability Analysis

The current target rate set by the funding agencies for combined water and sewer is 2.3% of the Median Household Income (MHI). The MHI for Alberton is $24,539/yr.

2.3% of the Town's MHI is $564.40/yr which is $47.03 per month (see **Appendix F**) Water and sewer users in the planning area currently pay a combined rate of $69.03 per month **(which is 147% of the target rate**), expected to increase to at least $11.88 per month (under the best funding scenario), this would equate to 172% of the target rate (see **Table 7.7** below). According to the 2015 ACS Census data the Town has 64.58% considered "low to moderate" income, and 19.8% poverty rate.

Table 7.7 Target Rate Analysis

	Target Rate/Yr @2.3%	Target Rate/Mo @2.3%	Alberton Combined Monthly W/S Rate	Percent of Target Rate
Current	$564.40	$47.03	$68.64	146%
Minimum Projected	$564.40	$47.03	$80.53	171%

More rate increases for drinking water and wastewater collection are quite possible in the future.

This affordability analysis indicates that increased costs, even with grants and low interest loans, are high and will impose a financial burden on water system users in the Town of Alberton. In addition, the Town is only taking on a portion of current needs in order to phase in all the needed improvements. The more assistance Alberton can receive now, the sooner the Town can address the remainder of its drinking water needs.

7.8 Public Participation

Anderson-Montgomery Consulting Engineers gave a presentation via Zoom on May 5, 2020 at a public meeting of the Alberton Town Council. Mr. Paul Montgomery made the presentation at this meeting along with Marc Golz. The presentation provided detailed information regarding the need for the project, the alternatives to address those needs and the ways in which the alternatives could be funded. This included applying for grants and other public funding options to complete preliminary engineering analysis and conduct the studies necessary - as well as prepare the necessary documentation. **Appendix G** contains documentation of community engagement to date for this project.

Public hearings were also held with the Town Council to discuss water system needs on May 10th, 2016, and May 1, 2018 with the inclusion of the public. Anderson-Montgomery made presentations regarding the project and answered numerous questions from the public. The presentation on May 1, 2018 outline is included in **Appendix G**. Notice of the hearing was included in the local paper.

7.9 Future Recommendations

In addition to the spring rehabilitation and distribution work recommended as Phase 1 in this report, the needs identified in Chapter 4 regarding the water source capacity and storage capacity should be considered for the next phase of improvements for the Town of Alberton. Due to existing system deficiencies and the difficulties of addressing them all at once both logistically and financially, the Town should keep in mind that taking care of these will be necessary at some point in the future. These are referred to as Phase 2 for this report and they could be addressed together or separately in the future. A summary of these improvements and their year 2020 estimated costs are reiterated here for ease of reference in **Table 7.8** and **Table 7.9.**

TABLE 7.8
Alberton
Alternative STO3

Recommended Phase 2: Upgrade Storage Volume

Recommended Improvements				
Capital Costs	**Unit**	**Quantity**	**Unit Cost**	**Capital Cost**
ITEM				
Mobilization & Bonds	LS	$715,000	12%	$85,800
Storage Tank				
New 200,000 Gallon Tank	LS	1	$510,000	$510,000
Site Work	LS	1	$74,000	$74,000
Telemetry & Controls	LS	1	$21,000	$21,000
Piping, Appurtenances	LS	1	$110,000	$110,000
Total Estimated Construction Cost:				**$800,800**
Contingency:	15%			**$120,120**
Engineering:	20%			**$160,160**
Legal, Bonding, Admin, DEQ Fees:	7%			**$56,056**
			TOTAL ESTIMATED PROJECT COST:	**$1,137,136**

TABLE 7.9 Alberton Alternative WS2				
Recommended Phase 2: Upgrade Existing Water Sources				
Recommended Improvements				
Capital Costs	**Unit**	**Quantity**	**Unit Cost**	**Capital Cost**
ITEM				
Mobilization & Bonds	LS	$279,000	10%	$27,900
Improve Water Sources				
Rehabilitate Existing Well	LS	1	$20,000	$20,000
Drill Additional Well	VF	200	$190	$38,000
Water Rights Filing	LS	1	$18,500	$18,500
Pump, Motor, Drop Pipe	LS	1	$31,000	$31,000
Pump Testing, Documentation	LS	1	$18,000	$18,000
Telemetry & Controls	LS	1	$28,500	$28,500
Pump House, Disinfection, Piping	LS	1	$125,000	$125,000
Total Estimated Construction Cost:				**$306,900**
Contingency:	15%			**$46,035**
Engineering:	20%			**$61,380**
Legal, Bonding, Administration, DEQ Fees:	7%			**$21,483**
			TOTAL ESTIMATED PROJECT COST:	**$435,798**

APPENDIX A

SPECIES OF CONCERN

Introduction

PART 1 - The Montana Natural Heritage Program (MTNHP) serves as the state's information source for animals, plants, and plant communities with a focus on species and communities that are rare, threatened, and/or have declining trends and as a result are at risk or potentially at risk of extirpation in Montana.

PART 2 - This report on **Montana Animal Species of Concern** is produced jointly by the Montana Natural Heritage Program (MTNHP) and Montana Department of Fish, Wildlife, and Parks (MFWP). Montana Animal Species of Concern are native Montana animals that are considered to be "at risk" due to declining population trends, threats to their habitats, and/or restricted distribution.

PART 3 - Also included in this report are **Potential Animal Species of Concern** -- animals for which current, often limited, information suggests potential vulnerability or for which additional data are needed before an accurate status assessment can be made.

PART 4 - We also include **Special Status Species** which are species that have some legal protections in place, but are otherwise not Montana Species of Concern. Bald Eagle is a Special Status Species because, although it is no longer protected under the Endangered Species Act and is also no longer a Montana Species of Concern, it is still protected under the **Bald and Golden Eagle Protection Act of 1940** (16 U.S.C. 668-668c). Red Knot is not a Montana Species of Concern, having a state rank of **SNA** because of a lack of information on its migratory stopover use of Montana's wetlands. However it is a Special Status Species because it is listed as Threatened in Montana under the Endangered Species Act (16 U.S.C. 1531-1544).

PART 5 - Over the last 200 years, 5 species with historic breeding ranges in Montana have been extirpated from the state; Woodland Caribou (*Rangifer tarandus*), Greater Prairie-Chicken (*Tympanuchus cupido*), Passenger Pigeon (*Ectopistes migratorius*), Pilose Crayfish (*Pacifastacus gambelii*), and Rocky Mountain Locust (*Melanoplus spretus*). Designation as a Montana Animal Species of Concern or Potential Animal Species of Concern is not a statutory or regulatory classification. Instead, these designations provide a basis for resource managers and decision-makers to make proactive decisions regarding species conservation and data collection priorities in order to avoid additional extirpations.

PART 6 - Status determinations are made by MTNHP and MFWP biologists in consultation with representatives of the Montana Chapter of the Wildlife Society, the Montana Chapter of the American Fisheries Society, and other experts. The process for evaluating and assigning status designations uses the Natural Heritage Program ranking system, described below, which forms the basis for identifying Montana Species of Concern.

How to Read the Lists

What Species are Included in this Report

PART 7 - Montana Species of Concern are defined as vertebrate animals with a state rank of S1, S2, or S3. Vertebrate species with a rank indicating uncertainty (SU), a "range rank" extending below the S3 cutoff (e.g., S3S4), or those ranked S4 for which there is limited baseline information on status are considered Potential Species of Concern. Because documentation for invertebrates is typically less complete than for vertebrates, only those ranked S1 or S2 are included as SOC. Invertebrates with a range rank extending below S2 (e.g., S2S3) are included as SOC only if their global ranks are G2G3 or G3, or if experts agree their occurrence in Montana has been adequately documented. Other invertebrates of concern with global ranks other than G1, G2, or G3 and with state ranks below S2 or range ranks extending below S2 (e.g., S3S4) are treated as Potential Species of Concern.

Organization of List

PART 8 - Both the list of Species of Concern and the list of Potential Species of Concern are grouped taxonomically in the following order: mammals, birds, reptiles, amphibians, fish, and various invertebrates. Within each taxonomic group you can sort species by common name or scientific name.

County Distribution

PART 9 - This column lists the documented county distribution for each species, including extant and historical occurrences. Any occurrences that cross county boundaries are counted for each county. Many older occurrence records and specimen collections are only known from vague location information and the area mapped as the potential area of observation may be quite large, leading to more than one county being counted.

Additions and Deletions

PART 10 - Species that have been added to or deleted from the SOC list due to changes in their state rank are reported in separate sections below; changes in global ranks are not tracked in this report.

Montana Species Ranking Codes (GRank, SRank)

PART 11 - Montana employs a standardized ranking system to denote **global** (range-wide) and **state** status (NatureServe 2006). Species are assigned numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure), reflecting the relative degree of risk to the species' viability, based upon available information.

PART 12 - A number of factors are considered in assigning ranks — the number, size and quality of known occurrences or populations, distribution, trends (if known), intrinsic vulnerability, habitat specificity, and definable threats. The process of assigning state ranks for each taxon relies heavily on the number of occurrences and Species Occurrence (OE) ranks, which is a ranking system of the quality (usually A through D) of each known occurrence based on factors such as size (# of individuals) and habitat quality. The remaining factors noted above are also incorporated into the ranking process when they are known. The "State Rank Reason" field in the **Montana Field Guide** provides additional information on the reasons for a particular species' rank.

Rank		Definition
G1	**S1**	At high risk because of **extremely limited** and/or **rapidly declining** population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.
G2	**S2**	At risk because of **very limited** and/or **potentially declining** population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.
G3	**S3**	Potentially at risk because of **limited** and/or **declining** numbers, range and/or habitat, even though it may be abundant in some areas.
G4	**S4**	Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.
G5	**S5**	Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.
GX	**SX**	Presumed Extinct or Extirpated - Species is believed to be extinct throughout its range or extirpated in Montana. Not located despite intensive searches of historical sites and other appropriate habitat, and small likelihood that it will ever be rediscovered.
GH	**SH**	Historical, known only from records usually 40 or more years old; may be rediscovered.
GNR	**SNR**	Not Ranked as of yet.
GU	**SU**	Unrankable - Species currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

GNA	**SNA**	A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities as a result of being: 1) not confidently present in the state; 2) non-native or introduced; 3) a long distance migrant with accidental or irregular stopovers; or 4) a hybrid without conservation value.

Combination or Range Ranks

G#G# or **S#S#** Indicates a range of uncertainty about the status of the species *(e.g., G1G3 = Global Rank ranges between G1 and G3).*

S#, S# Indicates that populations in different geographic portions of the species' range in Montana have a different conservation status *(e.g., S1 west of the Continental Divide and S4 east of the Continental Divide).*

Sub-rank

T# Rank of a subspecies or variety. Appended to the global rank of the full species, *e.g. G4T3*

Qualifiers

Q **Questionable** taxonomy that may reduce conservation priority-Distinctiveness of this entity as a taxon at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. Appended to the global rank, *e.g. G3Q*

? **Inexact Numeric Rank** - Denotes uncertainty; inexactness.

HYB **Hybrid** - Entity not ranked because it represents an interspecific hybrid and not a species.

C **Captive or Cultivated Only** - Species at present exists only in captivity or cultivation, or as a reintroduced population not yet established.

A **Accidental** - Species is accidental or casual in Montana, in other words, infrequent and outside usual range. Includes species (usually birds or butterflies) recorded once or only a few times at a location. A few of these species may have bred on the few occasions they were recorded.

SYN **Synonym** - Species reported as occurring in Montana, but the Montana Natural Heritage Program does not recognize the taxon; therefore the species is not assigned a rank.

B **Breeding** - Rank refers to the breeding population of the species in Montana. Appended to the state rank, *e.g. S2**B**,S5N = At risk during breeding season, but common in the winter*

N **Nonbreeding** - Rank refers to the non-breeding population of the species in Montana. Appended to the state rank, *e.g. S5B,S2**N** = Common during breeding season, but at risk in the winter*

M **Migratory** - Species occurs in Montana only during migration.

Federal Status

PART 13 - Designations in this column reflect the status of a species under the U.S. Endangered Species Act (ESA), or as “sensitive” by the U.S. Forest Service (USFS) or Bureau of Land Management (BLM).

U.S. Fish and Wildlife Service (Endangered Species Act)

PART 14 - Status of a taxon under the federal Endangered Species Act of 1973 (16 U.S.C.A. § 1531-1543 (Supp. 1996))

Designation Descriptions

LE **Listed endangered:** Any species in danger of extinction throughout all or a significant portion of its range (16 U.S.C. 1532(6)).

LT **Listed threatened:** Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(20)).

C **Candidate:** Those taxa for which sufficient information on biological status and threats exists to propose to list them as threatened or endangered. We encourage their consideration in environmental planning and partnerships; however, none of the substantive or procedural provisions of the Act apply to candidate species.

P **Proposed threatened:** Any species that is proposed in the Federal Register to be listed under section 4 of the Act.

DM **Recovered, delisted, and being monitored** - Any previously listed species that is now recovered, has been delisted, and is being monitored.

NL **Not listed** - No designation.

XE **Experimental - Essential population** - An experimental population whose loss would be likely to appreciably reduce the likelihood of the survival of the species in the wild.

XN **Experimental - Nonessential population** - An experimental population of a listed species reintroduced into a specific area that receives more flexible management under the Act.

CH **Critical Habitat** - The specific areas (i) within the geographic area occupied by a species, at the time it is listed, on which are found those physical or biological features (I) essential to conserve the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by the species at the time it is listed upon determination that such areas are essential to conserve the species.

PS **Partial status** - status in only a portion of the species' range. Typically indicated in a "full" species record where an infraspecific taxon or population, that has a record in the database has USESA status, but the entire species does not. For example, Yellow-billed Cuckoo (*Coccyzus americanus*) is ranked **PS:LT**. Partial Status - Listed Threatened. Designated as Threatened in the Western U.S. Distinct Population Segment (DPS) (subspecies *occidentalis*)

BGEPA **The Bald and Golden Eagle Protection Act of 1940 (BGEPA)** - (16 U.S.C. 668-668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald or golden eagles, including their parts, nests, or eggs. The BGEPA provides criminal and civil penalties for persons who take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof. The BGEPA defines take as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

MBTA **The Migratory Bird Treaty Act (MBTA)** - (16 U.S.C. §§ 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986 and 1989) implements four treaties that provide for international protection of migratory birds. The statute's language is clear that actions resulting in a "taking" or possession (permanent or temporary) of a protected species, in the absence of a U.S. Fish and Wildlife Service (USFWS) permit or regulatory authorization, are a violation of the MBTA. The MBTA states, "Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill ... possess, offer for sale, sell ... purchase ... ship, export, import ... transport or cause to be transported ... any migratory bird, any part, nest, or eggs of any such bird .... [The Act] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior." The word "take" is defined by regulation as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." The USFWS maintains a **list of species protected by the MBTA** at 50 CFR 10.13. This list includes over one thousand species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines. The USFWS also maintains a **list of species not protected by the MBTA**. MBTA does not protect species that are not native to the United States or species groups not explicitly covered under the MBTA; these include species such as the house (English) sparrow, European starling, rock dove (pigeon), Eurasian collared-dove, and non-migratory upland game birds.

BCC The 1988 amendment to the Fish and Wildlife Conservation Act mandates the U.S. Fish and Wildlife Service to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act. **Birds of Conservation Concern 2008 (BCC 2008)** is the most recent effort to carry out this mandate. The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the Service's highest conservation priorities. BCC10, BCC11, and BCC17 designations represent inclusion on the Birds of Conservation Concern list for Bird Conservation Region 10, 11, and 17 in Montana, respectively.

Bureau of Land Management (BLM)

PART 15 - BLM Sensitive Species are defined by the BLM 6840 Manual as native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either: (1) there is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range, or; (2) the species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.

Designation Descriptions

Endangered Denotes species that are listed as Endangered under the Endangered Species Act

Threatened Denotes species that are listed as Threatened under the Endangered Species Act

Sensitive	Denotes species listed as Sensitive on BLM lands

U.S. Forest Service (USFS)

Designation Descriptions

Endangered	Listed as Endangered (LE) under the U.S. Endangered Species Act.
Threatened	Listed as Threatened (LT) under the U.S. Endangered Species Act.
Proposed	Any species that is proposed in the Federal Register to be listed under section 4 of the Act.
Candidate	Those taxa for which sufficient information on biological status and threats exists to propose to list them as threatened or endangered. We encourage their consideration in environmental planning and partnerships; however, none of the substantive or procedural provisions of the Act apply to candidate species.
Sensitive	U.S. Forest Service Manual (2670.22) defines Sensitive Species on Forest Service lands as those for which population viability is a concern as evidenced by a significant downward trend in population or a significant downward trend in habitat capacity. These designations were last updated in 2011 and they apply only on USFS-administered lands with land management plans finalized prior to 2017. Sensitive Species designations are being replaced by Species of Conservation Concern designations on individual National Forest as revised land management plans are finalized under the 2012 planning rule.
Species of Conservation Concern	A species, other than federally recognized Threatened, Endangered, Proposed, or Candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area (36 CFR 219.9). Species of Conservation Concern replace regional forester Sensitive Species on individual National Forests as revised land management plans are finalized under the 2012 planning rule.

Acknowledgements

PART 16 - MTNHP and MFWP staff work together on a daily basis to manage information used to evaluate the status of Montana's animal species. We extend our thanks to these individuals and professional biologists that study and work to conserve species across Montana. We also thank a number of private citizens that spend a great deal of their free time contributing valuable information to statewide databases so that species can be better understood and managed.

Selected References

- Abbott, J.C. 2006. Odonata Central: An online resource for the Odonata of North America. Austin, TX. (Accessed: July 28, 2009). **http://www.odonatacentral.com**
- Acorn, J. 2004. *Damselflies of Alberta: flying neon toothpicks in grass.* Edmonton, Alberta: University of Alberta Press. 156 p.

- Brown, C.J.D. 1971. *Fishes of Montana.* Bozeman, MT: Montana State University. 207 p.
- Flath, D.L. 1984. Vertebrate species of special interest or concern. Helena, MT: Montana Department of Fish, Wildlife and Parks. 76 p.
- Flath, D.L. 1998. Species of special interest or concern. Helena, MT: Montana Department of Fish, Wildlife and Parks. 7 p.
- Frest, T.J. and E.J. Johannes. 1995. Interior Columbia Basin mollusk species of special concern. Final report to the Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA. 274 p. plus appendices.
- Foresman, K.R. 2001. *The wild mammals of Montana.* Special Publication No. 12. Lawrence, KS: The American Society of Mammalogists. 278 p.
- Hand, R.L. 1969. A distributional checklist of the birds of western Montana. Unpublished manuscript available from the Montana State Library, Helena, MT. 55 p.
- Hendricks, P., B.A. Maxell, S. Lenard, C. Currier, and J. Johnson. 2006. Riparian bat surveys in eastern Montana. Report to the USDI Bureau of Land Management, Montana State Office. Helena, MT: Montana Natural Heritage Program. 13 p. + appendices.
- Hendricks, P., B.A. Maxell, S. Lenard, and C. Currier. 2007. Land mollusk surveys on USFS Northern Region Lands: 2006. Report to the USDA Forest Service, Northern Region. Helena, MT: Montana Natural Heritage Program. 11 pp. + appendices.
- Hendricks, P., B.A. Maxell, S. Lenard, and C. Currier. 2008. Surveys and predicted distribution models for land mollusks on USFS Northern Region Lands: 2007. Report to the USDA Forest Service, Northern Region. Helena, MT: Montana Natural Heritage Program. 12 pp. + appendices.
- Hoffman, R.L. 1999. Checklist of the millipeds of North and Middle America. Special Publication No. 8. Martinsville, VA: Virginia Museum of Natural History. 584 p.
- Hoffmann, R.S. and D.L. Pattie. 1968. A guide to Montana mammals. Missoula, MT: University of Montana Printing Services. 133 p.
- Holton, G.D. and H.E. Johnson. 2003. *A field guide to Montana fishes.* Third Edition. Helena, MT: Montana Department of Fish, Wildlife, and Parks. 95 p.
- Kohler, S. 1980. Checklist of Montana butterflies (Rhopalocera). Journal of the Lepidopterists' Society 34(1):1-19.
- Lenard, S., J. Carlson, J. Ellis, C. Jones, and C. Tilly. 2003. *P.D. Skaar's Montana bird distribution.* Sixth edition. Helena, MT: Montana Audubon. 144 p.
- Lenard, S., B.A. Maxell, P. Hendricks, and C. Currier. 2007. Bat Surveys on USFS Northern Region 1 Lands in Montana: 2006. Report to the USDA Forest Service, Northern Region. Montana Natural Heritage Program, Helena, Montana 23 pp. plus appendices.
- Lewis, J.J. 2001. Three new species of subterranean assellids from western North America, with a synopsis of the species of the region (Crustacea: Isopoda: Asellidae). Texas Memorial Museum, Speleological Monographs 5:1-15.

- Maxell, B.A., J.K. Werner, P. Hendricks, and D. Flath. 2003. *Herpetology in Montana: a history, status summary, checklists, dichotomous keys, accounts for native, potentially native, and exotic species, and indexed bibliography.* Olympia, WA: Society for Northwestern Vertebrate Biology. Northwest Fauna 5: 1-138.
- Miller, K.B. and D.L. Gustafson. 1996. Distribution records of the Odonata of Montana. Bulletin of American Odonatology 3(4):75-88.
- [Montana Fish Wildlife and Parks]. 2005. Montana's comprehensive fish and wildlife conservation strategy. Helena, MT: Montana Fish, Wildlife & Parks. 658 p.
- Montana Natural Heritage Program and Montana Fish Wildlife and Parks. 2009. Montana animal Species of Concern. Helena, MT: Montana Natural Heritage Program and Montana Department of Fish Wildlife and Parks. 17 p.
- NatureServe. 2009. NatureServe Explorer: An on-line encyclopedia of life [web application]. Version 7.1. Arlington, VA. (Accessed: July 28, 2009). **http://www.natureserve.org/explorer**.
- Opler, P.A., H. Pavulaan, R.E. Stanford, and M. Pogue (coordinators). 2006. Butterflies and moths of North America. Bozeman, MT: NBII Mountain Prairie Information Node. (Accessed: July 28, 2009). **http://www.butterfliesandmoths.org**/
- Paulson, D.R. 2009. *Dragonflies and damselflies of the West*. Princeton, NJ: Princeton University Press. 535 p.
- Pearson, D.L., C.B. Knisley, and C.J. Kazilek. 2006. *A field guide to the tiger beetles of the United States and Canada: identification, natural history, and distribution of the Cicindelidae*. New York, NY: Oxford University Press. 227 p.
- Regan, T.J., L.L. Master, and G.A. Hammerson. 2004. Capturing expert knowledge for threatened species assessments: a case study using NatureServe conservation status ranks. Acta Oecologica 26:95-107.
- Roemhild, G. 1975. The damselflies (Zygoptera) of Montana. Montana Agricultural Experiment Station Research Report 87. Bozeman, MT: Montana State University. 53 p.
- Saunders, A.A. 1921. A distributional list of the birds of Montana with notes on the migration and nesting of the better known species. Pacific Coast Avifauna Number 14. Berkeley, CA: Cooper Ornithological Club. 194 p.
- Stagliano, D.M. 2008. *Freshwater mussels of Montana*. Helena, MT: Montana Natural Heritage Program. 20 p.
- Stagliano, D.M., G.M. Stephens, and W.R. Bosworth. 2007. Aquatic invertebrate Species of Concern on USFS Northern Region Lands. Report to USDA Forest Service, Northern Region. Helena, MT: Montana Natural Heritage Program. 95 pp. + appendices.
- Thompson, L.S. 1982. Distribution of Montana amphibians, reptiles, and mammals. Helena, MT: Montana Audubon Council. 24 p.

- Wang, D. and J.R. Holsinger. 2001. Systematics of the subterranean amphipod genus Stygobromus (Crangonyctidae) in western North America, with emphasis on the hubbsi group. Amphipacifica 3:39-147.
- Werner, J.K., B.A. Maxell, P. Hendricks, and D. Flath. 2004. *Amphibians and reptiles of Montana*. Missoula, MT: Mountain Press Publishing Company. 262 p.
- Westfall, M.J., Jr. and M.L. May. 1996. *Damselflies of North America*. Gainesville, FL: Scientific Publishers. 650 p.
- Westfall, M.J. Jr. and M.L. May. 2000. *Dragonflies of North America*. Revised Edition Gainesville, FL: Scientific Publishers. 940 p.
- Wright, P.L. 1996. Status of rare birds in Montana with comments on known hybrids. Northwest Naturalist 77(3):57-85.

Contact Information

PART 17 - For questions or comments specific to this publication or for specific zoology related questions, please contact:

Bryce A. Maxell
Senior Zoologist
bmaxell@mt.gov
(406) 444-3655

PART 18 - For general questions and zoology-related data requests please use the Information Request function on our website (www.mtnhp.org) or the general MTNHP contact info below.

Species_Subgroup	S_Sci_Name	S_Com_Name	USESA	USFS_Formatted	BLM	FWP_SWAP	MT_Status	Short_Habitat
Mammals (Mammalia	Antrozous pallidus	Pallid Bat		Sensitive - Known on Forests (CG)	SENSITIVE	SGCN3	SOC	Arid land rock outcrops
Mammals (Mammalia	Blarina brevicauda	Northern Short-tailed Shrew				SGCN1-3	SOC	Wetlands
Mammals (Mammalia	Bos bison	Bison				SGCN2	SOC	Grasslands
Mammals (Mammalia	Brachylagus idahoensis	Pygmy Rabbit		Sensitive - Known on Forests (BD)	SENSITIVE	SGCN3	SOC	Sagebrush
Mammals (Mammalia	Corynorhinus townsendii	Townsend's Big-eared Bat		Sensitive - Known on Forests (BD, BRT, CG,	SENSITIVE	SGCN3	SOC	Caves in forested habitats
Mammals (Mammalia	Cynomys leucurus	White-tailed Prairie Dog		Sensitive - Known on Forests (CG)	SENSITIVE	SGCN1	SOC	Sagebrush grassland
Mammals (Mammalia	Cynomys ludovicianus	Black-tailed Prairie Dog		Sensitive - Known on Forests (CG)	SENSITIVE	SGCN3	SOC	Grasslands
Mammals (Mammalia	Euderma maculatum	Spotted Bat		Sensitive - Known on Forests (BD, CG)	SENSITIVE	SGCN3, SGIN	SOC	Cliffs with rock crevices
Mammals (Mammalia	Gulo gulo	Wolverine	P	Proposed on Forests (BD, BRT, CG, HLC, KC	SENSITIVE	SGCN3	SOC	Boreal Forest and Alpine Habitats
Mammals (Mammalia	Lasiurus borealis	Eastern Red Bat					SOC	Riparian forest
Mammals (Mammalia	Lasiurus cinereus	Hoary Bat				SGCN3	SOC	Riparian and forest
Mammals (Mammalia	Lynx canadensis	Canada Lynx	LT; CH	Threatened on Forests (BD, BRT) Threate	THREATENED	SGCN3	SOC	Subalpine conifer forest
Mammals (Mammalia	Mustela nigripes	Black-footed Ferret	LE; XN	Endangered, Experimental Nonessential on F	ENDANGERED	SGCN1	SOC	Grasslands
Mammals (Mammalia	Myotis lucifugus	Little Brown Myotis				SGCN3	SOC	Generalist
Mammals (Mammalia	Myotis septentrionalis	Northern Myotis	LT	Threatened on Forests (CG)	THREATENED		SOC	Riparian and mixed forest
Mammals (Mammalia	Myotis thysanodes	Fringed Myotis			SENSITIVE	SGCN3	SOC	Riparian and dry mixed conifer forest
Mammals (Mammalia	Myotis yumanensis	Yuma Myotis				SGIN	SOC	Riparian and mixed forest
Mammals (Mammalia	Pekania pennanti	Fisher		Sensitive - Known on Forests (BD, BRT, HLC,	SENSITIVE	SGCN3	SOC	Mixed conifer forests
Mammals (Mammalia	Perognathus parvus	Columbia Plateau Pocket Mouse		Sensitive - Suspected on Forests (BD)		SGCN3, SGIN	SOC	Sagebrush / grassland
Mammals (Mammalia	Sorex arcticus	Arctic Shrew				SGCN1-3	SOC	Wet meadows
Mammals (Mammalia	Sorex hoyi	Pygmy Shrew				SGCN3	SOC	Open conifer forest, grasslands, and shrublands, often near water
Mammals (Mammalia	Sorex merriami	Merriam's Shrew				SGCN3	SOC	Sagebrush grassland
Mammals (Mammalia	Sorex nanus	Dwarf Shrew				SGCN2-3	SOC	Rocky habitat
Mammals (Mammalia	Sorex preblei	Preble's Shrew				SGCN3	SOC	Sagebrush grassland
Mammals (Mammalia	Synaptomys borealis	Northern Bog Lemming		Sensitive - Known on Forests (BD, BRT, HLC,		SGCN2, SGIN	SOC	Conifer forest wetland
Mammals (Mammalia	Ursus arctos	Grizzly Bear	PS: LT; XN	Threatened on Forests (BD, CG, HLC, KOOT,	THREATENED	SGCN2-3	SOC	Conifer forest
Mammals (Mammalia	Vulpes velox	Swift Fox			SENSITIVE	SGCN3	SOC	Grasslands
Birds (Aves)	Accipiter gentilis	Northern Goshawk	MBTA			SGCN3	SOC	Mixed conifer forests
Birds (Aves)	Aechmophorus clarkii	Clark's Grebe	MBTA			SGCN3	SOC	Lakes, ponds, reservoirs
Birds (Aves)	Ammospiza leconteii	LeConte's Sparrow	MBTA			SGCN3	SOC	Prairie wetland
Birds (Aves)	Ammospiza nelsoni	Nelson's Sparrow	MBTA; BCC11			SGCN3	SOC	Prairie wetland
Birds (Aves)	Anthus spragueii	Sprague's Pipit	MBTA; BCC11; B		SENSITIVE	SGCN3	SOC	Grasslands
Birds (Aves)	Aquila chrysaetos	Golden Eagle	BGEPA; MBTA; B		SENSITIVE	SGCN3	SOC	Grasslands
Birds (Aves)	Ardea herodias	Great Blue Heron	MBTA			SGCN3	SOC	Riparian forest
Birds (Aves)	Artemisiospiza nevadensis	Sagebrush Sparrow	MBTA; BCC10; B		SENSITIVE	SGCN3	SOC	Sagebrush
Birds (Aves)	Athene cunicularia	Burrowing Owl	MBTA; BCC17	Sensitive - Known on Forests (CG) Sensit	SENSITIVE	SGCN3	SOC	Grasslands
Birds (Aves)	Botaurus lentiginosus	American Bittern	MBTA; BCC11; B		SENSITIVE	SGCN3	SOC	Wetlands
Birds (Aves)	Buteo regalis	Ferruginous Hawk	MBTA; BCC10; B		SENSITIVE	SGCN3	SOC	Sagebrush grassland
Birds (Aves)	Calcarius ornatus	Chestnut-collared Longspur	MBTA; BCC11; B		SENSITIVE	SGCN2	SOC	Grasslands
Birds (Aves)	Catharus fuscescens	Veery	MBTA		SENSITIVE	SGCN3	SOC	Riparian forest
Birds (Aves)	Centrocercus urophasianus	Greater Sage-Grouse		Sensitive - Known on Forests (BD) Sensiti	SENSITIVE	SGCN2	SOC	Sagebrush
Birds (Aves)	Centronyx bairdii	Baird's Sparrow	MBTA; BCC11; B		SENSITIVE	SGCN3	SOC	Grasslands
Birds (Aves)	Certhia americana	Brown Creeper	MBTA			SGCN3	SOC	Moist conifer forests
Birds (Aves)	Charadrius melodus	Piping Plover	LT; CH; MBTA		THREATENED	SGCN2	SOC	Prairie lakes and river shorelines
Birds (Aves)	Charadrius montanus	Mountain Plover	MBTA; BCC11; B		SENSITIVE	SGCN2	SOC	Grasslands
Birds (Aves)	Chlidonias niger	Black Tern	MBTA; BCC11		SENSITIVE	SGCN3	SOC	Wetlands
Birds (Aves)	Cistothorus platensis	Sedge Wren	MBTA			SGCN3	SOC	Prairie wetland
Birds (Aves)	Coccothraustes vespertinus	Evening Grosbeak	MBTA			SGCN3	SOC	Conifer forest
Birds (Aves)	Coccyzus americanus	Yellow-billed Cuckoo	PS: LT; MBTA; B	Threatened on Forests (BRT, LOLO)	SENSITIVE	SGCN3, SGIN	SOC	Prairie riparian forest
Birds (Aves)	Coccyzus erythropthalmus	Black-billed Cuckoo	MBTA; BCC11; B			SGCN3, SGIN	SOC	Riparian forest
Birds (Aves)	Coturnicops noveboracensis	Yellow Rail	MBTA; BCC11; B			SGCN3	SOC	Wetlands
Birds (Aves)	Cygnus buccinator	Trumpeter Swan	MBTA	Sensitive - Known on Forests (BD, CG)	SENSITIVE	SGCN3	SOC	Lakes, ponds, reservoirs
Birds (Aves)	Cypseloides niger	Black Swift	MBTA; BCC10	Species of Conservation Concern on Forests		SGCN1, SGIN	SOC	Waterfalls
Birds (Aves)	Dolichonyx oryzivorus	Bobolink	MBTA			SGCN3	SOC	Moist grasslands
Birds (Aves)	Dryocopus pileatus	Pileated Woodpecker	MBTA			SGCN3	SOC	Moist conifer forests
Birds (Aves)	Empidonax alnorum	Alder Flycatcher	MBTA			SGCN3	SOC	Woody wetlands
Birds (Aves)	Falco peregrinus	Peregrine Falcon	DM; MBTA; BCC1	Sensitive - Known on Forests (BD, BRT, CG,	SENSITIVE	SGCN3	SOC	Cliffs / canyons
Birds (Aves)	Gavia immer	Common Loon	MBTA	Sensitive - Known on Forests (KOOT, LOLO)		SGCN3	SOC	Mountain lakes w/ emergent veg
Birds (Aves)	Grus americana	Whooping Crane	LE; MBTA		ENDANGERED	SGCN1	SOC	Wetlands
Birds (Aves)	Gymnorhinus cyanocephalus	Pinyon Jay	MBTA; BCC17			SGCN3	SOC	Open conifer forest
Birds (Aves)	Haemorhous cassinii	Cassin's Finch	MBTA; BCC10			SGCN3	SOC	Drier conifer forest
Birds (Aves)	Himantopus mexicanus	Black-necked Stilt	MBTA			SGCN3	SOC	Wetlands
Birds (Aves)	Histrionicus histrionicus	Harlequin Duck	MBTA	Sensitive - Known on Forests (BD, CG, HLC,		SGCN2	SOC	Mountain streams
Birds (Aves)	Hydroprogne caspia	Caspian Tern	MBTA		SENSITIVE	SGCN2	SOC	Large rivers, lakes
Birds (Aves)	Ixoreus naevius	Varied Thrush	MBTA			SGCN3	SOC	Moist conifer forests
Birds (Aves)	Lagopus leucura	White-tailed Ptarmigan				SGCN3, SGIN	SOC	Alpine
Birds (Aves)	Lanius ludovicianus	Loggerhead Shrike	MBTA; BCC10; B		SENSITIVE	SGCN3	SOC	Shrubland
Birds (Aves)	Leucophaeus pipixcan	Franklin's Gull	MBTA		SENSITIVE	SGCN3	SOC	Wetlands
Birds (Aves)	Leucosticte atrata	Black Rosy-Finch	MBTA; BCC10			SGCN2, SGIN	SOC	Alpine
Birds (Aves)	Leucosticte tephrocotis	Gray-crowned Rosy-Finch	MBTA			SGCN2, SGIN	SOC	Alpine
Birds (Aves)	Melanerpes erythrocephalus	Red-headed Woodpecker	MBTA; BCC11; B		SENSITIVE	SGCN3	SOC	Riparian forest
Birds (Aves)	Melanerpes lewis	Lewis's Woodpecker	MBTA; BCC10; B		SENSITIVE	SGCN2	SOC	Riparian forest
Birds (Aves)	Nucifraga columbiana	Clark's Nutcracker	MBTA	Species of Conservation Concern on Forests		SGCN3	SOC	Conifer forest
Birds (Aves)	Numenius americanus	Long-billed Curlew	MBTA; BCC10; B		SENSITIVE	SGCN3	SOC	Grasslands
Birds (Aves)	Nycticorax nycticorax	Black-crowned Night-Heron	MBTA			SGCN3	SOC	Wetlands
Birds (Aves)	Oreoscoptes montanus	Sage Thrasher	MBTA; BCC10; B		SENSITIVE	SGCN3	SOC	Sagebrush
Birds (Aves)	Pelecanus erythrorhynchos	American White Pelican	MBTA			SGCN3	SOC	Lakes, ponds, reservoirs
Birds (Aves)	Picoides arcticus	Black-backed Woodpecker	MBTA	Sensitive - Known on Forests (BD, BRT, CG,	SENSITIVE	SGCN3	SOC	Conifer forest burns
Birds (Aves)	Pipilo chlorurus	Green-tailed Towhee	MBTA			SGCN3	SOC	Shrub woodland
Birds (Aves)	Plegadis chihi	White-faced Ibis	MBTA		SENSITIVE	SGCN3	SOC	Wetlands
Birds (Aves)	Podiceps auritus	Horned Grebe	MBTA; BCC11; B			SGCN3	SOC	Wetlands
Birds (Aves)	Poecile hudsonicus	Boreal Chickadee	MBTA			SGCN3	SOC	Spruce-fir forests

Birds (Aves)	Polioptila caerulea	Blue-gray Gnatcatcher	MBTA	Sensitive - Known on Forests (CG)	SENSITIVE	SGCN2	SOC	Utah juniper
Birds (Aves)	Psiloscops flammeolus	Flammulated Owl	MBTA; BCC10	Sensitive - Known on Forests (BD, BRT, HLC,	SENSITIVE	SGCN3	SOC	Dry conifer forest
Birds (Aves)	Rhynchophanes mccownii	McCown's Longspur	MBTA; BCC10; B(		SENSITIVE	SGCN3	SOC	Grasslands
Birds (Aves)	Spizella breweri	Brewer's Sparrow	MBTA; BCC10; B(		SENSITIVE	SGCN3	SOC	Sagebrush
Birds (Aves)	Sterna forsteri	Forster's Tern	MBTA		SENSITIVE	SGCN3	SOC	Wetlands
Birds (Aves)	Sterna hirundo	Common Tern	MBTA		SENSITIVE	SGCN3	SOC	Large rivers, lakes
Birds (Aves)	Sternula antillarum	Least Tern	LE; MBTA	Endangered on Forests (CG)	ENDANGERED	SGCN1, SGIN	SOC	Large prairie rivers
Birds (Aves)	Strix nebulosa	Great Gray Owl	MBTA		SENSITIVE	SGCN3, SGIN	SOC	Conifer forest near open meadows
Birds (Aves)	Surnia ulula	Northern Hawk Owl	MBTA			SGCN3, SGIN	SOC	Conifer forest
Birds (Aves)	Troglodytes pacificus	Pacific Wren	MBTA			SGCN3	SOC	Moist conifer forests
Birds (Aves)	Tympanuchus phasianellus	Sharp-tailed Grouse				SGCN1	SOC	Shrub grassland
Fish (Actinopterygii)	Acipenser transmontanus	White Sturgeon	LE	Endangered on Forests (KOOT)		SGCN1	SOC	Large mountain rivers
Fish (Actinopterygii)	Chrosomus eos	Northern Redbelly Dace				SGCN3	SOC	Small prairie rivers
Fish (Actinopterygii)	Chrosomus eos x Chrosomus neogaeus	Northern Redbelly X Finescale Da			SENSITIVE	SGCN3	SOC	Small prairie streams
Fish (Actinopterygii)	Cottus rhotheus	Torrent Sculpin				SGCN3	SOC	Mountain streams, rivers, lakes
Fish (Actinopterygii)	Cottus ricei	Spoonhead Sculpin				SGCN3	SOC	Mountain streams, rivers, lakes
Fish (Actinopterygii)	Cycleptus elongatus	Blue Sucker				SGCN2-3	SOC	Large prairie rivers
Fish (Actinopterygii)	Etheostoma exile	Iowa Darter			SENSITIVE	SGCN3	SOC	Small prairie rivers
Fish (Actinopterygii)	Lepisosteus platostomus	Shortnose Gar				SGCN1	SOC	Large prairie rivers
Fish (Actinopterygii)	Macrhybopsis gelida	Sturgeon Chub			SENSITIVE	SGCN2-3	SOC	Large prairie rivers
Fish (Actinopterygii)	Macrhybopsis meeki	Sicklefin Chub				SGCN1	SOC	Large prairie rivers
Fish (Actinopterygii)	Margariscus nachtriebi	Northern Pearl Dace			SENSITIVE	SGCN2	SOC	Small prairie streams
Fish (Actinopterygii)	Myoxocephalus thompsonii	Deepwater Sculpin				SGCN3, SGIN	SOC	Deep mountain lakes
Fish (Actinopterygii)	Oncorhynchus clarkii bouvieri	Yellowstone Cutthroat Trout		Sensitive - Known on Forests (CG)	SENSITIVE	SGCN2	SOC	Mountain streams, rivers, lakes
Fish (Actinopterygii)	Oncorhynchus clarkii lewisi	Westslope Cutthroat Trout		Sensitive - Known on Forests (BD, BRT, CG, I	SENSITIVE	SGCN2	SOC	Mountain streams, rivers, lakes
Fish (Actinopterygii)	Oncorhynchus mykiss gairdneri	Columbia River Redband Trout		Sensitive - Known on Forests (KOOT)		SGCN1	SOC	Mountain streams, rivers
Fish (Actinopterygii)	Percopsis omiscomaycus	Trout-perch				SGCN2, SGIN	SOC	Deep lakes, mountain streams
Fish (Actinopterygii)	Polyodon spathula	Paddlefish			SENSITIVE	SGCN2	SOC	Large prairie rivers
Fish (Actinopterygii)	Prosopium coulteri	Pygmy Whitefish				SGCN3, SGIN	SOC	Deep mountain lakes and tributaries
Fish (Actinopterygii)	Salvelinus confluentus	Bull Trout	LT; CH	Threatened, Critical Habitat on Forests (BD, B	THREATENED	SGCN2	SOC	Mountain streams, rivers, lakes
Fish (Actinopterygii)	Salvelinus namaycush	Lake Trout				SGCN2	SOC	Deep mountain lakes
Fish (Actinopterygii)	Sander canadensis	Sauger			SENSITIVE	SGCN2	SOC	Large prairie rivers
Fish (Actinopterygii)	Scaphirhynchus albus	Pallid Sturgeon	LE		ENDANGERED	SGCN1	SOC	Large prairie rivers
Fish (Actinopterygii)	Thymallus arcticus	Arctic Grayling		Sensitive - Known on Forests (BD)	SENSITIVE	SGCN1	SOC	Mountain rivers, lakes

Species_Subgroup	S_Sci_Name	S_Com_Name	USE	USFS_Formatted	BLM	COUNTY	MT_Status	Short_Habitat
Ferns and Fern Allies (Pteridophyta)	Asplenium trichomanes-ramosum	Limestone Maidenhair Spleenwort				Carbon, Fergus, Flathead, (	SOC	
Ferns and Fern Allies (Pteridophyta)	Botrychium ascendens	Upward-lobed Moonwort		Sensitive - Known on Fc			SOC	Various Mesic Sites
Ferns and Fern Allies (Pteridophyta)	Botrychium campestre	Prairie Moonwort					SOC	Various Mesic Sites
Ferns and Fern Allies (Pteridophyta)	Botrychium crenulatum	Wavy Moonwort		Sensitive - Known on Fc			SOC	Various Mesic Sites
Ferns and Fern Allies (Pteridophyta)	Botrychium gallicomontanum	Frenchman's Bluff Moonwort					SOC	Grasslands (Fescue)
Ferns and Fern Allies (Pteridophyta)	Botrychium hesperium	Western Moonwort		Sensitive - Known on Fc			SOC	Various Mesic Sites
Ferns and Fern Allies (Pteridophyta)	Botrychium lanceolatum	Lanceleaf Moonwort					SOC	
Ferns and Fern Allies (Pteridophyta)	Botrychium lineare	Linearleaf Moonwort					SOC	Various Mesic Sites
Ferns and Fern Allies (Pteridophyta)	Botrychium michiganense	Michigan Moonwort					SOC	Various Mesic Sites
Ferns and Fern Allies (Pteridophyta)	Botrychium pallidum	Pale Moonwort					SOC	Grasslands (Fescue)
Ferns and Fern Allies (Pteridophyta)	Botrychium paradoxum	Peculiar Moonwort		Sensitive - Known on Fc			SOC	Meadows (Mesic Montane/Subalpine)
Ferns and Fern Allies (Pteridophyta)	Botrychium pedunculosum	Stalked Moonwort		Sensitive - Known on Fc			SOC	Forests (Mesic bottmlands)/Open sites
Ferns and Fern Allies (Pteridophyta)	Botrychium pinnatum	Northern Moonwort					SOC	
Ferns and Fern Allies (Pteridophyta)	Botrychium simplex	Least Moonwort					SOC	
Ferns and Fern Allies (Pteridophyta)	Botrychium sp. (SOC)	Moonworts (SOC)				Deer Lodge, Flathead, Glac	SOC	
Ferns and Fern Allies (Pteridophyta)	Botrychium sp. 4	Adnate Moonwort					SOC	Grasslands (Fescue)
Ferns and Fern Allies (Pteridophyta)	Botrychium spathulatum	Spoon-leaf Moonwort					SOC	Forests (Mesic bottmlands)/Open sites
Ferns and Fern Allies (Pteridophyta)	Botrychium tunux	Moosewort					SOC	
Ferns and Fern Allies (Pteridophyta)	Botrychium yaaxudakeit	Yakutat Moonwort					SOC	Open sites (mesic)
Ferns and Fern Allies (Pteridophyta)	Cryptogramma cascadensis	Cascade Rockbrake				Lincoln, Missoula, Ravalli, S	SOC	
Ferns and Fern Allies (Pteridophyta)	Dryopteris cristata	Crested Shieldfern		Sensitive - Known on Fc		Flathead, Glacier, Lake, Lin	SOC	Wetland/Riparian
Ferns and Fern Allies (Pteridophyta)	Equisetum palustre	Marsh Horsetail				Beaverhead, Flathead, Glac	SOC	
Ferns and Fern Allies (Pteridophyta)	Equisetum pratense	Meadow Horsetail				Cascade, Chouteau, Flathe	SOC	
Ferns and Fern Allies (Pteridophyta)	Isoetes echinospora	Spiny-spore Quillwort				Flathead, Lake, Madison, M	SOC	feshwater lakes
Ferns and Fern Allies (Pteridophyta)	Isoetes howellii	Howell's Quillwort				Flathead, Glacier, Lake, Mis	SOC	feshwater lakes
Ferns and Fern Allies (Pteridophyta)	Isoetes occidentalis	Western Quillwort				Flathead, Missoula	SOC	feshwater lakes
Ferns and Fern Allies (Pteridophyta)	Lycopodium dendroideum	Treelike Clubmoss		Sensitive - Known on Fc		Flathead, Glacier, Lewis an	SOC	Forests (Mesic valley and montane)
Ferns and Fern Allies (Pteridophyta)	Lycopodium inundatum	Northern Bog Clubmoss		Sensitive - Suspected oı		Flathead, Missoula	SOC	Fens
Ferns and Fern Allies (Pteridophyta)	Lycopodium lagopus	Running-pine		Sensitive - Known on Fc		Flathead, Glacier, Lincoln	SOC	Alpine
Ferns and Fern Allies (Pteridophyta)	Marsilea oligospora	Pepperwort				Lake	SOC	
Ferns and Fern Allies (Pteridophyta)	Ophioglossum pusillum	Adder's Tongue		Sensitive - Known on Fc		Flathead, Lake, Lincoln, Mis	SOC	Fens, Wet meadows
Ferns and Fern Allies (Pteridophyta)	Phegopteris connectilis	Northern Beechfern		Sensitive - Known on Fc		Flathead, Glacier, Lincoln, S	SOC	Forests (Mesic valley to subalpine)
Ferns and Fern Allies (Pteridophyta)	Polystichum kruckebergii	Kruckeberg's Swordfern				Deer Lodge, Flathead, Galla	SOC	Alpine
Ferns and Fern Allies (Pteridophyta)	Polystichum scopulinum	Mountain Swordfern				Ravalli, Sanders	SOC	Rock Crevices
Ferns and Fern Allies (Pteridophyta)	Selaginella selaginoides	Northern Spikemoss				Beaverhead, Deer Lodge, G	SOC	Wet, mossy soil (montane/subalpine)
Gymnosperm (Conifers)	Pinus albicaulis	Whitebark Pine	C	Candidate on Forests (E	SENSITIVE	Beaverhead, Broadwater, C	SOC	Subalpine forest, timberline
Flowering Plants - Dicots (Magnoliopsida)	Adoxa moschatellina	Musk-root		Sensitive - Known on Fc		Carbon, Cascade, Granite,	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Agastache cusickii	Cusick's Horsemint		Sensitive - Known on Fc	SENSITIVE	Beaverhead	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Ageratina occidentalis	Western Joepye-weed		Sensitive - Known on Fc		Beaverhead, Lewis and Cla	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Almutaster pauciflorus	Alkali Marsh Aster				Richland, Sheridan, Valley,	SOC	mesic grasslands
Flowering Plants - Dicots (Magnoliopsida)	Alnus rubra	Red Alder				Lincoln, Sanders	SOC	Forest (Mesic)
Flowering Plants - Dicots (Magnoliopsida)	Ammannia robusta	Scarlet Ammannia				Park, Phillips, Valley, Yellov	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Amorpha canescens	Lead Plant				Carter, Rosebud	SOC	Prairie
Flowering Plants - Dicots (Magnoliopsida)	Antennaria densifolia	Dense-leaved Pussytoes		Sensitive - Known on Fc		Deer Lodge, Granite, Raval	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Aquilegia brevistyla	Short-styled Columbine		Sensitive - Known on Fc		Judith Basin	SOC	Forest (Mesic)
Flowering Plants - Dicots (Magnoliopsida)	Aquilegia formosa	Sitka Columbine				Beaverhead, Madison, Park	SOC	Forest (Mesic)
Flowering Plants - Dicots (Magnoliopsida)	Arctostaphylos patula	Greenleaf Manzanita				Lake, Ravalli, Sanders	SOC	Forest (Montane)
Flowering Plants - Dicots (Magnoliopsida)	Artemisia tilesii	Tilesius Wormwood				Glacier, Lake, Lewis and Cl	SOC	grassland, meadows
Flowering Plants - Dicots (Magnoliopsida)	Asclepias incarnata	Swamp Milkweed				Carbon, Wibaux	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Asclepias ovalifolia	Ovalleaf Milkweed		Sensitive - Known on Fc		Carter, Lewis and Clark, Ro	SOC	Prairie
Flowering Plants - Dicots (Magnoliopsida)	Asclepias stenophylla	Narrowleaf Milkweed				Carter, Rosebud	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Astragalus aretioides	Sweetwater Milkvetch				Big Horn, Carbon	SOC	Exposed ridges and slopes
Flowering Plants - Dicots (Magnoliopsida)	Astragalus barrii	Barr's Milkvetch		Sensitive - Known on Fc		Big Horn, Carbon, Carter, P	SOC	Sparsely vegetated knobs and buttes
Flowering Plants - Dicots (Magnoliopsida)	Astragalus ceramicus	Pottery Milkvetch					SOC	sandy sites, sand dunes
Flowering Plants - Dicots (Magnoliopsida)	Astragalus ceramicus var. apus	Painted Milkvetch			SENSITIVE	Beaverhead	SOC	sandy sites, sand dunes
Flowering Plants - Dicots (Magnoliopsida)	Astragalus ceramicus var. filifolius	Painted Milkvetch				Big Horn, Carter, Dawson, F	SOC	sandy sites, sand dunes
Flowering Plants - Dicots (Magnoliopsida)	Astragalus convallarius	Lesser Rushy Milkvetch				Beaverhead, Broadwater, J	SOC	Grasslands (Intermountain)
Flowering Plants - Dicots (Magnoliopsida)	Astragalus geyeri	Geyer's Milkvetch				Carbon, Garfield	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Astragalus grayi	Gray's Milkvetch			SENSITIVE	Carbon, Fergus	SOC	Sagebrush-Grassland
Flowering Plants - Dicots (Magnoliopsida)	Astragalus lackschewitzii	Lackschewitz' Milkvetch		Sensitive - Known on Fc		Pondera, Teton	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Astragalus oreganus	Wind River Milkvetch				Carbon	SOC	Sandy sites/Sagebrush-Grassland
Flowering Plants - Dicots (Magnoliopsida)	Astragalus racemosus	Raceme Milkvetch				Carter, Fallon, Missoula	SOC	Grasslands (Clay soils)
Flowering Plants - Dicots (Magnoliopsida)	Astragalus scaphoides	Bitterroot Milkvetch		Sensitive - Known on Fc	SENSITIVE	Beaverhead, Granite	SOC	Sagebrush-grassland
Flowering Plants - Dicots (Magnoliopsida)	Astragalus terminalis	Railhead Milkvetch			SENSITIVE	Beaverhead, Gallatin, Madi	SOC	Sagebrush steppe
Flowering Plants - Dicots (Magnoliopsida)	Athysanus pusillus	Sandweed		Sensitive - Known on Fc		Ravalli, Sanders	SOC	Rock/talus-Mesic
Flowering Plants - Dicots (Magnoliopsida)	Atriplex truncata	Wedge-leaf Saltbush				Beaverhead, Deer Lodge, J	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Bacopa rotundifolia	Roundleaf Water-hyssop				Cascade, Fergus, Garfield,	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Balsamorhiza hookeri	Hooker's Balsamroot				Beaverhead, Deer Lodge	SOC	Sagebrush-grassland
Flowering Plants - Dicots (Magnoliopsida)	Berberis nervosa	Longleaf Oregon-grape				Sanders	SOC	

Flowering Plants - Dicots (Magnoliopsida)	Bidens beckii	Beck Water-marigold	Sensitive - Known on Fc		Broadwater, Flathead, Lake	SOC	Aquatic
Flowering Plants - Dicots (Magnoliopsida)	Boechera demissa	Daggett Rockcress			Carbon	SOC	Open woodland and sagebrush steppe
Flowering Plants - Dicots (Magnoliopsida)	Boechera fecunda	Sapphire Rockcress	Sensitive - Known on Fc	SENSITIVE	Beaverhead, Ravalli, Silver	SOC	Rocky, calcareous, montane slopes
Flowering Plants - Dicots (Magnoliopsida)	Brasenia schreberi	Watershield	Sensitive - Known on Fc		Flathead, Lake, Lincoln, Mis	SOC	Aquatic
Flowering Plants - Dicots (Magnoliopsida)	Braya humilis	Low Braya			Beaverhead, Fergus, Teton	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Brickellia oblongifolia	Mojave Brickellbush			Park, Silver Bow	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Camissonia andina	Obscure Evening-primrose			Carbon, Missoula	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Camissonia parvula	Small Camissonia			Carbon	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Cardamine oligosperma var. kamtsc	Few-seeded Bittercress			Flathead	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Cardamine rupicola	Cliff Toothwort			Flathead, Lake, Lewis and (	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Castilleja cervina	Deer Indian Paintbrush			Flathead, Madison, Missoul	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Castilleja covilleana	Coville Indian Paintbrush	Sensitive - Known on Fc		Flathead, Lake, Missoula, F	SOC	Subalpine slopes
Flowering Plants - Dicots (Magnoliopsida)	Castilleja exilis	Annual Indian Paintbrush			Broadwater, Deer Lodge, F	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Castilleja gracillima	Slender Indian Paintbrush			Beaverhead, Cascade, Ferg	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Castilleja kerryana	Kerry's Paintbrush			Lewis and Clark	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Castilleja nivea	Snow Indian Paintbrush			Carbon, Fergus, Golden Va	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Celastrus scandens	Bittersweet			Dawson, Richland	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Centunculus minimus	Chaffweed			Cascade, Lake, Missoula, F	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Cercocarpus montanus	Alderleaf mountain-mahogany			Beaverhead, Treasure	SOC	Open, stony slopes
Flowering Plants - Dicots (Magnoliopsida)	Chenopodium subglabrum	Smooth Goosefoot			Carter, Cascade, Custer, Fe	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Cirsium longistylum	Long-styled Thistle			Broadwater, Cascade, Ferg	SOC	Meadows (Montane-subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Cirsium pulcherrimum	Wyoming Thistle			Big Horn, Carbon, Powder F	SOC	Sparsely-vegetated soils
Flowering Plants - Dicots (Magnoliopsida)	Clarkia rhomboidea	Diamond Clarkia	Sensitive - Known on Fc		Lake, Lincoln, Ravalli, Sanc	SOC	Forests (Open, montane)
Flowering Plants - Dicots (Magnoliopsida)	Claytonia arenicola	Sand Springbeauty	Sensitive - Known on Fc		Sanders	SOC	Mesic, rocky slopes
Flowering Plants - Dicots (Magnoliopsida)	Cleome lutea	Yellow Beeplant			Big Horn, Carbon, Deer Loc	SOC	Sagebrush-grassland (Low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Collomia debilis var. camporum	Alpine Collomia			Granite, Missoula, Ravalli	SOC	Rock/Talus (Valleys to Montane)
Flowering Plants - Dicots (Magnoliopsida)	Corydalis sempervirens	Pale Corydalis	Sensitive - Known on Fc		Flathead, Glacier, Lincoln, F	SOC	Forests/Meadows (Recently-burned)
Flowering Plants - Dicots (Magnoliopsida)	Cryptantha fendleri	Fendler Cat's-eye		SENSITIVE	Beaverhead, Gallatin, Sheri	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Cryptantha humilis	Round-headed Cryptantha			Beaverhead, Jefferson	SOC	Sagebrush Steppe (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Cryptantha scoparia	Miner's Candle			Carbon	SOC	Sagebrush Steppe (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Dalea enneandra	Nine-anther prairie clover			Big Horn, Custer, Fallon, Ri	SOC	Grasslands (Plains)
Flowering Plants - Dicots (Magnoliopsida)	Dalea villosa	Silky prairie clover			Carter, Fallon, Richland, Sh	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Delphinium burkei	Meadow Larkspur			Beaverhead, Flathead, Silv	SOC	Meadows (Moist, low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Delphinium depauperatum	Slim Larkspur			Beaverhead, Flathead, Pon	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Delphinium glaucum	Pale Larkspur			Mineral	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Descurainia torulosa	Wyoming Tansymustard			Park	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Douglasia conservatorum	Bloom Peak Douglasia			Sanders	SOC	Ridges (Open, subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Downingia laeta	Great Basin Downingia			Beaverhead, Lewis and Cla	SOC	Wetland/Riparian (Shallow water ponds, lak
Flowering Plants - Dicots (Magnoliopsida)	Draba crassa	Thick-leaf Whitlow-grass			Beaverhead, Carbon, Deer	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Draba daviesiae	Bitterroot Draba			Beaverhead, Granite, Raval	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Draba densifolia	Dense-leaf Draba			Beaverhead, Flathead, Gall	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Draba fladnizensis	White Arctic Draba			Deer Lodge, Madison, Stillv	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Draba globosa	Round-fruited Draba			Beaverhead, Madison	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Draba macounii	Macoun's Draba			Flathead, Glacier	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Draba porsildii	Porsild's Draba			Carbon, Madison	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Draba ventosa	Wind River Draba			Madison	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Drosera anglica	English Sundew	Sensitive - Known on Fc		Beaverhead, Flathead, Grai	SOC	Fens
Flowering Plants - Dicots (Magnoliopsida)	Drosera linearis	Slenderleaf Sundew	Sensitive - Known on Fc		Flathead, Lake, Lewis and (	SOC	Fens
Flowering Plants - Dicots (Magnoliopsida)	Dryas integrifolia	Entire-leaved Avens			Fergus, Golden Valley	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Ericameria discoidea var. discoidea	Whitestem Goldenbush	Sensitive - Known on Fc		Beaverhead, Gallatin	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Ericameria parryi var. montana	Parry's Mountain Rabbitbrush			Beaverhead	SOC	Grasslands (subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Erigeron allocotus	Big Horn Fleabane			Big Horn, Carbon	SOC	Rock outcrops/Ridges (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Erigeron asperugineus	Idaho Fleabane	Sensitive - Known on Fc		Beaverhead, Madison, Rav	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Erigeron evermannii	Evermann Fleabane	Sensitive - Known on Fc		Ravalli	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Erigeron flabellifolius	Fan-leaved Fleabane			Carbon, Glacier, Lincoln, M	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Erigeron formosissimus	Beautiful Fleabane			Beaverhead, Carbon, Madis	SOC	Meadows (Montane/subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Erigeron grandiflorus	Large-flower Fleabane			Carbon, Lincoln, Mineral	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Erigeron lackschewitzii	Lackschewitz' Fleabane	Sensitive - Known on Fc		Flathead, Glacier, Granite, I	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Erigeron leiomerus	Smooth Fleabane			Beaverhead, Madison	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Erigeron linearis	Linear-leaf Fleabane			Beaverhead, Deer Lodge, L	SOC	Sagebrush/Grasslands (Foothills to Montane
Flowering Plants - Dicots (Magnoliopsida)	Erigeron parryi	Parry's Fleabane			Beaverhead, Big Horn, Bro	SOC	Slopes and ridges (Open, Montane)
Flowering Plants - Dicots (Magnoliopsida)	Erigeron tener	Slender Fleabane			Beaverhead	SOC	Slopes (Open, limestone, montane)
Flowering Plants - Dicots (Magnoliopsida)	Eriogonum caespitosum	Mat Buckwheat			Beaverhead, Lewis and Cla	SOC	Sagebrush steppe (Montane)
Flowering Plants - Dicots (Magnoliopsida)	Eriogonum crosbyae	Crosby's Buckwheat			Deer Lodge, Gallatin, Grani	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Eriogonum salsuginosum	Smooth Buckwheat			Carbon	SOC	Clay Barrens
Flowering Plants - Dicots (Magnoliopsida)	Eriogonum soliceps	Railroad Canyon Wild Buckwheat			Beaverhead, Deer Lodge, N	SOC	Ridges/slopes (Open, Montane)
Flowering Plants - Dicots (Magnoliopsida)	Eriogonum visheri	Visher's Buckwheat		SENSITIVE	Carter, Powder River	SOC	Clay Barrens
Flowering Plants - Dicots (Magnoliopsida)	Eupatorium maculatum	Spotted Joepye-weed			Big Horn, Carbon	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Euphrasia subarctica	Arctic Eyebright			Glacier	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Gentiana glauca	Glaucous Gentian			Flathead	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Gentianopsis macounii	Macoun's Gentian	Sensitive - Known on Fc		Glacier, Lincoln, Madison, T	SOC	Fens
Flowering Plants - Dicots (Magnoliopsida)	Gentianopsis simplex	Hiker's Gentian	Sensitive - Known on Fc		Beaverhead, Carbon, Madis	SOC	Fens, wet meadows, seeps

Flowering Plants - Dicots (Magnoliopsida)	Githopsis specularioides	Common Blue-cup			Sanders	SOC	Cliffs
Flowering Plants - Dicots (Magnoliopsida)	Glossopetalon spinescens	Spiny Greasebush		Sensitive - Known on Fc	Ravalli	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Gratiola ebracteata	Bractless Hedge-hyssop			Flathead, Glacier, Pondera,	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Grayia spinosa	Spiny Hopsage			Big Horn, Carbon, Park	SOC	Shrublands (Dry)
Flowering Plants - Dicots (Magnoliopsida)	Grindelia howellii	Howell's Gumweed		Sensitive - Known on Fc	Granite, Missoula, Powell	SOC	Vernally moist sites (Open, Low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Gymnosteris parvula	Small-flower Gymnosteris			Beaverhead, Gallatin	SOC	Grasslands/Sagebrush steppe
Flowering Plants - Dicots (Magnoliopsida)	Heterocodon rariflorum	Western Pearl-flower		Sensitive - Known on Fc	Beaverhead, Lake, Lincoln,	SOC	Vernally moist habitats
Flowering Plants - Dicots (Magnoliopsida)	Hornungia procumbens	Hutchinsia			Beaverhead, Carbon, Flathe	SOC	Sagebrush Steppe
Flowering Plants - Dicots (Magnoliopsida)	Howellia aquatilis	Water Howellia	LT	Threatened on Forests (	Lake, Missoula	SOC	Aquatic
Flowering Plants - Dicots (Magnoliopsida)	Idahoa scapigera	Scalepod		Sensitive - Known on Fc	Flathead, Ravalli	SOC	Vernally moist, rock ledges
Flowering Plants - Dicots (Magnoliopsida)	Impatiens aurella	Pale-yellow Jewel-weed			Cascade, Flathead, Gallatir	SOC	riparian
Flowering Plants - Dicots (Magnoliopsida)	Ipomoea leptophylla	Bush morning-glory			Big Horn, Rosebud, Treasu	SOC	Prairie
Flowering Plants - Dicots (Magnoliopsida)	Ipomopsis congesta ssp. crebrifolia	Ballhead Ipomopsis			Beaverhead	SOC	Sagebrush Steppe
Flowering Plants - Dicots (Magnoliopsida)	Ipomopsis minutiflora	Small-flower Ipomopsis			Ravalli	SOC	Sagebrush (Open)
Flowering Plants - Dicots (Magnoliopsida)	Kelloggia galioides	Kelloggia			Mineral	SOC	Forest (Open/low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Kochia americana	Red Sage			Beaverhead, Petroleum	SOC	Saline/Alkaline Sites
Flowering Plants - Dicots (Magnoliopsida)	Koenigia islandica	Island Koenigia			Carbon	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Lagophylla ramosissima	Slender Hareleaf			Sanders	SOC	Grasslands (Dry/Valley)
Flowering Plants - Dicots (Magnoliopsida)	Lathyrus bijugatus	Latah Tule Pea		Sensitive - Known on Fc	Flathead, Lincoln	SOC	Forest (Open/Valley)
Flowering Plants - Dicots (Magnoliopsida)	Leptodactylon caespitosum	Mat Prickly-phlox			Carbon	SOC	Sandy Breaks/Outcrops
Flowering Plants - Dicots (Magnoliopsida)	Lewisia columbiana	Columbia Lewisia			Ravalli	SOC	Rock Crevices
Flowering Plants - Dicots (Magnoliopsida)	Ligusticum verticillatum	Idaho Lovage			Granite, Lincoln, Missoula, I	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Lobelia kalmii	Kalm's Lobelia			Deer Lodge, Flathead, Lake	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Lobelia spicata	Pale-spiked Lobelia			Dawson, Richland, Sheridai	SOC	Moist meadows
Flowering Plants - Dicots (Magnoliopsida)	Lomatium attenuatum	Taper-tip Desert-parsley			Beaverhead, Madison, Mine	SOC	Slopes and Scree (Dry)
Flowering Plants - Dicots (Magnoliopsida)	Lomatium geyeri	Geyer's Biscuitroot		Sensitive - Known on Fc	Lincoln	SOC	Rocky sites (Mesic)
Flowering Plants - Dicots (Magnoliopsida)	Lomatium nuttallii	Nuttall Desert-parsley			Big Horn, Rosebud	SOC	Rocky, pine woodlands
Flowering Plants - Dicots (Magnoliopsida)	Lomatogonium rotatum	Marsh Felwort			Beaverhead, Ravalli	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Malacothrix torreyi	Desert Dandelion			Carbon	SOC	Open slopes (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Mentzelia nuda	Bractless blazingstar			Big Horn, Custer, Dawson, I	SOC	Open areas (sandy or gravelly solis)
Flowering Plants - Dicots (Magnoliopsida)	Mentzelia pumila	Dwarf mentzelia			Big Horn, Carbon	SOC	Shrublands (Dry, sandy soils)
Flowering Plants - Dicots (Magnoliopsida)	Mertensia bella	Oregon Bluebells		Sensitive - Known on Fc	Missoula	SOC	Vernally moist soil (Montane)
Flowering Plants - Dicots (Magnoliopsida)	Micranthes apetala	Tiny Swamp Saxifrage			Beaverhead, Carbon, Deer	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Micranthes tempestiva	Storm Saxifrage		Sensitive - Known on Fc	Beaverhead, Deer Lodge, C	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Mimulus ampliatus	Stalk-leaved Monkeyflower		Sensitive - Known on Fc	Flathead, Glacier, Lincoln, I	SOC	Vernally moist soil (Valleys to subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Mimulus breviflorus	Short-flowered Monkeyflower		Sensitive - Known on Fc	Beaverhead, Flathead, Glac	SOC	Rock/Talus (Mesic, Montane)
Flowering Plants - Dicots (Magnoliopsida)	Mimulus clivicola	North Idaho Monkeyflower		Sensitive - Known on Fc	Mineral, Sanders	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Mimulus floribundus	Floriferous Monkeyflower			Beaverhead, Cascade, Flat	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Mimulus hymenophyllus	Thinsepal monkeyflower			Carbon, Lake, Park, Stillwa	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Mimulus nanus	Dwarf Purple Monkeyflower		Sensitive - Known on Fc	Gallatin, Ravalli	SOC	Open slopes (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Mimulus primuloides	Primrose Monkeyflower		Sensitive - Known on Fc	Beaverhead, Deer Lodge, C	SOC	Fens and wet meadows
Flowering Plants - Dicots (Magnoliopsida)	Mimulus ringens	Square-stem Monkeyflower			Cascade, Chouteau, Fergus	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Myriophyllum quitense	Andean Water-milfoil			Broadwater, Gallatin, Madis	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Nama densum	Nama			Carbon	SOC	Sagebrush (Sandy soil)
Flowering Plants - Dicots (Magnoliopsida)	Navarretia divaricata	Divaricate Navarretia			Sanders	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Noccaea parviflora	Small-flowered Pennycress			Beaverhead, Carbon, Casca	SOC	Meadows (Moist, Montane to alpine)
Flowering Plants - Dicots (Magnoliopsida)	Nuttallanthus texanus	Blue Toadflax			Carter, Dawson	SOC	Grasslands/woodlands (sandy to clay soils)
Flowering Plants - Dicots (Magnoliopsida)	Nymphaea leibergii	Pygmy Water-lily			Flathead, Lake, Missoula	SOC	Aquatic
Flowering Plants - Dicots (Magnoliopsida)	Oenothera pallida ssp. pallida	Pale Evening-primrose			Beaverhead	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Oxytropis campestris var. columbiar	Columbia Locoweed			Lake	SOC	Wetland/Riparian, Gravelly shoreline
Flowering Plants - Dicots (Magnoliopsida)	Oxytropis deflexa var. foliolosa	Nodding Locoweed			Beaverhead, Gallatin, Madi	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Oxytropis parryi	Parry's Locoweed			Beaverhead, Madison	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Oxytropis podocarpa	Stalked-pod Locoweed		Sensitive - Known on Fc	Glacier, Teton	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Papaver pygmaeum	Alpine Glacier Poppy			Flathead, Glacier, Lewis an	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Papaver radicatum ssp. kluanensis	Alpine Poppy			Carbon, Park, Sweet Grass	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Pedicularis contorta var. ctenophora	Pink Coil-beaked Lousewort			Beaverhead, Judith Basin, I	SOC	Slopes (Montane/Subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Pedicularis contorta var. rubicunda	Selway Coil-beaked Lousewort			Ravalli	SOC	Ridgetops and meadows (subalpine and alpi
Flowering Plants - Dicots (Magnoliopsida)	Pedicularis crenulata	Scallop-leaf Lousewort			Beaverhead	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Pedicularis pulchella	Mountain Lousewort			Carbon, Deer Lodge, Gallat	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Penstemon angustifolius	Narrowleaf Penstemon			Carter, Dawson, Fallon, Gra	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Penstemon caryi	Cary's Beardtongue			Carbon	SOC	Grasslands and slopes (Open, montane)
Flowering Plants - Dicots (Magnoliopsida)	Penstemon flavescens	Yellow Beardtongue			Mineral, Missoula, Ravalli	SOC	Rocky slopes (Open, montane)
Flowering Plants - Dicots (Magnoliopsida)	Penstemon grandiflorus	Large Flowered Beardtongue			Custer	SOC	Sandy soils
Flowering Plants - Dicots (Magnoliopsida)	Penstemon humilis	Low Beardtongue			Beaverhead, Gallatin, Lewis	SOC	Sagebrush steppe (Montane)
Flowering Plants - Dicots (Magnoliopsida)	Penstemon lemhiensis	Lemhi Beardtongue		Sensitive - Known on Fc	Beaverhead, Deer Lodge, F	SOC	Sagebrush-grasslands
Flowering Plants - Dicots (Magnoliopsida)	Penstemon payettensis	Payette Beardtongue		Sensitive - Known on Fc	Beaverhead, Ravalli	SOC	Slopes (Open, Montane)
Flowering Plants - Dicots (Magnoliopsida)	Penstemon whippleanus	Whipple's Beardtongue			Beaverhead, Gallatin, Madi	SOC	Open areas (subalpine and alpine)
Flowering Plants - Dicots (Magnoliopsida)	Petasites frigidus var. frigidus	Arctic Sweet Coltsfoot		Species of Conservatior	Flathead, Glacier	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Phacelia incana	Hoary Phacelia			Beaverhead	SOC	Rocky slopes (foothills)
Flowering Plants - Dicots (Magnoliopsida)	Phacelia thermalis	Hot Spring Phacelia			Fergus, Garfield, Phillips, V	SOC	Barren clay slopes
Flowering Plants - Dicots (Magnoliopsida)	Phlox kelseyi var. missoulensis	Missoula Phlox		Sensitive - Known on Fc	Cascade, Granite, Jeffersor	SOC	Slopes/ridges (Open, foothills to subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Physaria brassicoides	Double Bladderpod			Carbon, Carter, Custer, Pet	SOC	Breaklands/badlands

Flowering Plants - Dicots (Magnoliopsida)	Physaria carinata	Keeled Bladderpod		Sensitive - Known on Fc		Beaverhead, Granite, Muss	SOC	Grassland slopes (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Physaria didymocarpa var. lanata	Woolly Twinpod				Big Horn, Rosebud	SOC	Grasslands/Shrublands (Open, plains)
Flowering Plants - Dicots (Magnoliopsida)	Physaria douglasii	Douglas Bladderpod				Lincoln	SOC	Woodlands (Sandy soils, low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Physaria humilis	Bitterroot Bladderpod		Sensitive - Known on Fc		Ravalli	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Physaria klausii	Divide Bladderpod				Broadwater, Lewis and Clar	SOC	Slopes (Open, Montane/subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Physaria lesicii	Lesica's Bladderpod			SENSITIVE	Carbon	SOC	Woodlands/Grasslands (Montane)
Flowering Plants - Dicots (Magnoliopsida)	Physaria ludoviciana	Silver Bladderpod				Carbon, Carter, Cascade, C	SOC	Sandy sites
Flowering Plants - Dicots (Magnoliopsida)	Physaria pachyphylla	Thick-leaf Bladderpod				Carbon	SOC	Rocky slopes (foothills)
Flowering Plants - Dicots (Magnoliopsida)	Physaria pulchella	Beautiful Bladderpod		Sensitive - Known on Fc	SENSITIVE	Beaverhead	SOC	Open slopes (Calcaeous soils, foothills to al
Flowering Plants - Dicots (Magnoliopsida)	Physaria saximontana var. dentata	Rocky Mountain Twinpod				Beaverhead, Broadwater, C	SOC	Gravelly slopes/talus (Montane/subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Plagiobothrys leptocladus	Slender-branched Popcorn-flower				Beaverhead, Custer, Glacie	SOC	Wetland/Riparian (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Pleiacanthus spinosus	Spiny Skeletonweed				Beaverhead, Carbon, Madis	SOC	Grasslands (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Potentilla brevifolia	Short-leaved Cinquefoil				Madison	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Potentilla hyparctica	Low Arctic Cinquefoil				Carbon, Flathead, Glacier	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Potentilla nivea var. pentaphylla	Five-leaf Cinquefoil		Sensitive - Known on Fc		Flathead, Glacier, Lincoln, I	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Potentilla plattensis	Platte Cinquefoil				Beaverhead, Carbon, Judith	SOC	Grasslands/Sagebrush (Mesic)
Flowering Plants - Dicots (Magnoliopsida)	Primula alcalina	Alkali Primrose		Sensitive - Known on Fc	SENSITIVE	Beaverhead, Madison	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Primula incana	Mealy Primrose		Sensitive - Known on Fc		Beaverhead, Broadwater, C	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Prunus pumila	Sand Cherry				Fallon	SOC	Sandy or rocky soils (Plains)
Flowering Plants - Dicots (Magnoliopsida)	Psilocarphus brevissimus	Dwarf woolly-heads		Sensitive - Known on Fc		Cascade, Lincoln, Petroleur	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Pyrrocoma carthamoides var. subsq	Beartooth Large-flowered Goldenwe		Sensitive - Known on Fc	SENSITIVE	Carbon	SOC	Sagebrush-Grassland
Flowering Plants - Dicots (Magnoliopsida)	Quercus macrocarpa	Bur Oak				Carter	SOC	Shale ridges
Flowering Plants - Dicots (Magnoliopsida)	Ranunculus cardiophyllus	Heart-leaved Buttercup				Chouteau, Glacier, Sweet G	SOC	Grasslands (Moist, Montane)
Flowering Plants - Dicots (Magnoliopsida)	Ranunculus grayi	Arctic Buttercup				Carbon, Deer Lodge, Flathe	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Ranunculus orthorhynchus	Straightbeak Buttercup				Deer Lodge, Flathead, Glac	SOC	Wetland/Riparian (Montane)
Flowering Plants - Dicots (Magnoliopsida)	Ranunculus pedatifidus	Northern Buttercup				Carbon, Flathead, Glacier, (	SOC	Meadows/Woodlands (Montane to Alpine)
Flowering Plants - Dicots (Magnoliopsida)	Ribes laxiflorum	Trailing Black Currant				Lincoln	SOC	Shrublands (Rocky, montane)
Flowering Plants - Dicots (Magnoliopsida)	Ribes triste	Swamp Red Currant				Beaverhead, Deer Lodge, G	SOC	Forest openings (Mesic, montane/subalpine)
Flowering Plants - Dicots (Magnoliopsida)	Rorippa calycina	Persistent-sepal Yellow-cress				Big Horn, Custer, Mccone, I	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Rotala ramosior	Toothcup				Lake, Missoula, Ravalli	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Rubus arcticus	Nagoonberry				Flathead, Glacier	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Sagina nivalis	Arctic Pearlwort				Carbon, Glacier, Stillwater	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Salix barrattiana	Barratt's Willow		Sensitive - Known on Fc		Carbon, Glacier, Madison	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Salix cascadensis	Cascade Willow				Deer Lodge, Sanders, Teton	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Salix serissima	Autumn Willow				Cascade, Glacier, Meagher	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Sandbergia perplexa	Puzzling Rockcress		Sensitive - Known on Fc		Ravalli	SOC	Shrubland/woodland slopes (Open, Montane
Flowering Plants - Dicots (Magnoliopsida)	Satureja douglasii	Yerba Buena				Mineral, Missoula, Ravalli, S	SOC	Forest (Moist, montane)
Flowering Plants - Dicots (Magnoliopsida)	Saussurea densa	Dwarf Saw-wort				Flathead, Lewis and Clark,	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Saussurea weberi	Weber's Saw-wort		Sensitive - Known on Fc		Deer Lodge, Granite, Park	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Saxifraga hirculus	Yellow Marsh Saxifrage				Carbon	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Senecio amplectens	Clasping Groundsel				Carbon, Glacier	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Senecio elmeri	Elmer's Ragwort				Lincoln, Sanders	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Senecio eremophilus	Desert Groundsel				Big Horn, Blaine, Hill, Lake,	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Senecio hydrophilus	Alkali-marsh Ragwort				Beaverhead, Broadwater, F	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Senecio integerrimus var. scribneri	Scribner's Ragwort				Carbon, Custer, Fergus, Go	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Shoshonea pulvinata	Shoshonea		Sensitive - Known on Fc	SENSITIVE	Carbon	SOC	Rock Outcrops
Flowering Plants - Dicots (Magnoliopsida)	Sidalcea oregana	Oregon Checker-mallow				Gallatin, Lake	SOC	Grasslands (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Silene spaldingii	Spalding's Catchfly	LT	Threatened on Forests (		Flathead, Lake, Lincoln, Sa	SOC	Grasslands (Intermountain)
Flowering Plants - Dicots (Magnoliopsida)	Solidago ptarmicoides	Prairie Goldenrod				Carter, Richland, Wibaux	SOC	Grasslands (Plains)
Flowering Plants - Dicots (Magnoliopsida)	Sphaeromeria argentea	Chicken-sage			SENSITIVE	Beaverhead	SOC	Sagebrush steppe (low-elevation)
Flowering Plants - Dicots (Magnoliopsida)	Stellaria crassifolia	Fleshy Stitchwort				Beaverhead, Carbon, Glaci	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Sullivantia hapemanii	Wyoming Sullivantia				Big Horn, Carbon	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Symphyotrichum molle	Soft Aster				Big Horn, Carbon	SOC	NA
Flowering Plants - Dicots (Magnoliopsida)	Synthyris canbyi	Mission Mountain kittentails				Flathead, Granite, Lake, Mi	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Thalictrum alpinum	Alpine Meadowrue		Sensitive - Known on Fc		Beaverhead, Deer Lodge, G	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Thelypodium paniculatum	Northwestern Thelypody				Beaverhead, Gallatin, Madi	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Thelypodium sagittatum	Slender Thelypody				Beaverhead, Gallatin	SOC	Alkaline meadows (Valleys and Montane)
Flowering Plants - Dicots (Magnoliopsida)	Tonestus aberrans	Idaho Goldenweed		Sensitive - Known on Fc		Ravalli	SOC	Rock/Talus
Flowering Plants - Dicots (Magnoliopsida)	Townsendia condensata	Cushion Townsend-daisy				Beaverhead, Flathead, Glac	SOC	Alpine
Flowering Plants - Dicots (Magnoliopsida)	Townsendia florifer	Showy Townsend-daisy				Beaverhead, Park, Sweet G	SOC	Grasslands and Sagebrush
Flowering Plants - Dicots (Magnoliopsida)	Trifolium cyathiferum	Cup Clover				Missoula, Ravalli	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Trifolium eriocephalum	Woolly-head Clover		Sensitive - Known on Fc		Beaverhead, Ravalli	SOC	Open areas (foothills and montane)
Flowering Plants - Dicots (Magnoliopsida)	Trifolium gymnocarpon	Hollyleaf Clover		Sensitive - Known on Fc		Granite, Ravalli	SOC	Open areas (foothills and montane)
Flowering Plants - Dicots (Magnoliopsida)	Trifolium microcephalum	Woolly Clover				Missoula, Ravalli	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Triodanis leptocarpa	Slim-pod Venus'-looking-glass				Big Horn, Carter, Cascade,	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Utricularia intermedia	Flatleaf Bladderwort		Sensitive - Known on Fc		Flathead, Glacier, Lake, Lin	SOC	Fens (Aquatic)
Flowering Plants - Dicots (Magnoliopsida)	Utricularia ochroleuca	Northern Bladderwort				Deer Lodge, Glacier	SOC	
Flowering Plants - Dicots (Magnoliopsida)	Vaccinium myrtilloides	Velvetleaf Huckleberry				Flathead, Glacier	SOC	Forests
Flowering Plants - Dicots (Magnoliopsida)	Viburnum lentago	Nannyberry				Big Horn, Richland, Roosev	SOC	Riparian forest
Flowering Plants - Dicots (Magnoliopsida)	Viguiera multiflora	Many-flowered Viguiera				Beaverhead, Carbon, Casca	SOC	Aspen woodlands
Flowering Plants - Dicots (Magnoliopsida)	Viola selkirkii	Great-spurred Violet		Sensitive - Known on Fc		Lincoln	SOC	Wetland/Riparian
Flowering Plants - Dicots (Magnoliopsida)	Waldsteinia idahoensis	Idaho Barren Strawberry		Sensitive - Known on Fc		Mineral, Missoula	SOC	Forests (Ponderosa Pine)

Flowering Plants - Monocots (Liliopsida)	Acorus americanus	Sweetflag				Flathead, Lake	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Allium acuminatum	Tapertip Onion		Sensitive - Known on Fo		Lincoln, Madison, Ravalli, S	SOC	Dry Forest-Grassland
Flowering Plants - Monocots (Liliopsida)	Allium columbianum	Columbia Onion				Lincoln, Ravalli, Sanders	SOC	Open, mesic sites
Flowering Plants - Monocots (Liliopsida)	Allium geyeri var. geyeri	Geyer's Onion				Beaverhead, Big Horn, Broa	SOC	
Flowering Plants - Monocots (Liliopsida)	Allium parvum	Small Onion		Sensitive - Known on Fo		Beaverhead, Ravalli	SOC	Dry Forest-Grassland
Flowering Plants - Monocots (Liliopsida)	Allium simillimum	Dwarf Onion				Gallatin, Lincoln, Ravalli	SOC	Mesic Grasslands-Meadows
Flowering Plants - Monocots (Liliopsida)	Amerorchis rotundifolia	Round-leaved Orchis		Sensitive - Known on Fo		Flathead, Glacier, Lake, Lev	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Bolboschoenus fluviatilis	River Bulrush				Sheridan, Valley	SOC	
Flowering Plants - Monocots (Liliopsida)	Calamagrostis tweedyi	Cascade reedgrass				Mineral, Missoula, Ravalli, S	SOC	Montane Forest
Flowering Plants - Monocots (Liliopsida)	Calochortus bruneaunis	Bruneau Mariposa Lily				Beaverhead	SOC	Grasslands (Intermountain)
Flowering Plants - Monocots (Liliopsida)	Carex amplifolia	Big-leaf Sedge		Sensitive - Known on Fo		Flathead, Sanders	SOC	Wetland
Flowering Plants - Monocots (Liliopsida)	Carex chordorrhiza	Creeping Sedge		Sensitive - Known on Fo		Flathead, Lincoln, Powell	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Carex comosa	Bristly Sedge				Flathead	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Carex crawei	Crawe's Sedge				Cascade, Pondera, Powell,	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Carex glacialis	Alpine Sedge				Flathead, Lewis and Clark,	SOC	
Flowering Plants - Monocots (Liliopsida)	Carex gravida	Heavy Sedge		Sensitive - Known on Fo		Big Horn, Carter, Fallon, Mc	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Carex idahoa	Idaho Sedge		Sensitive - Known on Fo	SENSITIVE	Beaverhead, Broadwater, D	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Carex incurviformis	Coastal Sand Sedge				Deer Lodge, Glacier, Madis	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Carex lacustris	Lake-bank Sedge		Species of Conservation		Lake, Missoula	SOC	Fens and marshes
Flowering Plants - Monocots (Liliopsida)	Carex multicostata	Many-ribbed Sedge				Beaverhead, Carbon, Galla	SOC	Grasslands (Montane)
Flowering Plants - Monocots (Liliopsida)	Carex occidentalis	Western Sedge				Beaverhead, Gallatin, Silve	SOC	Dry, montane to alpine
Flowering Plants - Monocots (Liliopsida)	Carex petricosa	Rock Sedge				Beaverhead, Glacier, Powe	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Carex plectocarpa	Goose-grass Sedge				Flathead, Glacier, Park	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Carex prairea	Prairie Sedge		Sensitive - Known on Fo		Flathead, Lewis and Clark,	SOC	Fens
Flowering Plants - Monocots (Liliopsida)	Carex rostrata	Glaucus Beaked Sedge		Sensitive - Known on Fo		Flathead, Gallatin, Lincoln,	SOC	Fens
Flowering Plants - Monocots (Liliopsida)	Carex scoparia	Pointed Broom Sedge				Beaverhead, Missoula, Phil	SOC	Wetland/Riparian (Valleys)
Flowering Plants - Monocots (Liliopsida)	Carex stenoptila	Small-winged Sedge				Carbon, Gallatin, Madison,	SOC	Grasslands (Montane)
Flowering Plants - Monocots (Liliopsida)	Carex stevenii	Steven's Scandinavian Sedge				Beaverhead, Deer Lodge, S	SOC	Wetland/Riparian (Subalpine)
Flowering Plants - Monocots (Liliopsida)	Carex sychnocephala	Many-headed Sedge				Cascade, Flathead, Garfielc	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Carex tenuiflora	Thin-flowered Sedge				Flathead	SOC	Fens
Flowering Plants - Monocots (Liliopsida)	Carex vaginata	Sheathed Sedge		Sensitive - Known on Fo		Lincoln	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Cyperus acuminatus	Short-pointed Flatsedge				Missoula, Sanders	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Cyperus bipartitus	Shining Flatsedge				Missoula, Ravalli	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Cyperus erythrorhizos	Red-root Flatsedge				Prairie	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Cyperus schweinitzii	Schweinitz's Flatsedge				Carter, Cascade, Custer, Po	SOC	Sandy sites
Flowering Plants - Monocots (Liliopsida)	Cypripedium fasciculatum	Clustered Lady's-slipper		Sensitive - Known on Fo		Lake, Mineral, Missoula, Sa	SOC	Forests (Montane)
Flowering Plants - Monocots (Liliopsida)	Cypripedium passerinum	Sparrow's-egg Lady's-slipper		Sensitive - Known on Fo		Flathead, Glacier, Lake, Lev	SOC	Forests (Mesic bottoms)
Flowering Plants - Monocots (Liliopsida)	Dichanthelium acuminatum	Panic Grass				Big Horn, Carbon, Deer Loc	SOC	
Flowering Plants - Monocots (Liliopsida)	Dichanthelium oligosanthes var. scri	Scribner's Panic Grass				Carter, Lake, Powder River	SOC	Mesic, sandy woodlands (low-elevation)
Flowering Plants - Monocots (Liliopsida)	Eleocharis rostellata	Beaked Spikerush		Sensitive - Known on Fo		Carbon, Flathead, Gallatin,	SOC	Wetlands (Alkaline)
Flowering Plants - Monocots (Liliopsida)	Elodea bifoliata	Long-sheath Waterweed				Beaverhead, Blaine, Fergus	SOC	Wetland/Riparian (Shallow water)
Flowering Plants - Monocots (Liliopsida)	Elymus flavescens	Sand Wildrye			SENSITIVE	Beaverhead	SOC	Sandy sites
Flowering Plants - Monocots (Liliopsida)	Elymus innovatus	Northern Wildrye		Sensitive - Known on Fo		Cascade, Glacier, Pondera,	SOC	Wetland/Riparian (mesic openings /streamb
Flowering Plants - Monocots (Liliopsida)	Epipactis gigantea	Giant Helleborine		Sensitive - Known on Fo		Carbon, Flathead, Granite,	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Eriophorum callitrix	Sheathed Cotton-grass				Carbon	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Eriophorum gracile	Slender Cottongrass		Sensitive - Known on Fo		Flathead, Gallatin, Lake, Lir	SOC	Fens
Flowering Plants - Monocots (Liliopsida)	Festuca viviparoidea	Northern Fescue				Flathead, Glacier	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Goodyera repens	Northern Rattlesnake-plantain		Sensitive - Known on Fo		Fergus, Flathead, Judith Ba	SOC	Mesic Forest
Flowering Plants - Monocots (Liliopsida)	Heteranthera dubia	Water Star-grass				Flathead, Sanders	SOC	Aquatic
Flowering Plants - Monocots (Liliopsida)	Juncus acuminatus	Tapered Rush				Lincoln, Teton	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Juncus covillei	Coville's Rush				Flathead, Mineral, Missoula	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Juncus triglumis var. albescens	Three-flowered Rush				Carbon, Flathead, Glacier, I	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Kobresia sibirica	Large-fruited Kobresia				Carbon	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Kobresia simpliciuscula	Simple Kobresia				Beaverhead, Carbon, Glaci	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Lilaea scilloides	Flowering Quillwort				Lake, Phillips	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Lilium columbianum	Columbia Lily				Lincoln	SOC	
Flowering Plants - Monocots (Liliopsida)	Lilium philadelphicum	Wood Lily				Carbon, Carter, Fergus, Lev	SOC	
Flowering Plants - Monocots (Liliopsida)	Liparis loeselii	Loesel's Twayblade		Species of Conservation		Lake	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Muhlenbergia andina	Foxtail Muhly				Broadwater, Carbon, Casca	SOC	
Flowering Plants - Monocots (Liliopsida)	Muhlenbergia minutissima	Annual Muhly				Beaverhead, Gallatin, Madi	SOC	
Flowering Plants - Monocots (Liliopsida)	Najas guadalupensis	Guadalupe Water-nymph				Carter, Cascade, Flathead,	SOC	Aquatic
Flowering Plants - Monocots (Liliopsida)	Phippsia algida	Ice Grass				Carbon, Stillwater	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Poa laxa ssp. banffiana	Banff Bluegrass				Glacier	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Potamogeton obtusifolius	Blunt-leaved Pondweed		Sensitive - Known on Fo		Flathead, Glacier, Lake, Mis	SOC	Aquatic
Flowering Plants - Monocots (Liliopsida)	Puccinellia lemmonii	Lemmon's Alkaligrass				Beaverhead	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Scheuchzeria palustris	Pod Grass		Sensitive - Known on Fo		Flathead, Granite, Lake, Lir	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Schoenoplectus heterochaetus	Slender Bulrush				Lake, Phillips	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Schoenoplectus subterminalis	Water Bulrush		Sensitive - Known on Fo		Flathead, Lake, Lewis and (	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Scolochloa festucacea	Sprangletop				Flathead	SOC	
Flowering Plants - Monocots (Liliopsida)	Sisyrinchium septentrionale	Northern Blue-eyed-grass				Sheridan	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Spiranthes diluvialis	Ute ladies'-tresses	LT			Beaverhead, Broadwater, G	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Sporobolus compositus	Tall Dropseed				Big Horn, Carter, Custer	SOC	Forests/Grasslands (open, plains)

Flowering Plants - Monocots (Liliopsida)	Sporobolus neglectus	Small Dropseed		Gallatin, Sanders, Wheatlar	SOC	Grasslands (low-elevation)
Flowering Plants - Monocots (Liliopsida)	Stipa lettermanii	Letterman's Needlegrass		Beaverhead, Big Horn, Carl	SOC	Talus and Grasslands (low-elevation)
Flowering Plants - Monocots (Liliopsida)	Tofieldia pusilla	Small Tofieldia		Flathead, Glacier	SOC	Alpine
Flowering Plants - Monocots (Liliopsida)	Trichophorum alpinum	Hudson's Bay Bulrush	Species of Conservatior	Flathead, Glacier	SOC	Fens and cold, wet slopes
Flowering Plants - Monocots (Liliopsida)	Trichophorum cespitosum	Tufted Club-rush	Sensitive - Known on Fc	Beaverhead, Flathead, Glac	SOC	Fens and wet meadows
Flowering Plants - Monocots (Liliopsida)	Trichophorum pumilum	Rolland's bulrush		Glacier, Teton	SOC	Fens
Flowering Plants - Monocots (Liliopsida)	Veratrum californicum	California False-hellebore	Sensitive - Known on Fc	Gallatin, Granite, Lewis and	SOC	Wetland/Riparian
Flowering Plants - Monocots (Liliopsida)	Wolffia columbiana	Columbia Water-meal		Flathead, Lake, Missoula, F	SOC	Aquatic
Bryophytes (Bryophyta)	Aloina brevirostris	Short-beaked Aloe Moss		Flathead, Lincoln	SOC	
Bryophytes (Bryophyta)	Catoscopium nigritum	Black Golf Club Moss		Flathead, Glacier, Lewis an	SOC	
Bryophytes (Bryophyta)	Cinclidium stygium	A Cinclidium Moss		Teton	SOC	
Bryophytes (Bryophyta)	Cynodontium tenellum	A Cynodontium Moss			SOC	
Bryophytes (Bryophyta)	Dichodontium olympicum	Olympic Dichodontium Moss		Missoula	SOC	
Bryophytes (Bryophyta)	Dicranella schreberiana	Schreber's Dicranella Moss		Flathead, Glacier	SOC	
Bryophytes (Bryophyta)	Dicranum acutifolium	Acuteleaf Dicranum Moss		Ravalli	SOC	
Bryophytes (Bryophyta)	Eucladium verticillatum	Lime-Seep Eucladium Moss		Granite, Powell	SOC	
Bryophytes (Bryophyta)	Fabronia pusilla	Silky Urn Moss		Madison	SOC	
Bryophytes (Bryophyta)	Fissidens fontanus	Flat Pocket Moss		Granite	SOC	
Bryophytes (Bryophyta)	Grimmia brittoniae	Britton's Dry Rock Moss	Sensitive - Known on Fc	Flathead, Sanders	SOC	
Bryophytes (Bryophyta)	Grimmia incurva	Curved Dry Rock Moss		Ravalli	SOC	
Bryophytes (Bryophyta)	Hamatocaulis vernicosus	Hamatocaulis Moss		Flathead, Lincoln	SOC	
Bryophytes (Bryophyta)	Haplodontium macrocarpum	Waterfall Copper Moss			SOC	
Bryophytes (Bryophyta)	Hennediella heimii	Heim's Hennediella Moss		Ravalli	SOC	
Bryophytes (Bryophyta)	Homalothecium megaptilum	Giant Golden Moss		Lake, Lincoln, Mineral, San	SOC	
Bryophytes (Bryophyta)	Hygroamblystegium varium ssp. not	A Conecap Moss		Cascade, Granite	SOC	
Bryophytes (Bryophyta)	Leucolepis acanthoneuron	Umbrella Moss		Lincoln, Sanders	SOC	
Bryophytes (Bryophyta)	Meesia longiseta	Meesia Moss		Flathead	SOC	
Bryophytes (Bryophyta)	Meesia triquetra	Meesia Moss	Sensitive - Known on Fc	Carbon, Flathead, Glacier, I	SOC	
Bryophytes (Bryophyta)	Meesia uliginosa	Meesia Moss		Flathead, Glacier, Lake, Lin	SOC	
Bryophytes (Bryophyta)	Meiotrichum lyallii	Lyall's Polytrichum Moss		Flathead, Sanders	SOC	
Bryophytes (Bryophyta)	Myurella tenerrima	A Mousetail Moss		Glacier	SOC	
Bryophytes (Bryophyta)	Neckera douglasii	Douglas' Neckera Moss		Flathead, Lake, Sanders	SOC	
Bryophytes (Bryophyta)	Paludella squarrosa	Angled Paludella Moss		Beaverhead, Carbon, Flathe	SOC	
Bryophytes (Bryophyta)	Paraleucobryum enerve	A Windblown Moss		Flathead, Glacier, Stillwater	SOC	
Bryophytes (Bryophyta)	Physcomitrium hookeri	Hooker's Physcomitrium Moss		Ravalli, Roosevelt	SOC	
Bryophytes (Bryophyta)	Porotrichum bigelovii	Bigelow's Porotrichum Moss		Ravalli	SOC	
Bryophytes (Bryophyta)	Pseudocrossidium obtusulum	A Pseudocrossidium Moss		Musselshell, Ravalli	SOC	
Bryophytes (Bryophyta)	Ptychostomum schleicheri	Schleicher's Ptychostomum Moss		Glacier	SOC	
Bryophytes (Bryophyta)	Rhynchostegium aquaticum	Aquatic Rhynchostegium Moss		Lake, Lincoln, Sanders	SOC	
Bryophytes (Bryophyta)	Sarmentypnum exannulatum	Warnstorfia Moss		Beaverhead, Flathead, Glac	SOC	
Bryophytes (Bryophyta)	Scorpidium revolvens	Limprichtia Moss		Flathead, Gallatin, Glacier,	SOC	
Bryophytes (Bryophyta)	Scorpidium scorpioides	A Scorpidium Moss	Sensitive - Known on Fc	Flathead, Glacier, Lake, Le	SOC	
Bryophytes (Bryophyta)	Sphagnum angustifolium	Narrowleaf Peatmoss		Beaverhead, Flathead, Linc	SOC	
Bryophytes (Bryophyta)	Sphagnum centrale	A Peatmoss		Flathead, Missoula, Ravalli,	SOC	
Bryophytes (Bryophyta)	Sphagnum compactum	Cushion Peatmoss		Granite, Meagher	SOC	
Bryophytes (Bryophyta)	Sphagnum contortum	Contorted Sphagnum Moss		Flathead, Lincoln	SOC	
Bryophytes (Bryophyta)	Sphagnum fimbriatum	Fringed Bogmoss		Beaverhead, Flathead, Grai	SOC	
Bryophytes (Bryophyta)	Sphagnum fuscum	Brown Hair Peatmoss		Flathead, Lake, Lincoln, Mis	SOC	
Bryophytes (Bryophyta)	Sphagnum girgensohnii	Star Hair Peatmoss		Lincoln	SOC	
Bryophytes (Bryophyta)	Sphagnum magellanicum	Red Spoon Peatmoss	Species of Conservatior	Flathead, Lincoln, Madison,	SOC	
Bryophytes (Bryophyta)	Sphagnum mendocinum	Mendocino Peatmoss		Flathead, Missoula	SOC	
Bryophytes (Bryophyta)	Sphagnum riparium	Streamside Peatmoss		Lewis and Clark, Lincoln, M	SOC	
Bryophytes (Bryophyta)	Sphagnum wulfianum	Wulf's Peatmoss		Lake, Lincoln	SOC	
Bryophytes (Bryophyta)	Stegonia latifolia	Wideleaf Stegonia Moss			SOC	
Bryophytes (Bryophyta)	Syntrichia bartramii	Bartram's Syntrichia Moss		Ravalli	SOC	
Bryophytes (Bryophyta)	Syntrichia norvegica	Norwegian Syntrichia Moss		Glacier, Lake, Madison	SOC	
Bryophytes (Bryophyta)	Syntrichia papillosissima	Antler Twist Moss		Carbon, Lewis and Clark, M	SOC	
Bryophytes (Bryophyta)	Tortula acaulon	Elfin Crisp Moss		Ravalli, Richland	SOC	
Lichens (Fungi)	Arctomia delicatula	Delicate Arctic Scale Lichen			SOC	
Lichens (Fungi)	Arctoparmelia subcentrifuga	Subcentric Ring Lichen		Missoula	SOC	
Lichens (Fungi)	Cetraria commixta	Friendly Camouflage Lichen		Flathead, Glacier	SOC	
Lichens (Fungi)	Circinaria rogeri	Roger's Vagabond Lichen		Carbon	SOC	
Lichens (Fungi)	Cladonia botrytes	Stump Pixie-Cup Lichen		Flathead, Lincoln	SOC	
Lichens (Fungi)	Cladonia uncialis	Thorny Pixie-Sticks Lichen		Lake	SOC	
Lichens (Fungi)	Collema curtisporum	Pustulate Tarpaper Lichen	Sensitive - Known on Fc	Flathead, Glacier, Lake, Mi	SOC	
Lichens (Fungi)	Dactylina ramulosa	Frosted Finger Lichen		Park, Ravalli	SOC	
Lichens (Fungi)	Gyalectaria diluta	Diluted Wart Lichen			SOC	
Lichens (Fungi)	Lobaria amplissima	Large Lungwort Lichen			SOC	
Lichens (Fungi)	Lobaria anomala	Netted Lungwort Lichen		Lake	SOC	
Lichens (Fungi)	Lobaria hallii	Gray Lungwort Lichen		Flathead, Lake, Lincoln, Mis	SOC	
Lichens (Fungi)	Lobaria linita	Cabbage Lungwort Lichen		Ravalli	SOC	
Lichens (Fungi)	Lobaria scrobiculata	Textured Lungwort Lichen		Lake, Mineral	SOC	

APPENDIX B

WATER QUALITY, CONSUMER CONFIDENCE REPORT, GROUNDWATER DETERMINATION, & SANITARY SURVEY

consumer confidence report 2018

Is my water safe?

We are pleased to present this year's Annual Water Quality Report (Consumer Confidence Report) as required by the Safe Drinking Water Act (SDWA). This report is designed to provide details about where your water comes from, what it contains, and how it compares to standards set by regulatory agencies. This report is a snapshot of last year's water quality. We are committed to providing you with information because informed customers are our best allies.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Water Drinking Hotline (800-426-4791).

Where does my water come from?

Your water comes from the ground

Source water assessment and its availability

The most recent sanitary survey was completed in 2018

Why are there contaminants in my drinking water?

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800-426-4791). The sources of drinking water (both tap water and bottled water)

include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity:
microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife; inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming; pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses; organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems; and radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities. In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

How can I get involved?

Attend monthly town council meetings

Water Conservation Tips

Did you know that the average U.S. household uses approximately 400 gallons of water per day or 100 gallons per person per day? Luckily, there are many low-cost and no-cost ways to conserve water. Small changes can make a big difference - try one today and soon it will become second nature.

- Take short showers - a 5 minute shower uses 4 to 5 gallons of water compared to up to 50 gallons for a bath.
- Shut off water while brushing your teeth, washing your hair and shaving and save up to 500 gallons a month.
- Use a water-efficient showerhead. They're inexpensive, easy to install, and can save you up to 750 gallons a month.
- Run your clothes washer and dishwasher only when they are full. You can save up to 1,000 gallons a month.
- Water plants only when necessary.
- Fix leaky toilets and faucets. Faucet washers are inexpensive and take only a few minutes to replace. To check your toilet for a leak, place a few drops of food coloring in the tank

and wait. If it seeps into the toilet bowl without flushing, you have a leak. Fixing it or replacing it with a new, more efficient model can save up to 1,000 gallons a month.
- Adjust sprinklers so only your lawn is watered. Apply water only as fast as the soil can absorb it and during the cooler parts of the day to reduce evaporation.
- Teach your kids about water conservation to ensure a future generation that uses water wisely. Make it a family effort to reduce next month's water bill!
- Visit www.epa.gov/watersense for more information.

Cross Connection Control Survey

The purpose of this survey is to determine whether a cross-connection may exist at your home or business. A cross connection is an unprotected or improper connection to a public water distribution system that may cause contamination or pollution to enter the system. We are responsible for enforcing cross-connection control regulations and insuring that no contaminants can, under any flow conditions, enter the distribution system. If you have any of the devices listed below please contact us so that we can discuss the issue, and if needed, survey your connection and assist you in isolating it if that is necessary.

- Boiler/ Radiant heater (water heaters not included)
- Underground lawn sprinkler system
- Pool or hot tub (whirlpool tubs not included)
- Additional source(s) of water on the property
- Decorative pond
- Watering trough

Source Water Protection Tips

Protection of drinking water is everyone's responsibility. You can help protect your community's drinking water source in several ways:

- Eliminate excess use of lawn and garden fertilizers and pesticides - they contain hazardous chemicals that can reach your drinking water source.
- Pick up after your pets.
- If you have your own septic system, properly maintain your system to reduce leaching to water sources or consider connecting to a public water system.
- Dispose of chemicals properly; take used motor oil to a recycling center.
- Volunteer in your community. Find a watershed or wellhead protection organization in your community and volunteer to help. If there are no active groups, consider starting

one. Use EPA's Adopt Your Watershed to locate groups in your community, or visit the Watershed Information Network's How to Start a Watershed Team.

- Organize a storm drain stenciling project with your local government or water supplier. Stencil a message next to the street drain reminding people "Dump No Waste - Drains to River" or "Protect Your Water." Produce and distribute a flyer for households to remind residents that storm drains dump directly into your local water body.

Additional Information for Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Town of Alberton is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Additional Information for Arsenic

While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Water Quality Data Table

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of contaminants in water provided by public water systems. The table below lists all of the drinking water contaminants that we detected during the calendar year of this report. Although many more contaminants were tested, only those substances listed below were found in your water. All sources of drinking water contain some naturally occurring contaminants. At low levels, these substances are generally not harmful in our drinking water. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. A few naturally occurring minerals may actually improve the taste of drinking water and have nutritional value at low levels. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. As such, some of our data, though representative, may be more than one year old. In this table you will find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided the definitions below the table.

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Detect In Your Water	Range		Sample Date	Violation	Typical Source
				Low	High			
Disinfectants & Disinfection By-Products								
(There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants)								
Chlorine (as Cl2) (ppm)	4	4	.2	.2	.2	2018	No	Water additive used to control microbes
TTHMs [Total Trihalomethanes] (ppb)	NA	80	4.8	NA	NA	2018	No	By-product of drinking water disinfection
Inorganic Contaminants								
Arsenic (ppb)	0	10	3	.06	1.07	2017	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium (ppm)	2	2	1.07	.06	1.07	2017	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride (ppm)	4	4	.08	.05	.08	2017	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [measured as Nitrogen] (ppm)	10	10	.34	.34	.34	2017	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Radioactive Contaminants								
Alpha emitters (pCi/L)	0	15	8.8	1.6	8.8	2017	No	Erosion of natural deposits
Radium (combined 226/228) (pCi/L)	0	5	1.4	1.4	1.4	2017	No	Erosion of natural deposits
Uranium (ug/L)	0	30	8	2	8	2017	No	Erosion of natural deposits

Contaminants	MCLG	AL	Your Water	Sample Date	# Samples Exceeding AL	Exceeds AL	Typical Source
Inorganic Contaminants							
Copper - action level at consumer taps (ppm)	1.3	1.3	.31	2017	0	No	Corrosion of household plumbing systems; Erosion of natural deposits
Inorganic Contaminants							
Lead - action level at consumer taps (ppb)	0	15	3	2017	0	No	Corrosion of household plumbing systems; Erosion of natural deposits

Unit Descriptions	
Term	**Definition**
ug/L	ug/L : Number of micrograms of substance in one liter of water
ppm	ppm: parts per million, or milligrams per liter (mg/L)
ppb	ppb: parts per billion, or micrograms per liter (µg/L)
pCi/L	pCi/L: picocuries per liter (a measure of radioactivity)
NA	NA: not applicable
ND	ND: Not detected
NR	NR: Monitoring not required, but recommended.

Important Drinking Water Definitions	
Term	**Definition**
MCLG	MCLG: Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
MCL	MCL: Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
TT	TT: Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
AL	AL: Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Variances and Exemptions	Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.
MRDLG	MRDLG: Maximum residual disinfection level goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
MRDL	MRDL: Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MNR	MNR: Monitored Not Regulated
MPL	MPL: State Assigned Maximum Permissible Level

For more information please contact:

Contact Name: Diane Jodsaas
Address: 607 Railroad Ave.
ALBERTON, MT 59820
Phone: 4067223404

Consumer Confidence 2019

Is my water safe?

We are pleased to present this year's Annual Water Quality Report (Consumer Confidence Report) as required by the Safe Drinking Water Act (SDWA). This report is designed to provide details about where your water comes from, what it contains, and how it compares to standards set by regulatory agencies. This report is a snapshot of last year's water quality. We are committed to providing you with information because informed customers are our best allies.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Water Drinking Hotline (800-426-4791).

Where does my water come from?

Your water comes from the ground

Source water assessment and its availability

The most recent sanitary survey was completed in 2018

Why are there contaminants in my drinking water?

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline (800-426-4791). The sources of drinking water (both tap water and bottled water)

include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity:
microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife; inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming; pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses; organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems; and radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities. In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

How can I get involved?

Attend monthly town council meetings held the 1st Tuesday of the month at 7:00pm

Water Conservation Tips

Did you know that the average U.S. household uses approximately 400 gallons of water per day or 100 gallons per person per day? Luckily, there are many low-cost and no-cost ways to conserve water. Small changes can make a big difference - try one today and soon it will become second nature.

- Take short showers - a 5 minute shower uses 4 to 5 gallons of water compared to up to 50 gallons for a bath.
- Shut off water while brushing your teeth, washing your hair and shaving and save up to 500 gallons a month.
- Use a water-efficient showerhead. They're inexpensive, easy to install, and can save you up to 750 gallons a month.
- Run your clothes washer and dishwasher only when they are full. You can save up to 1,000 gallons a month.
- Water plants only when necessary.
- Fix leaky toilets and faucets. Faucet washers are inexpensive and take only a few minutes to replace. To check your toilet for a leak, place a few drops of food coloring in the tank

and wait. If it seeps into the toilet bowl without flushing, you have a leak. Fixing it or replacing it with a new, more efficient model can save up to 1,000 gallons a month.

- Adjust sprinklers so only your lawn is watered. Apply water only as fast as the soil can absorb it and during the cooler parts of the day to reduce evaporation.
- Teach your kids about water conservation to ensure a future generation that uses water wisely. Make it a family effort to reduce next month's water bill!
- Visit www.epa.gov/watersense for more information.

Cross Connection Control Survey

The purpose of this survey is to determine whether a cross-connection may exist at your home or business. A cross connection is an unprotected or improper connection to a public water distribution system that may cause contamination or pollution to enter the system. We are responsible for enforcing cross-connection control regulations and insuring that no contaminants can, under any flow conditions, enter the distribution system. If you have any of the devices listed below please contact us so that we can discuss the issue, and if needed, survey your connection and assist you in isolating it if that is necessary.

- Boiler/ Radiant heater (water heaters not included)
- Underground lawn sprinkler system
- Pool or hot tub (whirlpool tubs not included)
- Additional source(s) of water on the property
- Decorative pond
- Watering trough

Source Water Protection Tips

Protection of drinking water is everyone's responsibility. You can help protect your community's drinking water source in several ways:

- Eliminate excess use of lawn and garden fertilizers and pesticides - they contain hazardous chemicals that can reach your drinking water source.
- Pick up after your pets.
- If you have your own septic system, properly maintain your system to reduce leaching to water sources or consider connecting to a public water system.
- Dispose of chemicals properly; take used motor oil to a recycling center.
- Volunteer in your community. Find a watershed or wellhead protection organization in your community and volunteer to help. If there are no active groups, consider starting

one. Use EPA's Adopt Your Watershed to locate groups in your community, or visit the Watershed Information Network's How to Start a Watershed Team.

- Organize a storm drain stenciling project with your local government or water supplier. Stencil a message next to the street drain reminding people "Dump No Waste - Drains to River" or "Protect Your Water." Produce and distribute a flyer for households to remind residents that storm drains dump directly into your local water body.

Additional Information for Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Town of Alberton is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Additional Information for Arsenic

While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Water Quality Data Table

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of contaminants in water provided by public water systems. The table below lists all of the drinking water contaminants that we detected during the calendar year of this report. Although many more contaminants were tested, only those substances listed below were found in your water. All sources of drinking water contain some naturally occurring contaminants. At low levels, these substances are generally not harmful in our drinking water. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. A few naturally occurring minerals may actually improve the taste of drinking water and have nutritional value at low levels. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. As such, some of our data, though representative, may be more than one year old. In this table you will find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided the definitions below the table.

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Detect In Your Water	Range		Sample Date	Violation	Typical Source
				Low	High			
Inorganic Contaminants								
Asbestos (MFL)	7	7	NA	NA	NA	2019	No	

Contaminants	MCLG	AL	Your Water	Sample Date	# Samples Exceeding AL	Exceeds AL	Typical Source
Inorganic Contaminants							
Copper - action level at consumer taps (ppm)	1.3	1.3	.31	2019		No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead - action level at consumer taps (ppb)	0	15	3	2019		No	Corrosion of household plumbing systems; Erosion of natural deposits

---

Undetected Contaminants

The following contaminants were monitored for, but not detected, in your water.

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Your Water	Violation	Typical Source
Alpha emitters (pCi/L)	0	15	ND	No	Erosion of natural deposits
Arsenic (ppb)	0	10	ND	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium (ppm)	2	2	ND	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chlorine (as Cl2) (ppm)	4	4	ND	No	Water additive used to control microbes
Fluoride (ppm)	4	4	ND	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Your Water	Violation	Typical Source
					and aluminum factories
Nitrate [measured as Nitrogen] (ppm)	10	10	ND	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Radium (combined 226/228) (pCi/L)	0	5	ND	No	Erosion of natural deposits
TTHMs [Total Trihalomethanes] (ppb)	NA	80	ND	No	By-product of drinking water disinfection
Uranium (ug/L)	0	30	ND	No	Erosion of natural deposits

Unit Descriptions	
Term	**Definition**
ug/L	ug/L : Number of micrograms of substance in one liter of water
ppm	ppm: parts per million, or milligrams per liter (mg/L)
ppb	ppb: parts per billion, or micrograms per liter (g/L)
pCi/L	pCi/L: picocuries per liter (a measure of radioactivity)
MFL	MFL: million fibers per liter, used to measure asbestos concentration
NA	NA: not applicable
ND	ND: Not detected
NR	NR: Monitoring not required, but recommended.

Important Drinking Water Definitions	
Term	**Definition**
MCLG	MCLG: Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
MCL	MCL: Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
TT	TT: Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
AL	AL: Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Variances and Exemptions	Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.
MRDLG	MRDLG: Maximum residual disinfection level goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
MRDL	MRDL: Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Important Drinking Water Definitions	
MNR	MNR: Monitored Not Regulated
MPL	MPL: State Assigned Maximum Permissible Level

For more information please contact:

Contact Name: Diane Jodsaas
Address: PO Box 115
Alberton, MT 59820
Phone: 406-722-3404

Montana Department of
ENVIRONMENTAL QUALITY

Marc Racicot, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • E-mail: www.deq.state.mt.us

November 16, 1999

ALBERTON WATER SYSTEM
HOWARD HOGAN
607 RAILROAD AVE
PO BOX 115
ALBERTON MT 59820

Re: Ground Water Under the Direct
Influence of Surface Water.

Dear Howard:

The Department of Environmental Quality (DEQ) in conjunction with the Montana Bureau of Mines & Geology (MBMG) has completed the assessment of your groundwater source(s) for the Ground Water Under the Direct Influence of Surface Water (GWUDISW) program. This program is part of the federal Safe Drinking Water Act of 1986; it requires The States to determine those groundwater sources that are directly withdrawing surface water through well or spring sources.

Based on the DEQs preliminary assessment (PA) of your groundwater source

WELL NAME & PWSID	SOURCE #
Well (PWSID# 00015)	003

has been determined as **not** under the direct influence of surface water, and is therefore classified as **groundwater**. At this time there are no further requirements of this source under the GWUDISW rule. The source classification is based on the current configuration of the water system, if the water system is significantly altered in the future or evidence of surface water contamination occurs the system (s) may be re-evaluated under the GWUDISW rule.

Based on the DEQ's preliminary assessment (PA) of your groundwater source,

SPRING & PWSID #	SOURCE #
(# 00015)	002

is at risk for influence by surface water. This assessment is based on the Hydrogeologic

PASS-Fail.LTR

Assessment performed by Mr. Alan English of the MBMG.
Mr. English concluded that the following could be sources for bacterial contamination.

- The shallow collection laterals.
- The spring box construction.
- High infiltration rates of the colluvium.
- The inability of the area above the collection laterals to drain snowmelt and precipitation away from the area.
- There is a possibility of a cross connection between the storage tank and an older collapsed storage tank.

I have included the Hydrogeologic Assessment (HA) completed by Mr. English for your information and records. Based on this assessment, **additional monitoring/sampling** will need to be conducted on the spring to determine if a direct influenced by surface water is present.

The best solution to make a final classification as quickly as possible is to collect two Microscopic Particulate Analysis (MPA) samples for laboratory analysis. Both MPA's should be collected during the spring runoff period (May to June). The MPA samples can be collected prior to or after chlorinating, but the sampling process is easier if the sample can be collected prior to chlorinating. The results of the MPA or water quality analysis results will be used to classify your water sources under the GWUDISW program

I have included a copy of the Hydrogeologic Assessment (HA), a copy of the department GWUDISW policy memo and a list of water analysis labs. Also, the Department no longer requires that the MPA analyze for giardia, which results in much lower cost per MPA test. **I suggest that you contact several labs and get prices from them before deciding on a lab. There is a chance that a lab may charge as much as $150 more per-test for the same analysis. Cost typically range around $200 dollars before shiping.** To give your system the best chance at passing the MPA tests I recommend that your system satisfy the recommendations made in the HA before completing the MPA test. However, this literature will make more sense if you first contact me at your convenience to discuss the GWUDISW program.

If you have any questions regarding this classification or the GWUDISW program, please do not hesitate to contact me at 444-4630.

Sincerely,

Mike Brayton

Mike Brayton

Permitting & Compliance Division

PASS-Fail.LTR

Montana Department of
ENVIRONMENTAL QUALITY

Marc Racicot, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • E-mail: www.deq.state.mt.us

CERTIFIED MAIL

March 17, 2000

TOWN OF ALBERTON
JACQUELINE CALLISON
PO BOX 115
ALBERTON MT 59820

Re: Ground Water Under the Direct Influence of Surface Water Violation Letter

Dear Jacqueline

This letter is in regards to the classification of your water source(s) under the Groundwater Under the Direct Influence of Surface Water (GWUDISW) program. The Department of Environmental Quality (DEQ) has completed a Preliminary Assessment (PA) of your groundwater source(s) for the GWUDISW program. The GWUDISW program, is part of the 1986 Federal Safe Drinking Water Act (SDWA). In complying with the SDWA, The Environmental Protection Agency (EPA) requires the Department to make GWUDISW determinations on sources that are directly withdrawing surface water through well, infiltration gallery or spring sources.

The Preliminary Assessment (PA) of your source(s) indicates that groundwater may potentially be influenced by surface water. This assessment is based on the construction features of springs, infiltration galleries and shallow wells, which may have potential for surface water and **ground water interaction**. Surface waters or infiltrating precipitation adjacent to springs, infiltration galleries and shallow wells can contribute to recharge during the spring runoff period and periods of high use. Based on the PA **additional monitoring/sampling** must be conducted on the source(s) to determine if they are directly influenced by surface water. **I have previously contacted your system regarding this compliance issue. Some form of field analysis must be performed this spring. To return to compliance I recommend performing a Microscopic Particulate Analysis (MPA) on the source(s) to make a GWUDISW determination as quickly as possible.**

*The work must be performed during the period of May through June. If you fail to comply by July, 31 of 2000 I will turn this case over to the Division Enforcement team for review and prioritization as an enforcement case.

Please understand if you are unwilling to comply with the demands made in this letter the Department may initiate an enforcement proceeding pursuant to the Montana Public Water Supply Act intended to encourage your compliance. Such action could include assessment of civil penalties and/or administrative penalties.

If you need assistance this Department, PWSS or South Hills Environmental will be available to help.

Thanks for your assistance. If you have any questions or need assistance, please do not hesitate to contact one of the following:

Mike Brayton, DEQ @ (406) 444-4630.
or
Dean Chaussee, South Hills Environmental @ (406) 443-5388

Sincerely,

Mike Brayton

Mike Brayton
Hydrogeologist
Permitting & Compliance Division

PASS.LTR

COPY

ANALYSIS FOR WATERBORNE PARTICULATES

CH Diagnostic & Consulting Service, Inc.
214 SE 19th Street, Loveland, CO 80537
Carrie M. Hancock, President Telephone (970) 667-9789

Invoice 20000436

5/18/00

Customer 20001158
Town of Alberton
PO Box 115, 701 Rail Road Ave.
Alberton, MT 59820

PWSID# 00015

Laboratory Information

UPS; 5/18/00; 915Hrs; Wound; Excellent; Results submitted by: Tricia Klonicki

Sample Identification: Spring, Source #002, Source: Spring, unchlorinated

Date/Start: 5/16/00; 1400 Hrs	Date/Stop: 5/17/00; 1000 Hrs	Sampler: Bill Engle
Gallons: 1167	Filter Color: Off white	Centrifugate: 0.03 mL/100 gals

RESULTS OF MICROSCOPIC PARTICULATE ANALYSIS:

Amorphous Debris:	Clay, silt and inorganic precipitate, 1-50 μM diameter aggregates
Nondiatomaceous Algae:	ND
Diatoms:	ND
Plant Debris:	ND
Giardia:	ND
Coccidia:	ND
Rotifers:	4/100 gals
Nematodes:	166/100 gals
Pollen:	ND
Ameba:	ND
Ciliates:	46/100 gals
Colorless Flagellates:	ND
Crustaceans:	ND
Insects/Larvae:	ND
Other:	4/100 gals, Tardigrades; 8/100 gals, Arthropod pieces

None Detected (ND)

This sample was analyzed for particulates following the Environmental Protection Agency Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). All limitations described in the method apply.

Comments: Score: 1-Low Risk per EPA Consensus Method referenced above.
Equivalent volume assayed: 91.3 L

Stelling Engineers, INC.

Engineering
Planning
Consulting

• Transportation • Wastewater • Airports • Water • Site Development • Structures •

Great Falls Office
600 Central Plaza Suite 211
Great Falls, MT 59401
(406) 452-8600
Fax: (406) 452-8700
Email: Stel.eng@worldnet.att.net

Elliston Office
P.O. Box 65
Elliston, MT 59728
(406) 492-0021
Fax: (406) 492-0021
Email: stelling@blackfoot.net

MEMORANDUM

From: Alden Beard, P.E.

Date: August 8, 2000

Re: Alberton Water System – Additional MPA Testing

MDEQ directed the Town of Alberton November 16, 1999, to conduct two Microscopic Particulate Analyses (MPA's) on the spring source of water supply. The original directive from Mike Brayton required both tests to be run during May-June, 2000.

The first of these samples was taken May 16-17, by South Hills Environmental. Analysis of the sample by CH Diagnotic resulted in a "Low Risk" rating. Due to the absence of runoff this spring, Mike Brayton had suggested we delay the second test, perhaps until fall.

I consulted with Mike August 7th, inquiring when MDEQ would suggest the second test. After reviewing Alberton's situation, Mike called back to advise that the second test should be deferred until Spring, 2001. He noted that with the abnormally dry summer, a fall test doesn't appear practical.

Consequently we will anticipate scheduling the second test during May-June, 2001. This will hopefully encompass a period of "normal" runoff.

If anyone has questions or comments, please feel free to contact me at 406/492-0021.

Distribution: Honorable Donna Teeters, Mayor
Howard Hogan, Dir. Public Works
Mike Brayton, MDEQ
Bill Engle, South Hills Environmental
Mitch Stelling, SEI

IMPORTANT INFORMATION

(This report must be printed in Landscape Orientation to prevent cutting off of text)

The following pages comprise the Annual Consumer Confidence Report (CCR) for your water system.

To download the CCR into your word processing program follow these steps (Remember you must have the document set up in Landscape Orientation):

- Choose Select All from the edit dropdown MENU, (it will highlight all the information).
- Choose Edit from the MENU, select Copy from the edit dropdown MENU.
- Open your word processing program.
- Choose Edit from the MENU, select Paste from the edit dropdown MENU and the information will transfer.
- Choose Edit from the MENU.

In order to meet all of the requirements of the CCR, you **must** include the following additional information if it pertains to your water system.

- The report must include the telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report.
- In communities with a large proportion of non-English speaking residents, as determined by the Primacy Agency, the report must contain information in the appropriate language(s) regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report and/or assistance in the appropriate language.
- The report must include information about opportunities for public participation in decisions that may affect the quality of the water (e.g., time and place of regularly scheduled board meetings).
- If your water system purchases water from another source, you are required to include the current CCR year's Regulated Contaminants Detected table from your source water supply.
- If your water system had any violations during the current CCR Calendar year, you are required to include an explanation of the corrective action taken by the water system.
- If your water system is going to use the CCR to deliver a Public Notification, you must include the full public notice and return a copy of the CCR and Public Notice with the Public Notice Certification Form. This is in addition to the copy and certification form required by the CCR Rule.

• The information about likely sources of contamination provided in the CCR is generic. Specific information regarding contaminants may be available in sanitary surveys and source water assessments and should be used when available to the operator.

• If a community water system distributes water to its customers from multiple hydraulically independent distribution systems fed by different raw water sources, the table should contain a separate column for each service area, and the report should identify each separate distribution system. Alternatively, systems may produce separate reports tailored to include data for each service area.

• Detections of unregulated contaminants for which monitoring is required are not included in the CCR and must be added. When added, the information must include the average and range at which the contaminant was detected.

• If a water system has performed any monitoring for Cryptosporidium, including monitoring performed to satisfy the requirements of the Information Collection Rule [ICR] (§141.143), which indicates that Cryptosporidium may be present in the source water or the finished water, the report must include: (a) a summary of the results of the monitoring; and (b) an explanation of the significance of the results.

• If a water system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include: (a) The results of the monitoring; and (b) An explanation of the significance of the results.

• If a water system has performed additional monitoring which indicates the presence of other contaminants in the finished water, EPA strongly encourages systems to report any results which may indicate a health concern. To determine if results may indicate a health concern, EPA recommends that systems find out if EPA has proposed an NPDWR or issued a health advisory for that contaminant by calling the Safe Drinking Water Hotline (800-426-4791). EPA considers detects above a proposed MCL or health advisory level to indicate possible health concerns. For such contaminants, EPA recommends that the report include: (a) the results of the monitoring; and (b) an explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.

• If you are a ground water system that receives notice from the state of a significant deficiency, you must inform your customers in your CCR report of any significant deficiencies that are not corrected by December 31 of the year covered by it. The CCR must include the following information:

- The nature of the significant deficiency and the date it was identified by the state.
- If the significant deficiency was not corrected by the end of the calendar year, include information regarding the State-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed.
- If the significant deficiency was corrected by the end of the calendar year, include information regarding how the deficiency was corrected and the date it was corrected.

Annual Drinking Water Quality Report

ALBERTON TOWN OF

MT0000015

Annual Water Quality Report for the period of January 1 to December 31, 2015

This report is intended to provide you with important information about your drinking water and the efforts made by the water system to provide safe drinking water.

The source of drinking water used by
ALBERTON TOWN OF is Ground Water

For more information regarding this report contact:

Name ______________________

Phone ______________________

Este informe contiene información muy importante sobre el agua que usted bebe. Tradúzcalo ó hable con alguien que lo entienda bien.

Source of Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pickup substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPAs Safe Drinking Water Hotline at (800) 426-4791.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Some people may be more vulnerable to contaminants in drinking water than the general population.

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Source Water Information

Source Water Name	Type of Water	Report Status	Location
ALBERTON SPRINGS	GW	________	____
WELL 1 BACKUP TOWN GWIC 733138	GW	________	PARKWAY DR BETWEEN 3RD & 5TH STREETS CENTER OF TOWN S SIDE OF OLD RAILROAD GRADE

Lead and Copper

Definitions:
Action Level Goal (ALG): The level of a contaminant in drinking water below which there is no known or expected risk to health. ALGs allow for a margin of safety.
Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Lead and Copper	Date Sampled	MCLG	Action Level (AL)	90th Percentile	# Sites Over AL	Units	Violation	Likely Source of Contamination
Copper	09/24/2014	1.3	1.3	0.16	0	ppm	N	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems.
Lead	09/24/2014	0	15	1	0	ppb	N	Corrosion of household plumbing systems; Erosion of natural deposits.

Water Quality Test Results

Maximum Contaminant Level Goal or MCLG:	The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
Maximum Contaminant Level or MCL:	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
Maximum residual disinfectant level goal or MRDLG:	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
Maximum residual disinfectant level or MRDL:	The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Avg:	Regulatory compliance with some MCLs are based on running annual average of monthly samples.
ppm:	milligrams per liter or parts per million - or one ounce in 7,350 gallons of water.
ppb:	micrograms per liter or parts per billion - or one ounce in 7,350,000 gallons of water.
na:	not applicable.
Definitions:	The following tables contain scientific terms and measures, some of which may require explanation.

Regulated Contaminants

Disinfectants and Disinfection By-Products	Collection Date	Highest Level Detected	Range of Levels Detected	MCLG	MCL	Units	Violation	Likely Source of Contamination
Chlorine	2015	0.4	0.3 - 0.4	MRDLG = 4	MRDL = 4	ppm	N	Water additive used to control microbes.
Haloacetic Acids (HAA5)	2015	0.62	0.62 - 0.62	No goal for the total	60	ppb	N	By-product of drinking water disinfection

Not all sample results may have been used for calculating the Highest Level Detected because some results may be part of an evaluation to determine where compliance sampling should occur in the future

Haloacetic Acids (HAA5)*	2015	0.62	0.62 - 0.62	No goal for the total	60	ppb	N	By-product of drinking water disinfection.

Not all sample results may have been used for calculating the Highest Level Detected because some results may be part of an evaluation to determine where compliance sampling should occur in the future

Total Trihalomethanes (TTHM)	2015	4.6	4.6 - 4.6	No goal for the total	80	ppb	N	By-product of drinking water disinfection

Not all sample results may have been used for calculating the Highest Level Detected because some results may be part of an evaluation to determine where compliance sampling should occur in the future

Total Trihalomethanes (TTHM)	2015	4.6	4.6 - 4.6	No goal for the total	80	ppb	N	By-product of drinking water disinfection.

Not all sample results may have been used for calculating the Highest Level Detected because some results may be part of an evaluation to determine where compliance sampling should occur in the future

Inorganic Contaminants	Collection Date	Highest Level Detected	Range of Levels Detected	MCLG	MCL	Units	Violation	Likely Source of Contamination
Arsenic	06/03/2012	3	0 - 3	0	10	ppb	N	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
Barium	06/03/2012	0.65	0 - 0.65	2	2	ppm	N	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Fluoride	06/03/2012	0.09	0.05 - 0.09	4	4.0	ppm	N	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate [measured as Nitrogen]	2015	2	0.34 - 2.3	10	10	ppm	N	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Selenium	06/03/2012	2	0 - 2	50	50	ppb	N	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.

August 7, 2012

Joe Hanson - Mayor
Town of Alberton
PO Box 115
Alberton, MT 59820

Re: Groundwater Under the Direct Influence of Surface Water/Determination Of Status for SP002 Infiltration Gallery Spring MT0000015 Alberton Town of C

Mayor Hanson:

The Department of Environmental Quality (DEQ) is required by federal and state regulations to determine whether a public water supply (PWS) system's ground water sources are under the direct influence of surface water (GWUDISW). The GWUDISW determination process begins with a Preliminary Assessment (PA). The DEQ must complete a PA form for each existing ground water source. The PA uses a point system to evaluate the water sources based on the results of the PA. Sources that score less than 40 points may be classified as ground water unless other information becomes available that suggests that further review is necessary. Sources equal to or higher than 40 points will require further analysis, source rehabilitation, or additional source information to complete the GWUDISW determination.

No engineering plans of the spring collection system have been located. The available information concerning the spring was collected during sanitary surveys and during a hydrogeologic investigation by Montana Bureau of Mines and Geology (MBMG) staff in 1999. The three spring boxes consist of sections of 4-foot diameter culvert pipe installed vertically with open bottoms. The MBMG staff determined that the top spring box (Box #3) has no laterals and collects water just from upwards seepage from the surface. The middle spring box (Box #2) has one lateral. The bottom spring box (Box #1) has two laterals. The MBMG staff discovered two clay pipes that presumably connected Box #1 to Box #2 and Box #2 to Box #3. The line to the storage tank exits Box #3.

The available geologic information is somewhat conflicting. Available maps and field investigations do agree that the spring discharge area is covered with a thin layer of alluvium that may not be of sufficient thickness to account for the observed spring discharge. Bedrock in the spring discharge area is mapped as Precambrian formations, sedimentary rock that has been slightly metamorphosed. A fault trending northwest to southeast passes through the area, either several hundred yards uphill of the spring discharge area or much closer to the spring discharge. The high density of mapped faults in the Alberton area suggests that the bedrock is fractured and faulted. Therefore the aquifer supplying the spring may be a fractured bedrock aquifer.

The author of the MBMG hydrogeological investigation could not distinguish between two possible local groundwater flow patterns. One, the groundwater could emerge from the bedrock several hundred yards uphill of the spring and flow through the thin alluvial cover to the discharge area. In this scenario, the groundwater would be more vulnerable to surface influence. Two, the groundwater could emerge from the bedrock directly under the discharge area. Also, the recharge area of the spring could not be accurately delineated because of the complex geology.

On July 26, 1990, the spring received a failing score of 40 on the Preliminary Assessment (PA) for GWUDISW. Further assessment was required. Further assessment done using two Microscopic Particulate Analysis (MPA) tests conducted on September 12, 2011 and April 17, 2012. The result of the September 2011 test was Low Risk.

The result of the April 2012 test was Low Risk. No abundances of any of the primary indicator groups for surface water were found. In addition, no abundances of any secondary indicators were found.

Little water quality exists for the spring. The available data submitted to DEQ at the entry point to the treatment plan is a mix of the two sources, the spring collection system (SP002) and the backup well, Well 1 Backup WL003. On September 30, 1993, sampling for major and minor constituents was done for both the spring and the backup well. The spring water was found to be more basic (pH = 7.8) than the well water (pH=7.3). The conductivity of the spring water was lower (255 us/cm) than that of the well water (300 us/cm), suggesting that the spring water has lower abundances of dissolved ions than the well water. Sodium, calcium, and sulphate are significantly less abundant in the spring water. However, magnesium is more abundant.

Water quality data taken before and after both MPA tests supports the hypothesis that the spring source is groundwater. Before the fall 2011 test (b.t.) and after the fall 2011 test (a.t.), pH measurements show little change (7.98 b.t. and 7.99 a.t). The values for the spring 2012 test were similar (8.3 b.t. and 8.2 a.t). Based on these pH measurements, the water is basic. Therefore the water is not in equilibrium with atmospheric oxygen. Typically, pH values in surface water are 7 or slightly lower. The consistently low turbidity values measured at the fall 2011 test (0.21 NTU b.t. and 0.43 NTU a.t.) and the spring 2012 test (0.19 NTU b.t. and 0.16 a.t.) are characteristic of groundwater.

Using the criteria of the DEQ Water Quality Circular PWS_5, **Infiltration Gallery Spring is, therefore, classified as a groundwater source.** Please note that the GWUDISW evaluation (including the MPA tests) assessed the well for the potential for surface water microorganisms (specifically the larger parasitic protozoa Giardia and Cryptosporidium) entering the water supply.

Based on available soil map resources (NRCS Soil Web Survey), the soil at the spring is classified as “Repp soils”. A typical soil profile shows that the soil is mostly composed of larger particles (i.e. sand and gravel). The soil is characterized as well drained with a high saturated hydraulic conductivity. If the soil composition is dominated by large particles, the soil will have relatively low clay content and probably a low cation-exchange capacity. Soil data is not available for the recharge area of the spring (the area uphill to the northeast of the spring).

The Source Water Delineation Report (SWDAR) for Alberton lists the potential contaminants to the source water. As previously discussed, the recharge area of the spring, the pattern of flow of the groundwater that discharges at the spring, and the nature of the aquifer (bedrock or alluvial) are not known. Also, the soil data indicates rapid water infiltration with little filtration. Consequently, the aquifer supplying the spring is assigned a high sensitivity rating to potential contaminant sources. However, the spring is in an isolated location, away from human habitation and activities. The SWDAR only lists fire near the spring as the important event that could cause contamination. Aside from physically damaging the infiltration lines, spring boxes, and transmission lines during a fire, the results of a fire could impact the spring for years. Specifically, mudflows and ash could cover the drainage, including the spring infrastructure. Material dissolved from ash as well as fire fighting chemicals could enter the aquifer and affect the water quality of the spring. The SWDAR rates this hazard as high. With no barriers, the spring is highly susceptible to this contamination.

As noted in the 2009 sanitary survey as well as comments from DEQ staff that have visited the system, the spring discharge area is surrounded by a poorly maintained fence that does not prohibit entry by either humans or animals. The spring discharge area is therefore threatened by biological contamination and by potential vandalism. DEQ urges the Town of Alberton to fix the fence and increase security at this water source.

Also noted in the 2009 sanitary survey is the observation that the lids to the spring boxes are not properly sealed. DEQ requests that the Town of Alberton repair the lids and provide photo documentation of the repairs.

Please note that the source determination is based on two MPA tests that are "snapshots in time" representing the recent source character. Based on the available hydrogeoloic data, the ability of the recharge area of the spring to filter out surface water contamination could quickly change. If there are changes in surface conditions near the spring, DEQ recommends that the Town of Alberton arrange for an inorganic source water analysis of major cations and anions, trace elements, nitrate, pH, conductivity, and alkalinity.

Please note the Department is required to reassess each source for any changes in and around the source when a sanitary survey inspection is done on the Alberton system. Depending on that reassessment and other issues that may impact this source, you may be asked to conduct further source water monitoring. In the event of flooding near Well 1, the GWUDISW status of the well will be reassessed.

Please call me at 406-444-4633 or email me at jkandelin@mt.gov if you have questions.

Respectfully,

Jake Kandelin

Jake Kandelin
Public Water Supply Section, Montana Department of Environmental Quality

cc: PWS File
DEQ PWS Kalispell Field Office
Mineral County Sanitarian

February 7, 2018

Diane Jodsaas
Town Clerk
Town of Alberton
P.O. Box 115
Alberton, MT 59820

Re: Sanitary Survey Inspection of the Town of Alberton Public Water System (PWSID MT0000015).

Dear Diane:

I would like to thank you, Doug Lausch, and James Claxton for assisting me during the sanitary survey inspection of the Town of Alberton Public Water System (PWSID MT0000015). As a community water supply system, your facility is required to have a sanitary survey inspection once every three years. These regular inspections offer the Department of Environmental Quality (DEQ) an opportunity to look for sanitary deficiencies that have the potential to cause contamination in the water system, as well as pointing out operational and maintenance concerns.

Below are a few comments and recommendations relating to the sanitary survey conducted on September 14 and December 14, 2017. Please note that the enhanced communication between your certified operators, you, the Mayor, and Town Council is evident across your water and wastewater programs.

SOURCES:

SP002 – Springs/Infiltration Gallery: New exclusionary signs and some fencing have been installed to deter public access to the spring recharge area. The operators are installing various security measures in the springs area such as signs and fencing across access points, and increased operator presence on site. They have recently participated in a source water protection education campaign in the local schools with the technical assistance of RATES.

There have been some changes at the main spring box and lateral lines to increase integrity, security, and to add new seals to the box lid. Lines are being located, identified and either capped or screened as needed. The supply line to the storage tank was closed and the tank bypassed; the spring box was chlorinated before bringing the source back into service.

<u>WL003 - Well 1 GWIC 71338</u>: There are no changes at this well. The operator plans to re-apply the silicone sealant to assure the pedestal seal is maintained. Pump controls are still non-functional and the well is operated manually. The operator will usually run the well for two to three hours twice a day during the Town-mandated irrigation hours.

There is no disinfection capability associated with this well. When in use, the well contributes untreated flow to the distribution system that may dilute the residual chlorine concentrations below the level of efficacy. This has been noted in the previous four sanitary surveys.

- **The Town should seriously pursue the installation of disinfection for this source; the well house is set up with a room available for a chlorination system.**

<u>TREATMENT - TP002:</u> There have been upgrades to the gaseous chlorination treatment plant addressing some of the potential safety hazards for operating personnel and the public. The springs source sample tap (RW002) has been moved to be more accessible for the operators. Security measures have been installed to include remote monitoring of the treatment plant area. The operators have optimized chlorine gas use and decreased the dosage rate by nearly ⅓. This represents a substantial cost savings for the Town.

The CLA VAL that regulates spring flow to the storage tank based on tank level and controls chlorine dosing for disinfection does not function. As a result, the chlorination system pump runs 24/7 and all water being served, or overflowed from the tank to waste, is chlorinated.

- **Efforts should be made to plan for upgrades of the chlorination system and the flow regulating valve for safety and liability purposes and so that only the water being provided to consumers is treated. Eliminating the use of gaseous chlorine and the unnecessary treatment of potentially hundreds of thousands of gallons of unused water could represent a major cost savings for the Town and may have a positive impact on your Town's insurance rates.**

<u>DISTRIBUTION, DS001:</u> Water is distributed throughout the town via a mixture of pipes of various ages, materials, and sizes with dead legs. There is a flushing program that includes exercising distribution system valves. A suitable Site Sampling Plan under the Revised Total Coliform Rule is on file with DEQ.

There are two significant deficiencies associated with distribution that must be addressed:

- Distribution has two confirmed cross connections in the underground irrigation supply line vault in the Park. The required backflow prevention devices are either missing or inadequate for the application.

There is a Reduced Pressure Zone Assembly (RPZA) in place on the potable water supply line in the wastewater treatment plant UV room. This RPZA must be tested annually for performance. A certified backflow prevention tester must conduct this test and records must be available on request during an inspection. I have included a list of certified individuals in the greater Missoula area at the end of this letter. This list is not current however, it may be helpful to you.

STORAGE - ST001: The newest operators have made increased efforts to discourage tank access and off-road vehicle activity. Various remote sensing devices, strategically placed boulders, signs and some fencing are now in use. A local school education campaign about trespassing on the public facilities has been undertaken with the assistance of the local sheriff. However, until security is hardened at this tank with installation of at least a gate to deter entry and security fencing, the tank will remain vulnerable to unauthorized access and vandalism.

We did not access the top of the storage tank for safety reasons. It is important that, when conditions allow, the operators inspect all openings, hatches, vents, and ports for intact seals, screens, and gaskets.

The tank has not been inspected by a licensed engineer or cleaned since 1999. It is recommended that tanks of this construction be inspected on a five-year rotation. Also, the tank is now 50 years old. Tanks such as this are not designed to last this long. It is important to have the tank formally inspected for integrity so that the Town can start planning for potential replacement.

- **The storage tank has not been inspected or cleaned for 15 years. The 50-year old tank represents a major investment for the Town.**

Because the flow regulating CLA VAL has not functioned for decades, all spring water is chlorinated as it enters the storage tank. Excess flow that is not utilized by Town's demand at any given moment is overflowed out of the tank to waste via a pipe that disappears into the ground.

- **Discharge of chlorinated water to waters of the state may be considered a violation of the Montana Water Quality Act. This practice should be discontinued or permitted, as required.**

Because all spring water flows through the storage tank and spring flow rates are unknown, it is likely (especially in the non-irrigating season) that residence time in the 300,000-gallon tank is low and chlorine contact time may be inadequate to provide the adequate disinfection. It was mentioned that the tank is subject to short circuiting which impacts the disinfection process also.

MONITORING, REPORTING, and DATA VERIFICATION: Your certified operators conduct sampling of the system and sources as required. James and Doug have shown initiative and proactive responses to duties associated with the PWS. They have implemented security and operation and maintenance activities that have been recommended throughout the last several inspection cycles. There have been NO violations associated with this system in the last two years.

MAINTENANCE, MANAGEMENT, SAFETY, and OPERATION: The changes in the Public Works personnel in Alberton combined with the new Mayor and Council have resulted in positive changes regarding PWS security, operation, and maintenance – items of concern that have been "on the plate" for quite some time. Please note that the enhanced communication between your certified operators, you, the Mayor, and Town Council is evident across your water and wastewater programs.

The upgraded security measures now in place; the PWS's recent clean violation record; and the improved exclusion zone for the spring source are among the many unlisted improvements seen in the overall operation and maintenance of your PWS facilities. It is a pleasure to see the positive changes that have been implemented by the operators and Town.

There are numerous confined spaces and fall hazards associated with the PWS components. Efforts in enhance safety should be made to protect your personnel.

OPERATOR COMPLIANCE WITH STATE REQUIREMENTS: There are no concerns regarding this item, James Claxton (# 8376, levels 4AB 3C) and Doug Lausch (#8377, 4AB 3C) are your certified operators in full responsible charge of the PWS. Both aware of the requirements of the job to maintain compliance.

James has been more than willing to ask the DEQ and technical assistance providers, such as RATES and MT Rural Water Systems, for help as he develops the compliance, operation and maintenance program for the Town.

WASTEWATER HANDLING: The Town maintains a wastewater treatment lagoon facility and sewer collection system serving Alberton. Permitted discharges of treated wastewater to the Clark Fork River are covered under the Montana Pollutant Discharge Elimination System program. There are no current issues with this facility that would impact your PWS at this time.

SIGNIFICANT DEFICIENCIES and IMMEDIATE ACTION(S) REQUIRED: Significant deficiencies may include, but are not limited to, defects in design, operation, or maintenance or a failure or malfunction of the sources, treatment, storage, or distribution system that the state of Montana determines to be causing or has the potential for causing the introduction of contamination into the water delivered to consumers. The state of Montana adopted the federal Ground Water Rule (Administrative Rules of Montana 17.38.211) effective December 1, 2009.

The Ground Water Rule establishes strict timelines for confirming significant deficiencies; DEQ notification to the PWS system owner of any significant deficiencies; and the implementation of corrective action(s) by the PWS. DEQ has established the Significant Deficiency Review Committee (SDRC) to review deficiencies identified during a sanitary survey inspection, or a site visit, to determine if they meet DEQ's interpretation of significant.

During this inspection, the following deficiencies were identified and the SDRC has determined that they meet the definition of significant:

1. **DS001 has a confirmed cross connection –** there is an incorrect/inadequate backflow prevention in place on the main underground sprinkler supply line in the underground vault in the Park; and

2. **DS001 has a confirmed cross connection –** there is no backflow protection in place on one underground automatic irrigation supply line in the same vault.

You will have received correspondence dated January 16, 2018 from Craig Fetkavich - Ground Water Rule Manager - regarding these issues. Please have your operator communicate directly with Craig if he has any questions. Craig can be reached at 406-444-3425 or by email at CFetkavich@mt.gov.

At the same time, Karl Carlson is the State backflow prevention specialist. Karl can help the operators determine the appropriate reduced pressure zone assembly to use to meet requirements. Karl can be reached in Billings at 406-247-4444 or via email at KCarlson2@mt.gov. I recommend your operators give Karl a call if you have any questions regarding this process.

Again, I want to commend the Town of Alberton for the positive changes I observed while on site. Thank you to all involved for your assistance during the inspection. If you have any questions about this report or public water supply regulations, please contact me directly at (406) 541-9016 or by email at mvalett@mt.gov.

Sincerely,

Melee K. Valett

Melee K. Valett
Environmental Science Specialist
Public Water Supply Bureau
Field Services Section
Missoula Field Office

Cc: Helena PWS file
Kalispell PWS file
Mineral County file

Enclosure: 2015 List of Local Certified Backflow Device Testers

Certified Backflow Device Testers current as of January 2015

Last Name	First Name	Employer	City	Phone	Email
Anderson	Michael J.	Western States Fire Protection	Missoula	728-5242	
Arnold	Darren	D2 Fire Sprinkler Co.	Bonner	546-0020	
Briggs	Ron	Big Sky Surgery Center	Missoula	546-9090	ron@bigskysurgery.com
Burgad	Daniel P.	Dirtman Sprinkler	Missoula	880-3478	
Clevenger	Casey	St. Patrick's Hospital	Missoula	239-0440	clevenge@saintpatrick.org
Cowart	Cory	Missoula Parks & Recreation	Missoula	880-3478	ccowart@ci.missoula.mt.us
Dean	Bernie	Garden City Plumbing	Missoula	327-2530	
DeMinck	Dave	University of Montana	Missoula	531-7338	
Dowell	Valarie	Missoulan Water Company	Missoula		
Garrard	Che	University of Montana	Frenchtown	880-9099	garrardplumbing@q.com
Jarvi	Jeremy	Rankin Landscape Maintenance	Missoula	239-1188	liquiddesign@ymail.com
Kohler	Dale T.	Kohler Sprinklers	Milltown	240-6547	
Kohler Sr.	Michael T.	Kohler Sprinklers	Milltown	240-6547	
Lathrop	Peter S.	Missoula Parks & Recreation	Missoula	552-6262	plathrop@ci.missoula.mt.us
Lenchuk	Ivan	Temp Right Services	Missoula	728-1111	
McDonald	Fred	Missoula Housing Authority	Missoula	549-4113 ext107	
McNaughton	Carl	C&K Plumbing	Clinton	370-7935	
Murphy	Carl D.	Missoula Housing Authority	Missoula	543-7500	oskarr@msn.com
Updegrove	J. Randal	Missoula Housing Authority	Missoula	207-8025	rudegrove@missoulahousing.org
Wright	Joel	Crisp Water Technologies, Inc.	Missoula	549-8868	
Yonce	Craig	Mountain Water Company	Missoula	532-5160	
Zak	Shawn E.	Garden City Plumbing & Heating	Missoula	327-5417	

SANITARY SURVEY FORM - INVENTORY

1/2016

PWSID **MT0000015** | SYSTEM NAME **Town of Alberton**

DATE OF SURVEY 12/14/2017 | COUNTY Mineral | SURVEYOR NAME Melee K. Valett

(SYSTEM REPRESENTATIVE) James Claxton, OP | (OTHER REPRESENTATIVE) Doug Lausch, OP

SYSTEM ADDRESS – ADMINISTRATIVE CONTACT

Addressee Dianne Jodsaas
c/o Town of Alberton

Primary Address

Street P.O. Box 115

City Alberton State MT Zip 59820

System Phone (406)722-3404 Fax (_____)_____

SYSTEM OWNER

Addressee SAME

Owner's Address

Street _____

City _____ State _____ Zip _____

Owner Phone (_____)_____ Fax (_____)_____

LOCATION OF SYSTEM

Nearest City Alberton Description or Physical Address Town Hall 701 Railroad Street

☐ seasonal operation dates: _____to _____
☒ year round operation

OPERATOR OF SYSTEM

Name James Claxton
Certified Operator? ☒ Yes ☐ No ☐ Not required
Copy of Certificate? ☐ Yes ☒ No Certification # 8376
Phone # (406) 722-3404 Cell Phone # (_____)_____
Fax # (_____)_____

ALTERNATE OPERATOR OF SYSTEM

Name Doug Lausch
Certified Operator? ☒ Yes ☐ No ☐ Not required
Copy of Certificate? ☐ Yes ☒ No Certification # 8375
Phone # (406) 722-3404 Cell Phone # (_____)_____

SYSTEM STATUS

☒ **A** = Active ☐ **P** = Proposed *(Add New System)*
☐ **I** = Inactive

SYSTEM CLASS

☒ **C** = Community ☐ **NTNC** = Non-Transient Non-Community
☐ **TNC** = Transient Non-Community

Total Service Connections: Residential / Non-Transient: 202
Transient : 15

Total Active Connections: Residential / Non-Transient: 202
Transient: 15

Service Connections Metered? ☒ Yes ☐ No
Percent Metered 98 %

Resident Population 420
(Number of permanent residents utilizing PWS daily)

Non-Transient Population _____
(Maximum number of non-transient persons utilizing PWS daily)

Transient Population 75
(Maximum number of transient persons served by PWS daily)

OWNER TYPE

☐ 1 Federal Government
☐ 2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc.
☐ 3 State Government
☒ 4 Local Government Authority, Commission, District, Municipality, City, etc.
☐ 5 Mixed Public/Private
☐ 6 Native American

SERVICE AREA CHARACTERISTICS LIST

☐ BR Bar
☐ DC Day Care Center
☐ DI Dispenser
☐ HS Head Start
☐ HA Homeowners Assoc.
☐ HM Hotel/Motel
☐ HR Highway Rest Area
☐ IA Industrial/Agricultural
☐ IC Interstate Carrier
☐ IN Institution
☐ MF Medical Facility
☐ MH Mobile Home Park
☒ MU Municipality
☐ OA Other Area
☐ ON Other Non-Transient Area (_____Average Daily Visitors TNC)
☐ OR Other Residential Area
☐ OT Other Transient Area
☐ PA Recreation Areas
☐ RA Residential Area
☐ RE Retail Employees
☐ RS Restaurant
☐ RV RV Park
☐ SC School
☐ SI Sanitary Improvement District
☐ SK Summer Camp
☐ SR Secondary Residences
☐ SS Service Station
☐ SU Subdivision
☐ WBWater Bottler
☐ WH Wholesaler (Sells Water)

Service Category Description MU-municipality

Comments: This municipal system has shown marked improvements since the previous inspection. James Claxton and Doug Lausch along with the new mayor and town council have implemented long-term suggestions and recommendations that have increased security system-wide, protected the source water at the springs, upgraded various components, improved system-wide reliability, and identified areas of need for the PWS, decreased chlorine gas use substantially, and increased personnel safety.

The operators will need to access the top of the tank when conditions allow to verify all screens, gaskets, and port seals are intact.

Two significant deficiencies were identified: #1 an incorrect/inadequate backflow prevention in place on the main underground sprinkler supply line and #2 no backflow protection in place on one underground automatic irrigation supply line. These must be addressed.

The back up well source WL003 is used during the irrigation season. It is turned on each day for 2 to 3 hours during the allowed irrigation hours that are mandated by Town rules.

SANITARY SURVEY FORM – WATER SYSTEM FACILITIES

PWSID **MT0000015** | SYSTEM NAME **Town of Alberton**

Water System Facilities (WSF) numbers are WSF Type Codes plus an assigned number. (i.e. source facility numbering starts with 002 and all non-source facilities start with 001). See instruction sheet for a list of WSF Type Codes. When a source is operational it is considered ***A***ctive, this includes systems that are seasonal. ***I***nactive sources are those which are shut down but can return to active status, such as a system out of business. ***P***roposed sources are those that have been identified through the Plan Review process, but are not connected to the water system.

*A **water source facility** is a well, spring, intake, infiltration gallery or consecutive connections from which a system draws or purchases water:*

Total Number of Source Facilities 2

WATER SYSTEM FACILITIES SUMMARY (WSF)

WSF ID	Facility Name	Water Type Code	Purchased	Seller PWSID	Activity Status*
			☐ Yes ☐ No		
SP002	Alberton Springs	gw	☐ Yes ☒ No		A
TP002	Treatment Plant for Springs		☐ Yes ☐ No		A
ST001	Storage Tank		☐ Yes ☐ No		A
WL003	Well 1 gwic 71338	gw	☐ Yes ☒ No		A
DS001	Distribution System		☐ Yes ☐ No		A
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		

Description of Water System Facility flow: SP002>TP002>ST001>DS001 and WL003>DS001 OR WL003>DS001>TP002>ST001>DS001

Notes: EP502 is at TP002 EP503 is at WL003

(*Example: WL002 and WL003 > CH001 > TP001 > ST001 > PC001 > DS001*)

*(A)Active, (I)Inactive, (P)Proposed

EMERGENCY POWER

Does the system have emergency power? ☐ Yes ☒ No

If yes, what type: _____

Frequency of testing: _____

Record of primary power failures: ______ in last year

Switchover: ☐ Automatic ☐ Manual

Comments: the gravity fed spring source would be used until power is restored to the well. Chlorination equipment may not function without emergency power however.

SANITARY SURVEY FORM - SURFACE WATER, SPRINGS & INFILTRATION GALLERIES

PWSID **MT0000015** | SYSTEM NAME **Town of Alberton**

SOURCES — **STATUS OF SOURCE** ☒ **(A)**ctive ☐ **(I)**nactive ☐ **(P)**roposed

WSF ID SP002 — *Entry Point ID* EP502

These are State assigned identification numbers

Source Name Alberton Springs

Name of Source - Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) T14N R23W S3

Entry Point Name Entry Point for Alberton Springs

Example: EP for North Well 1 & South Well 2

Entry Point is at WSF ID TP002

EP is at the first water system facility with finished water.

Location of Entry Point on discharge side of TP002 supply pump

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other

If seasonal: ______ to _____

GWUDISW PA Completed with this Inspection? ☐ Yes ☒ No ☐ N/A

Average Production not known water right is for 50 gpm only (indicate units)

Maximum Production unk (indicate units)

Latitude 47.00839º

Longitude -114.48755º

SURFACE SOURCES

What is the nature of watershed?

☐ Agricultural Name _____
☐ Industrial
☐ Forest
☐ Residential
☐ Other _____

What is the size of the owned/protected area of the watershed? zero protected area

How is watershed controlled?
☐ Ownership
☐ Ordinances
☐ Zoning
☐ Other _____

	Yes	No	Unk	N/A
Has a source water protection plan been developed?	☐	☐	☐	☐
Has management had a watershed survey performed?	☐	☐	☐	☐
Is there an emergency spill response plan?	☐	☐	☐	☐
Is the source adequate in quantity?	☐	☐	☐	☐
Is the source adequate in quality?	☐	☐	☐	☐
Is the intake protected from sources of contamination?	☐	☐	☐	☐
Are multiple intakes, located at different levels, utilized?	☐	☐	☐	☐
Is the highest quality water being drawn?	☐	☐	☐	☐
Can the raw water transmission line bypass treatment?	☒	☐	☐	☐

How often are intakes inspected? ______

What conditions cause fluctuations in quality? ______

Comment:

SPRINGS & INFILTRATION GALLERIES

	Yes	No	Unk	N/A
Is recharge area protected?	☐	☒	☐	☐

If Yes, how? _____

☐ Ownership
☐ Fencing
☐ Ordinances
☒ Other posted signs and minimal rudimentary fencing are the only exclusionary measures in place

What is the nature of recharge zones? ☐ ☐

☐ Agricultural
☐ Industrial
☒ Forest
☐ Residential
☐ Other _____

	Yes	No	Unk	N/A
Is site protected from flooding?	☐	☒	☐	☐
Is there diversion of surface drainage from site?	☐	☒	☐	☐
Is collection chamber properly constructed?	☐	☒	☐	☐
Does hatch cover overlap?	☒	☐	☐	☐
Is the overflow outlet screened? Located and screened	☐	☐	☐	☒
Vented and screened? NO vent	☐	☐	☐	☒
Is supply intake adequate? Except for irrigation season	☒	☒	☐	☐
Is site properly protected (from livestock, vandalism, tampering, etc)?	☐	☒	☐	☐

What conditions cause changes to quality of the water? potentially precipitation and run off; land use practises; human and animal activity

Comment: The operators have increased security at the spring box areas; erected fencing to deter public access; posted exclusion signs, and increased operator presence.

There is no full exclusion zone however to protect the source. More robust fencing of this entire area should be considered

The water right of record for this source is for only 50 gpm flow. It is likely the Town requires a greater volume of water than this represents. The Town should pursue establishing the appropriate flow is associated with the water right.

A suitable tap has been installed to collect a source sample RW002 if necessary.

The operators have been assessing the main spring boxes and assuring clean conditions are maintained at the surface and in the main box collection ports and feeder lines. They have been installing screens on open pipe ends and exercising valves, trying to determine what various pipes are for. They are generally more present on the landscape and aware of how the area is being impacted.

SANITARY SURVEY FORM – WELLS & WELL PUMPS

PWSID **MT0000015** SYSTEM NAME **Town of Alberton**

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE ☐ **(A)**ctive ☐ **(I)**nactive ☐ **(P)**roposed

WSF ID WL003 *Entry Point ID* EP503
These are State assigned identification numbers

Source Name Well 1 gwic 71338 GWIC 71338
Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) T14N R23W S3

Entry Point Name EP502
Example: EP for North Well 1 & South Well 2

Entry Point is at WSF ID TP002
EP is at the first water system facility with finished water.

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to ______

GWUDISW PA completed with this inspection ☐ Yes ☒ No

Log Available? ☒ Yes ☐ No

Average Production 100 gpm (indicate units)

Maximum Production unknown (indicate units)

Date Drilled 2/1/1978 (if well. . date drilled)

Casing Size 8 inch (size of casing installed in well)

Case Depth 203 feet (depth of casing installed in well)

Well Depth 300 feet (depth of well expressed in feet)

Grout Depth 30 feet cement (depth of grout used to seal well walls)

Log SWL 99 feet 10 inches ((static) expressed in feet below ground elevation)

Log PWL 145 feet after 4 hours ((pumping) expressed in feet below ground elevation)

Test Pump Rate 100 gpm (expressed in gallons per min)

Intake Type open casing (example: screen, slots, perforations, open)

Intake Interval na (expressed in feet below ground elevation)

Well Yield 100 gpm (pump tested in gallons per minute)

Latitude +47.00242º (in decimal degrees)

Longitude -114.48055º (in decimal degrees)

WELLS

	Yes	No	Unk	N/A
Is well metered?	☒	☐	☐	☐
Is well site protected from flooding?	☐	☒	☐	☐
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☒	☐	☐

If no . . explain Historic railroad activities (the roundhouse and tracks were in the area of the well) may have contributed to spills and land contamination issues; there is a small petroleum products tank farm to the north of the well approximately 300 feet; there is no control over lawn and yard pesticide/herbicide use in the area of the well-head; motorized vehicles and materials are within 100 ft of well in neighbors' yards.

	Yes	No	Unk	N/A
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☒
☒12 inches above finished floor inside well house; and	☒	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☒	☐
Is top of the well casing properly sealed? (sanitary seal)	☒	☐	☐	☐
Is well vented?	☒	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	☒	☐	☐	☐
Does well have suitable sampling tap? Raw Water	☒	☐	☐	☐
Treated	☐	☒	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	☒	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	☒	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	☐	☐

PUMPS

Type submersible 20-hp
(example: 30 hp line shaft turbine)
Rated Capacity 115 gpm

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? 1999			☐	☐
Are backup pumps/motors provided?	☐	☒	☐	☐
Are controls functioning properly and adequately protected?	☐	☒	☐	☐
Do underground compartments have a drain?	☐	☐	☒	☐
Is facility properly protected against trespassing and vandalism?	☒	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	☐	☒	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	☒	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	☒	☐	☐	☐
Is a preventive maintenance program in operation?	☒	☐	☐	☐
Are recommended spare parts on hand?	☒	☐	☐	☐
Cross connection protection provided?	☒	☐	☐	☐

Comment: This source is used as back up for the springs supply (SP002) during the irrigation season. It is usually turned on twice a day between 0700 and 1000 and again at 1900 through 2200 May to October. When only supplying distribution, the well water is not chlorinated.

If it were to feed water to the storage tank when runninng, that water would undergo chlorination as it entered ST001. It is anticipated that this scenario would be rare.

A suitable tap for collection of a source sample (RW003 is in place.

Explain Controls: manually activated daily on timer (usually running 2 to 3 hours at a time) to coincide with Town-mandated irrigation hours.

Comment: Flow regulating CLA VAL should call for well when springs input is inadequate to maintain tank level and keep up with Town's needs. Control valve has been non-functional for decades.

SANITARY SURVEY FORM - TREATMENT

PWSID **MT0000015** | SYSTEM NAME **Town of Alberton**

Treatment Objective

B = Disinfection Byproduct Control
C = Corrosion Control
D = Disinfection
E = Dechlorination
F = Iron Removal
I = Inorganics Removal
M = Manganese Removal
O = Organics Removal
P = Particulate Removal
R = Radionuclides Removal
S = Softening (Hardness Removal)
T = Taste / Odor Control
Z = Other _____

WATER TREATMENT FACILITIES

WSF ID	Treatment Plant Name	Treatment Objectives and Code		
TP002	Treatment Plant for water entering ST001	D401		

WSF ID **Location** Record in decimal degrees

WSF ID		
TP002	Latitude +47.00767º	Longitude -114.48729º
_____	Latitude +_____º	Longitude -_____º
_____	Latitude +_____º	Longitude -_____º
_____	Latitude +_____º	Longitude -_____º
_____	Latitude +_____º	Longitude -_____º

Treatment Plant Description: gaseous chlorination for water entering the storage tank

FOR SYSTEMS EMPLOYING FULL-TIME DISINFECTION

	Yes	No	Unk	N/A
What disinfectant is used? _____				
Is the disinfectant used NSF approved?	☐	☐	☐	☐
Is the amount of disinfectant used recorded? If Yes, amount used: _____lbs/day _____ ppm _____ other	☐	☐	☐	☐
Is the amount of disinfectant used compared to water pumped to verify concentration?	☐	☐	☐	☐
Is chemical storage adequate and safe? If No, explain _____	☐	☐	☐	☐
Is disinfectant residual being monitored daily?	☐	☐	☐	☐
Are residual reports submitted monthly?	☐	☐	☐	☐
Is 4-log removal (D361) required?	☐	☐	☐	☐
(D361) Minimum free chlorine residual concentration = _____mg/L				
Is minimum free chlorine residual maintained?	☐	☐	☐	☐
Is the disinfection equipment being operated and maintained properly?	☐	☐	☐	☐
Is operational standby equipment provided?	☐	☐	☐	☐
If not, are critical spare parts on hand?	☐	☐	☐	☐
Has disinfection system been free from failure during the past year – no interruption?	☐	☐	☐	☐
If No, give dates of interruptions _____				

Describe provisions for providing contact time between disinfection point and the first point of use: _____

IF USING GAS CHLORINATION

	Yes	No	Unk	N/A
Is a manifold provided to allow feeding gas from more than one cylinder?	☐	☒	☐	☐
Is there automatic switchover from cylinder to cylinder?	☐	☒	☐	☐
Are scales provided for weighing of containers?	☒	☐	☐	☐
Are chlorine storage and use areas isolated from other work areas?	☐	☒	☐	☐
Are stored cylinders capped and labeled?	☐	☒	☐	☐
Is room vented to the outdoors with suction located no more than 6 inches above the floor level?	☐	☒	☐	☐
Is vent inlet near the ceiling?	☐	☒	☐	☐
Is room containing chlorination treatment labeled sufficiently (DANGER signs, etc.)?	☒	☐	☐	☐
Is a view port provided into the room storing chlorine?	☐	☒	☐	☐
Is a means of leak detection provided? Type? _____	☐	☒	☐	☐
Is a self-contained breathing apparatus available for use during repair of leaks? Where? well house	☒	☐	☐	☐
Are personnel trained to use apparatus?	☐	☐	☒	☐
Are all doors hinged outward and equipped with panic bars?	☐	☒	☐	☐
Are all gas cylinders restrained near the top and about half way down by chaining to wall or by other means?	☐	☒	☐	☐

Comment: the current operators have managed to reduce the chlorine dose by 1/3 and still retain the appropriate level of chlorine at te pont of application.

SANITARY SURVEY FORM - STORAGE

PWSID **MT0000015**	SYSTEM NAME **Town of Alberton**

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

Total storage provided designed to be 300,000 gallons	Total treated storage provided designed to be 300,000 gallons	Storage provides varied days of water reserve

STORAGE FACILITY

WSF ID ST001

Location West end of Water Works Road above Town

Description above-ground, welded steel tank

Latitude: + 47.00759º in decimal degrees

Longitude: -114.48724º in decimal degrees

Storage Volume designed to be 300,000 gallons

Year constructed: 1968

Condition: ☐Good ☐Fair ☐Poor ☒ Unknown ☒Not Accessible

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☒	☐	☐	☐
Is the site protected against flooding?	☐	☒	☐	☐
Is the site protected against trespass/vandalism?	☐	☒	☐	☐
Ladders caged and locked?	☐	☐	☐	☒
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☐	☐	☒	☐
Overflow pad?	☐	☒	☐	☐
Is access hatch sealed properly and locked?	☐	☐	☒	☐
Are surface coatings in contact with water ANSI / NSF approved?	☒	☐	☐	☐
Is tank protected against icing and corrosion?	☒	☐	☐	☐
Can tank be isolated from system?	☐	☒	☐	☐
Is all treated water storage covered?	☒	☐	☐	☐
Are tanks disinfected after repairs are made?	☐	☐	☒	☐

What is cleaning frequency for tanks? last in 1999

	Yes	No	Unk	N/A
Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	☒	☐	☐

1999 — Date of last inspection

Liquid Engineering — By whom

Comments: the operator has been diligent about increasing safety and security at the tank. He has interfaced with the School District personnel to address school aged kids tresspassing on the storage tank. He has secured access to the ladder, installed signage, and increased monitoring at the treatment building and tank.

We did not access the tank due to safety restrictions. Please be sure to check the condition of all ports into the tank, screens, hatch gaskets, and air vents.

STORAGE FACILITY

WSF ID _____

Location _____

Description _____

Latitude: +_____º in decimal degrees

Longitude: -_____º in decimal degrees

Storage Volume _____ gallons

Year constructed: ______

Condition: ☐Good ☐Fair ☐Poor ☐Not accessible

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☐	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	☐
Is the site protected against trespass/vandalism?	☐	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	☐
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☐	☐	☐	☐
Overflow pad?	☐	☐	☐	☐
Is access hatch sealed properly and locked?	☐	☐	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	☐	☐	☐	☐
Is tank protected against icing and corrosion?	☐	☐	☐	☐
Can tank be isolated from system?	☐	☐	☐	☐
Is all treated water storage covered?	☐	☐	☐	☐
Are tanks disinfected after repairs are made?	☐	☐	☐	☐

What is cleaning frequency for tanks? _____

	Yes	No	Unk	N/A
Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	☐	☐	☐

_____ Date of last inspection

_____ By whom

Comments: _____

SANITARY SURVEY FORM - MISCELLANEOUS

PWSID **MT0000015** | SYSTEM NAME **Town of Alberton**

DISTRIBUTION SYSTEM EVALUATION

WSF ID DS001

	Yes	No	Unk	N/A
System drawings available?	☒	☐	☐	☐
Accurate As-Built drawing(s) on-site?	☒	☐	☐	☐
Lines adequately sized?	☐	☐	☐	☐
Adequate pressure maintained?	☒	☐	☐	☐
Mains protected from freezing?	☒	☐	☐	☐
Distribution system free of leaks?	☐	☒	☐	☐
Asbestos concrete pipe used?	☒	☐	☐	☐
Fire hydrants?	☒	☐	☐	☐
Dead end lines minimized by looping mains?	☐	☒	☐	☐
Flushing program?	☒	☐	☐	☐
Pressure reducing stations? Number _____	☐	☒	☐	☐
Booster stations? Number _____	☐	☒	☐	☐
Are individual booster pumps on any service lines? (see DEQ-1 6.4.4)	☐	☒	☐	☐
Were cross connections observed?	☒	☐		

Describe distribution: mixture of materials, ages, and sizes

Comments: There are 2 significant deficiencies that must be addressed. - DS001 has 2 confirmed cross connections in the underground irrigation supply line vault in the Park. you will have received correspondence dated January 16, 2018 from Craig Fetkavich Ground Water Rule Manager regarding these issues. Please have your operator communicate directly with Craig if he has any questions.

SAFETY

	Yes	No	Unk	N/A
Were confined spaces observed?	☐	☐	☐	☐
Describe any confined spaces observed _____				
Confined space safety adequate?	☐	☐	☐	☐
Fall risks adequately mitigated?	☐	☐	☐	☐

Note all safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.)

TP002 building and specifically the CLA VAL pit in the treatment building in gaseous chlorine atmosphere is a confined space. And the underground vault with the irrigation supply line iteh PArk is a confined space and fall hazard.

MONITORING AND RECORDKEEPING EVALUATION

	Yes	No	Unk	N/A
Does the system have a current Monitoring Schedule?	☒	☐	☐	☐
Bacti monitoring records maintained? (5 years)	☒	☐	☐	☐
Bacti Sample Site Plan submitted?	☒	☐	☐	☐
Familiar with repeat sampling?	☒	☐	☐	☐
Chemical monitoring records maintained? (10 years)	☒	☐	☐	☐
System specific records / plans maintained? (DBP, PB/CU, treatments, waivers, violations, etc.)	☒	☐	☐	☐
Familiar with Public Notice requirements?	☒	☐	☐	☐
Did Surveyor take a bacteriological sample?	☐	☒		

If Yes, date of Sample: _____ Time of Sample: _____

Comments: A suitable Site Sampling Plan under the Revised Total Coliform Rule is on file with DEQ. No issues with this item. NO violations in the previous 2 years.

MANAGEMENT

	Yes	No	Unk	N/A
Are there sufficient personnel?	☒	☐	☐	☐
Are operators properly certified?	☒	☐	☐	☐
Are personnel adequately trained?	☒	☐	☐	☐
Is there a current O&M manual on-site?	☐	☒	☐	☐
Is an emergency plan on-site and workable?	☒	☐	☐	☐
Has system addressed concerns from previous sanitary survey(s) or technical visit(s)?	☒	☐	☐	☐
Budget exists?	☒	☐	☐	☐
Does system maintain an emergency fund?	☐	☒	☐	☐
Does system contribute to facility replacement fund?	☐	☐	☒	☐
Are abandoned wells present?	☐	☒	☐	☐
Do abandoned wells appear to be properly abandoned? (see ARM 36.21.670)	☐	☐	☐	☒

Comments: this PWS is improving in all aspects due to the new operators and their relationship with the Town Clerk, Council and Mayor. The changes are noticeable and reflected in the lack of violations and the enhanced security measures and source protect in place. Thank you for this increased commitment to your public infrastructure in place for your citizens' use.

2 significant deficiencies that must be addressed.- DS001 has confirmed cross connections in the underground irrigation supply line vault in the Park.

PWSID **MT0000015**	SYSTEM NAME **Town of Alberton**

The State, or an authorized agent, must conduct sanitary surveys for all public water supply systems in Montana. DEQ believes that periodic sanitary surveys, along with appropriate corrective actions, are indispensable for assuring the long-term quality and safety of drinking water. When properly conducted, sanitary surveys can provide important information on a water system's design and operations and can identify minor and significant deficiencies for correction before they become major problems.

Minor deficiencies do not pose serious health threats. However, corrective action of minor deficiencies can be critical in the long-term operation and safety of a public water system. Minor deficiencies are generally described as suggested or recommended corrections in the letter to system owner(s).

Significant deficiencies can be defined as a defective water supply component(s) having or likely to have an adverse influence on public health. Significant deficiencies require immediate corrective action in efforts to protect consumers.

EPA and ASDWA guidance identifies eight broad components that should be covered in a sanitary survey. Using these eight broad components as a guide, minor and significant deficiencies should be described in the letter to system owner(s).

1) Source
2) Treatment
3) Distribution system
4) Finished water storage
5) Pumps, pump facilities, and controls
6) Monitoring and reporting, and data verification
7) System management and operation
8) Operator compliance with State requirements

With consideration that significant deficiencies may influence regulatory decisions and monitoring requirements, please list all significant deficiencies observed and corrective action(s) taken below.

Comments: **There were two significant deficiencies associated with this sanitary survey identified by the Significant Deficiency Review Committee.**

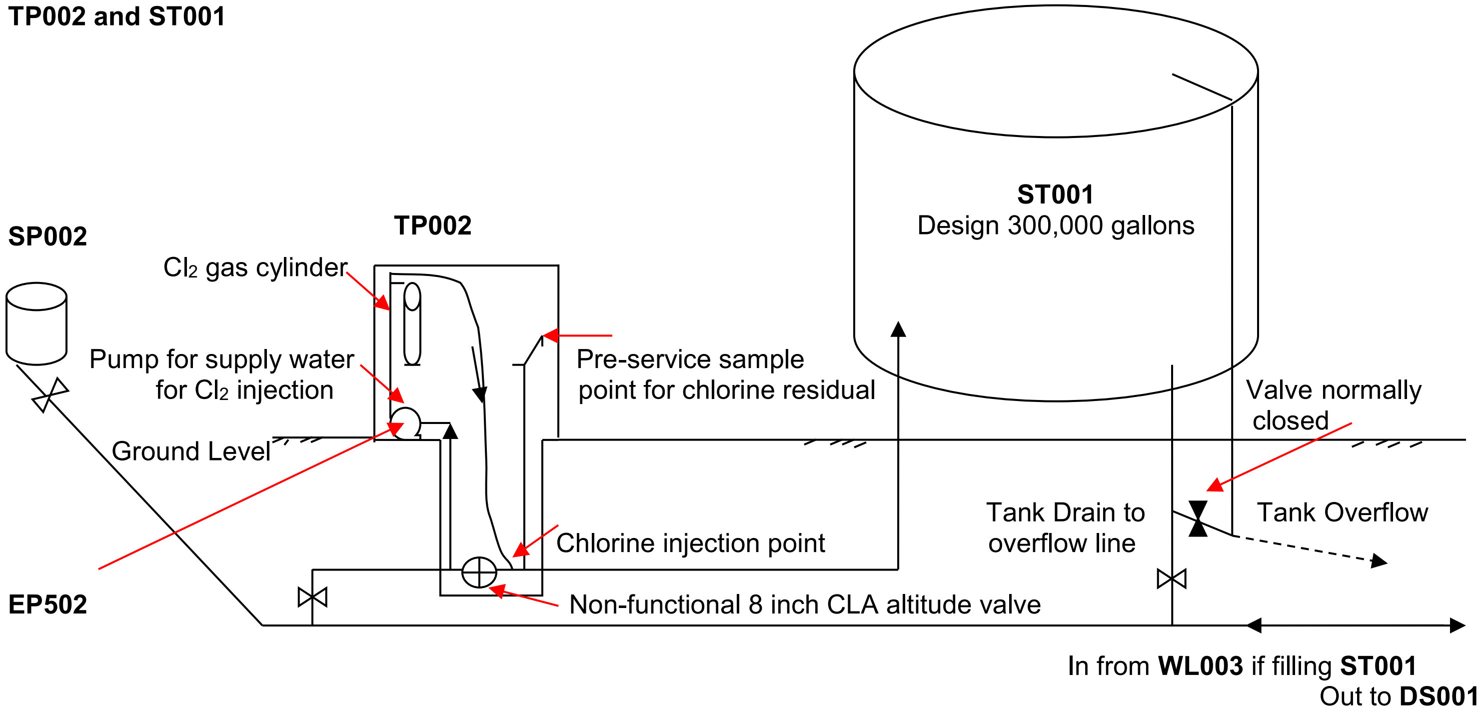
#1 DS001 has a confirmed cross connection: an incorrect/inadequate backflow prevention in place on the main underground sprinkler supply line; and

#2 DS001 has a confirmed cross connection: there is no backflow protection in place on one underground automatic irrigation supply line.

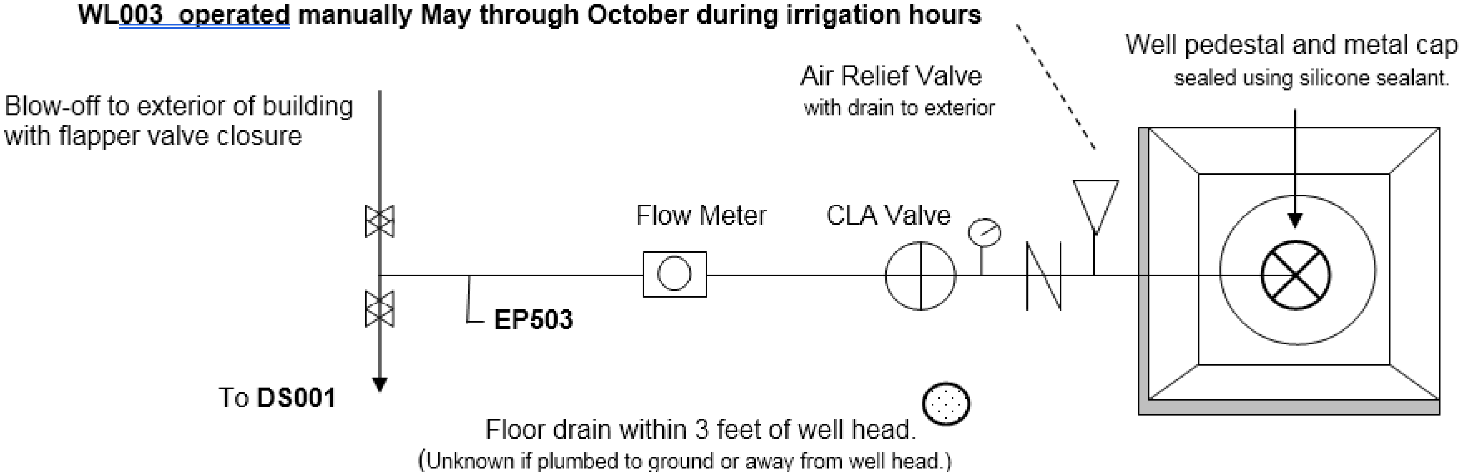
PWSID **MT0000015**

Draw brief schematic of pump house facilities (pressure control assemblies, treatment(s) valves, filters, meters, electrical controls, etc.)

TP002 and ST001



WL003 operated manually May through October during irrigation hours



SANITARY SURVEY FORM – WELL LOG(S)

PWSID **MT0000015** | SYSTEM NAME **Town of Alberton**

Please insert schematics, diagrams and maps as needed. Additional sheets may be added.

WL003 Well 1 gwic 71338

Site Name: CITY OF ALBERTON
GWIC Id: 71338
DNRC Water Right: P013904-00

Section 1: Well Owner

Owner Name
CITY OF ALBERTON
Mailing Address

City	State	Zip Code
ALBERTON	MT	59820

Section 2: Location

Township	Range	Section	Quarter Sections
14N	23W	2	SE¼ SW¼ SW¼ NW¼

County	Geocode
MINERAL	

Latitude	Longitude	Geomethod	Datum
47.0027	114.4798	NAV-GPS	NAD27

Altitude	Method	Datum	Date
3035			10/26/1999

Addition	Block	Lot

Section 3: Proposed Use of Water
PUBLIC WATER SUPPLY (1)

Section 4: Type of Work
Drilling Method: CABLE

Section 5: Well Completion Date
Date well completed: Wednesday, February 01, 1978

Section 6: Well Construction Details
There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2.5	203	8				

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
203	300	8			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	CEMENT GROUT	

Section 7: Well Test Data

Total Depth: 300
Static Water Level: 100
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
100 gpm pump rate with _ feet of drawdown after 4 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 145 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks
8IN STEEL CASING; METAL PLATE BOLTED ON TOP; VENT HOLE ALLOWS ACCESS; SUB PUMP. WELL USED FOR SUMMER IRRIGATION. DISCHARGE WAS ESTIMATED BY MAINTINANCE MAN-LARGE VOLUME IS DISCHARGED OUT OF LARGE DIA VENT PIPE

Section 9: Well Log
Geologic Source
400BELT - BELT SUPERGROUP

From	To	Description
0	2	SANDY BLACK TOP SOIL
2	11	TAN SILTY SABD
11	32	BROWN SANDY CLAY
32	42.5	GRAVEL IMBEDDED IN BROWN SILTY CLAY
42.5	52	GRAVEL MIXED IN BROWN SILTY CLAY
52	71	SAND AND SILTY BROWN CLAY WITH A FEW GRAVELS MIXED IN SEEP OF WATER AT 58 FEET
71	74	DENSE BROWN SILTY AND SANDY CLAY
74	78	GRAVEL IMBEDDED IN BROWN SANDY CLAY
78	86.5	GRAYISH TAN SILTY SAND GRAVEL AND COBBLESTONES
86.5	89	GRAVEL & COBBLESTONES IMBEDDED IN LIGHT BROWN CLAY
89	92	GRAVEL IMBEDDED IN GRAYISH TAN CLAY
92	94.5	GRAYISH TAN SILTY SAND AND GRAVEL
94.5	103	TAN CLAY WITH SOME GRAVEL MIXED IN
103	112	GRAVEL EMBEDDED IN REDDISH TAN SILTY CLAY SEEP OF WATER AT 111 FEET
112	114	GRAVEL IMBEDDED IN LIGHT BROWN SILTY CLAY

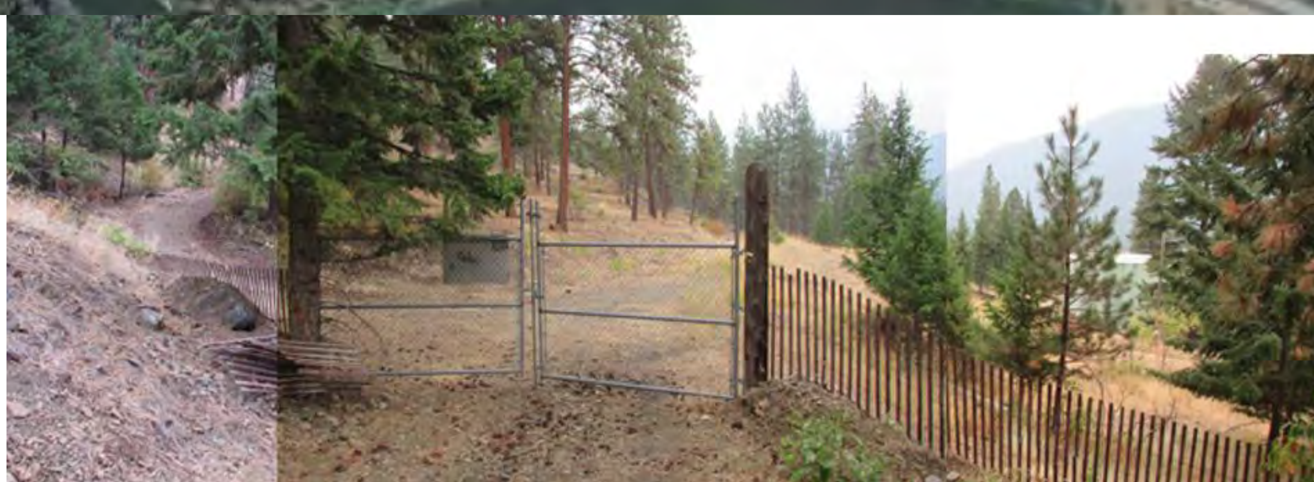
Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: LIBERTY DRILLING & PUMP CO
License No: WWC-52
Date Completed: 2/1/1978

Site Name: CITY OF ALBERTON
GWIC Id: 71338
Additional Lithology Records

From	To	Description
114	118	LIGHT BROWN SILTY SAND AND GRAVEL WITH SOME STRINGERS OF CLAY
118	126	GRAVEL IMBEDDED IN REDDISH TAN SILTY CLAY
126	127.2	RED TO DARK BRWON ROCK SEEP OF WATER
127.2	133	BROWN ROCK 5 TO 10 GPM
133	135	FRACTURED PURPLE ROCK WITH SEAMS OF BROWN CLAY
135	147	FRACTURED PURPLE BROWN GREEN AND GRAY ROCK IN ALTERNATE LAYERS SOME SEAMS OF BROWN CLAY
147	150	BROKEN BROWN ROCK WITH SEAMS OF BROWN CLAY
150	151	BROKEN RED ROCK. 30 GPM WATER @150
151	158	BROKEN REDDISH BROWN ROCK SOME THIN SEAMS OF GREEN & GRAY ROCK AND BROWN CLAY
158	163	CLEAN REDDISH BROWN BROKEN ROCK
163	190	BROKEN REDDISH BROWN ROCK WITH SOME THIN SEAMS OF GREEN GRAY AND PURPLE ROCK
190	202	SOLID REDDISH BROWN ROCK
202	215	BROKEN REDDISH BROWN ROCK
215	248	FRACTURED REDDISH BROWN ROCK WITH SOME THIN SEAMS OF GRAY PURPLE CLAY GRAY PURPLE AND GREEN ROCK
248	269	HARD BROWN ROCK
269	276.5	HARD PINKISH RED ROCK
276.5	277.5	SOFTER PINKISH RED ROCK WITH BROWN CLAY SEAMS
277.5	282.5	HARD PINKISH RED ROCK
277.5	300	RED ROCK

Town of Alberton
MT0000015
Sanitary Survey
Conducted December 14, 2017
by MK Valett

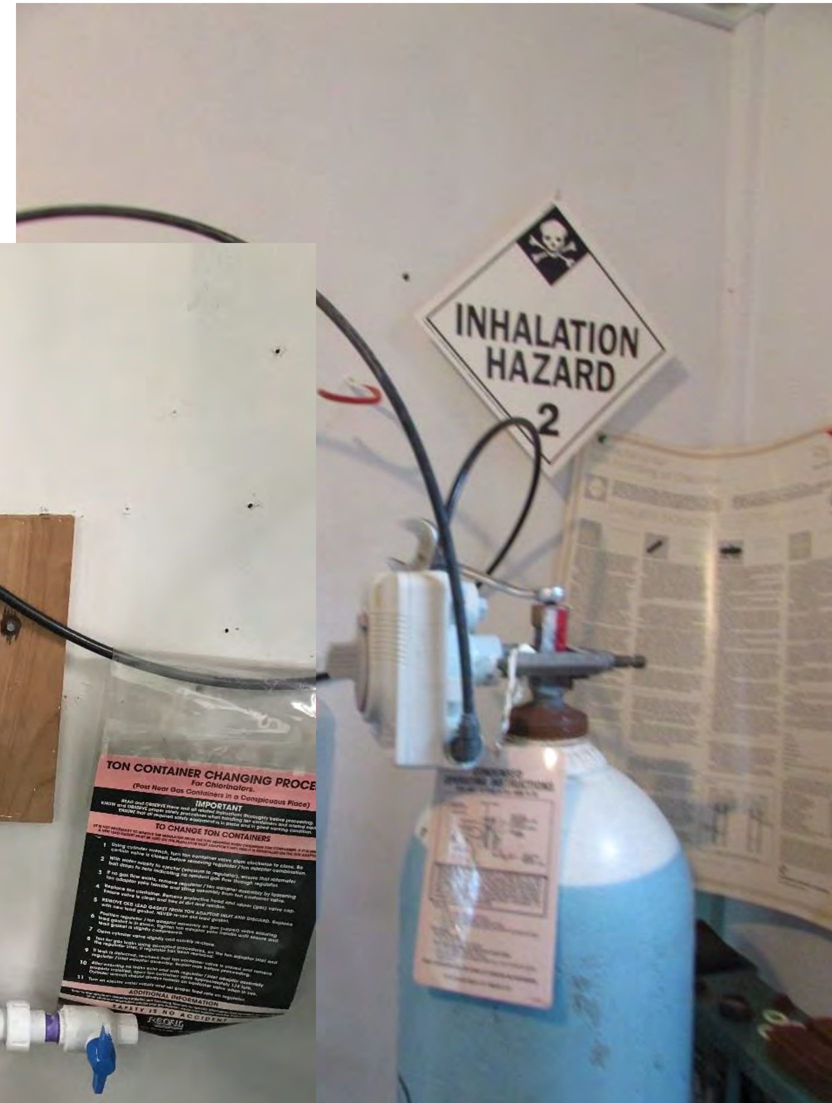


Gate and fencing erected across access road to springs area to deter public access.

SP002 showing the lower (main) spring box with new gasket, padlock and hasp (lower left photos) and diffusion cap for main supply lateral (lower right photo).

TP002 above left;
ST001 above right;
ST001 overflow line below left;
remote sensing set up for SP002, ST001, and TP002 access below right.

MT0000015
December 14, 2017



Above, relocated sample tap for collection of a raw source sample (RW002); middle, new centrifugal separator installed on the gaseous chlorine injector water supply line.

Chlorine tank safety is still inadequate to protect personnel, right photo.

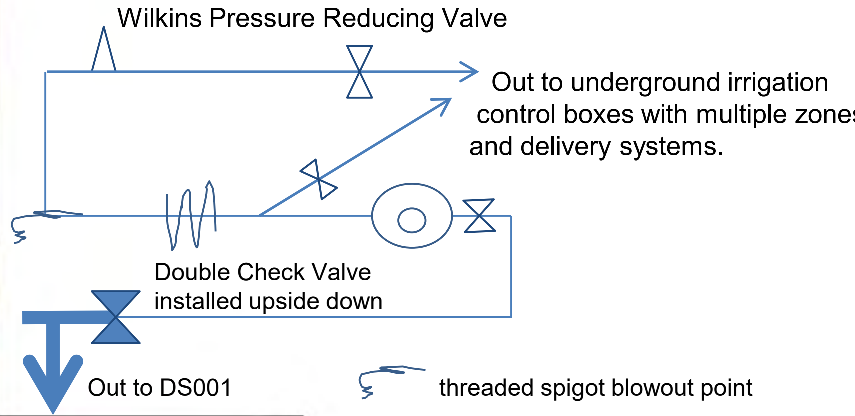
Be sure to inform your local emergency services of the presence of gaseous chlorine in this building.

Above left, spare parts inventory on hand in the well house.

There is an RPZA in place at the wastewater treatment plant for cross connection protection, above right.

Be sure to have this device tested by a certified backflow device tester as required.

James has a laboratory space at the wastewater treatment plant. I encouraged him to use this lab for his PWS field chemistry also. He has posted important documents, drawings, and procedures he regularly uses.



VALVE VAULT SCHEMATIC

threaded spigot blowout point

SIGNIFICANT DEFICIENCY
incorrect/inadequate bfpd/rpza in place

SIGNIFICANT DEFICIENCY underground automatic irrigation supply line with NO bfpd or rpza in place.

APPENDIX C

SOURCE WATER & WELL HEAD PROTECTION REPORTS

Town of Alberton
Public Water System

PWSID # MT0000015

SOURCE WATER DELINEATION AND ASSESSMENT REPORT

Date of Report: May 5, 2005

PO Box 115
Alberton, MT 59820

Phone: *406-722-4942*

Table of Contents

INTRODUCTION

This Delineation and Assessment Report is for:

Town of Alberton
PWS ID# MT00015
Howard Hogan
701 Railroad Avenue
Alberton, MT 59820

It was prepared by Joe Meek with assistance from student intern Heather Cling (University of Montana). Certified operator Howard Hogan provided review comments and corrections based on his extensive knowledge of the system. The draft report relies on information derived from the Hydrogeologic Assessment of the Alberton Public Water Supply for Ground Water Under the Direct Influence of Surface Water (English, 1999) and a Sanitary Survey completed in 2002.

Purpose

This report is intended to meet the technical requirements for the completion of the delineation and assessment report for the *Town of Alberton* as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182).

The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to protect public drinking water supplies from contamination. A major component of the Montana Source Water Protection Program is "delineation and assessment". Delineation is a process of mapping source water protection areas, which contribute water used for drinking. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported, and then determining the relative susceptibility to contamination of drinking water. The primary purpose of this source water delineation and assessment report is to provide information that helps the *Town of Alberton* continue to provide high quality drinking water.

Limitations

This report was prepared to assess threats to the *Town of Alberton* public water supply, and is based on published information and information obtained from local residents familiar with the community. The terms "drinking water supply" or "drinking water source" refer specifically to the source of the *Town of Alberton* public water supply and not any other public or private water supply. Also, not all potential or existing sources of groundwater or surface water contamination in the area of the *Town of Alberton* are identified. Only significant potential sources of regulated contaminants in areas that contribute water to its drinking water source are considered.

The terms "contaminant" are used in this report to refer to constituents for which maximum concentration levels (MCLs) have been specified under the national primary drinking water standards, and to certain constituents that do not have MCLs but are considered to be significant health threats.

CHAPTER 1
BACKGROUND

The Community

Alberton is located in Mineral County in western Montana. The town is located just west of the Missoula County line and is approximately 30 miles northwest of Missoula, Montana. The population of Alberton is around 400 persons. Alberton lies immediately north of Interstate 90, the Clark Fork River and the Burlington Northern Railroad tracks (mainline). The local economy is based on tourism, government, and employment in other locations. There is some farming on the land along the river. The town is served by a community public water supply system and a community wastewater collection and treatment system.

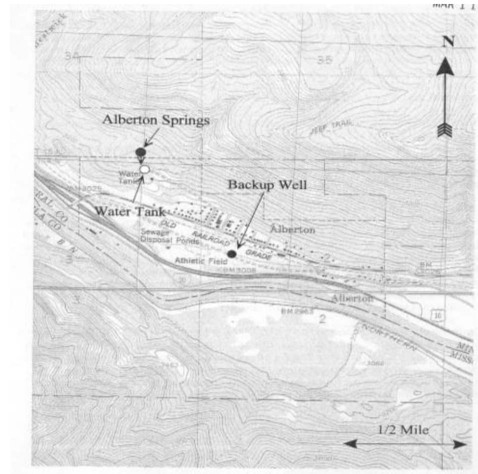


Figure 2. The Alberton spring site is situated on a gentle south sloping bench, below a major slope break. The backup well is situated on a flat terrace above the 100-year flood plain of the Clark Fork River. Base map modified from U.S. Geological Survey Alberton (1984) and Petty Mountain (1964) 7.5 minute quadrangles.

Hydrogeologic setting

The Alberton water system has two sources. The main water source is a spring (IG002) and a backup well (WL003) is connected to the distribution system to meet seasonal demand during the summer. The spring source is located on a bench above town and the backup well is located in town just north of the Athletic Field.

The main water source is the spring which surfaces at a gentle south sloping bench on the northwest edge of town. The spring is at an elevation of approximately 3,240 feet. The spring surfaces approximately 400 feet down slope of a major slope break. Above the slope break and to the north, the slope steepens significantly. Steep slopes extend from the slope break to the top of the Nine Mile Divide, which reaches a maximum elevation of 5,825 feet.

The spring discharge area is forested. The area was selectively logged in the mid-1980s (Hagel, 1995). In the wet areas around the spring boxes, thick brush, grasses, and other vegetation cover the ground surface. There are no commercial or residential land uses in the spring area. At the time of the field inspection related to the hydrologic assessment there were no indications of livestock grazing in the area, but signs of deer and other wildlife were noted. The spring site is readily accessible by the general public. The site is susceptible to forest fires, and a small fire in 1999 reportedly came within a few hundred feet of the spring site (English, 1999).

General description of the Source Water

Alberton is on a terrace deposit on the north side of the Clark Fork River Valley and lies within an extensively faulted and folded terrain at the intersection of two major regional structural features. These features are Montana's Western Thrust Belt, which generally trends north-south, and the Lewis and Clark Line, which generally trends southeast-northwest (Lonn and McFaddan, 1999). This area experienced tectonic compression in Late Cretaceous, followed by extension. Due to this tectonic history, thrust faults, strike-slip faults, and normal faults are all present in the Alberton area.

Bedrock (see Appendix D) exposed in the Alberton area includes Precambrian meta-sedimentary rocks of tile Belt Super Group, and Paleozoic (Cambrian) sedimentary rocks (Wells, 1974). Along the valley floors and lower-valley side slopes, the bedrock is covered by younger, unconsolidated Tertiary and Quaternary sediments (Wells, 1974; McMurtrey et al., 1965) including alluvium and Glacial Lake Missoula deposits (English, 1999).

The Public Water Supply

The Town of Alberton Public Water Supply serves around 400 residents with 195 active service connections (DEQ, 1998). The system is classified as a community public water supply by DEQ. The legal description for the spring site is Tract BBAA in section 3, T14N, R23W. The coordinates of the spring site are lat 47° 00' 32", long 114°29' 11". The sensitivity of the water source the supplies the spring infiltration gallery is high. The legal description and coordinates for the backup well are Tract ACAD section 2, T14N, R23W, and lat 47° 00' 08", long 114 °28' 45". The sensitivity of the confined aquifer tapped by the well is low. The spring area is accessed from town by driving up a short jeep trail to the water tank, located 160 and 200 feet above Alberton to the northwest. The backup well is located in at 313 Parkway Drive.

The backup well (WL003) has a total depth of 300 feet. This source is mainly used in the summer to meet the added demand for lawn irrigation. A well log is included in Appendix E. The GWIC database identification number assigned to the well is M71338. The log indicates the well is grouted to 30 feet below ground surface (bgs) and yields 100 gallons per minute. A well house, constructed of cinder blocks and concrete, encloses the wellhead, 20 HP submersible pump, and a chlorine room. The chlorine room is separated from the pump room and is accessed from a separate entry door. The well house is fenced to prevent access by the public. The backup well system is set up to inject chlorine into the well water as it is pumped into the distribution lines.

The primary water supply is from the spring (IG002). Spring water is collected using three spring-water collection boxes, which have buried collection laterals. Spring water flows under gravity from the spring boxes to the 300,000-gallon storage tank. Water collected in the spring boxes is chlorinated using chlorine gas. The gas is injected prior to discharge of the spring water into the storage tank. An old post and wire fence surrounds the spring area. The fence has not been maintained and does not prohibit animals or people from accessing the spring discharge area.

Piping from the old collapsed tank was connected to the new storage tank when it was built in 1968 (Hogan, 1999). A buried valve on the discharge line from the old tank is reported to be closed, but has not been inspected since the new tank was constructed. There is a possibility that the current distribution system receives water from the collapsed tank structure, especially in the spring, when the snow pack melts in the spring area and the old tank fills with snowmelt (Hogan, 1999).

As-built plans are not available to determine the number, length, orientation and depth of the collection laterals attached to the spring boxes. The inside of the spring boxes were inspected to try to determine the orientation and number of collection lines connected to each box. Appendix B shows the piping that was observed and estimated flows if flow was observed. The spring boxes are constructed out of 4-foot diameter galvanized culvert pipe installed vertically in the spring discharge area. The bottoms of the pieces of culvert are open-ended and extend 5-6 feet bellow ground surface. Locked metal lids cover the tops of the spring boxes. The spring discharge area, the chlorine shed, and the storage tanks are accessible by the public. The lid on top of the 300,000-gallon storage tank is not locked according to the system operator.

The spring boxes collect water from the infiltration pipes connected to them, and from seepage upward into the open bottoms of the boxes. The collection laterals are buried approximately five to six feet below the ground surface (bgs). The ground surface over the laterals appears to consist of native backfill, which is composed of colluvium. The collection areas are not graded to prevent infiltration of storm water runoff, and the nature of the fill material probably allows for rapid infiltration of snowmelt and storm water runoff into the collection area (English, 1999).

Water Quality

The Town of Alberton Public Water Supply analyzes for inorganic and organic chemicals once every three years and nitrates once every year. Radionuclides are also tested. Bacteriological monitoring occurs monthly. The highest reading for nitrates from the spring in the last five years is 0.34 mg/L and the backup well has a history of nitrate readings from 1.88 to 2.79 mg/L. The standard for nitrate is 10 mg/L. In the past five years, a single positive coliform analysis was reported in December 2000.

CHAPTER 2
DELINEATION

The source water protection area, the land area that contributes water to well and spring used by the Town of Alberton is identified in this chapter. Three management regions are identified within the source water protection area. These three regions are the control zone, inventory region, and recharge region. The control zone, also known as the exclusion zone, is an area at least 100-foot radius around the well and spring collection system. The inventory region represents the zone of contribution to the well and spring; for the well it is a fixed radius of 1,000’ (locally confined setting), and for the spring it is the topographic area above the spring

Hydrogeologic Conditions

The source of ground water discharging at the Alberton spring site is believed to be flow from bedrock. Normal faults, strike-slip faults, and thrust faults are all present in the Alberton area, including the spring area (Wells, 1974; Lonn, 1999). The slope break above the springs, the mapping by Lonn (1999), and the presence of breccia boulders in the spring area, all suggest that a major normal fault (down to the south) is present in the spring area. With the exception of the diabase outcrop near the storage tank, the entire spring area is covered with colluvium. Because of the lack of bedrock exposure, the actual bedrock control on the location of the spring could not be determined.

Based on the depth of the well (300 feet) and the lithology, the backup well is probably completed in a locally confined bedrock aquifer. The well log information included in Appendix E shows a borehole through 126 feet of lake sediments and alluvium prior to hitting bedrock. The alluvium contained layers of clay, silt, and claybound gravels. No significant water-bearing zones were encountered above the bedrock (English, 1999).

Table 1. List of geologic or hydrogeologic maps or references available for the Alberton area.

Title or Description	Date	Area Covered	Reference

Geologic map of the Montana part of the Wallace 30' x 60' quadrangle.	1999	Wallace 30' x 60' quadrangle.	**Lonn, J.D., and McFaddan, M.D., 1999.** Montana Bureau of Mines and Geology, Open-File Report MBMG 388.
Geology and ground-water resources of the Missoula Basin, Montana.	1956	Missoula Basin	**McMurtrey, R.G., Konizeski, R.L., and Brietkrietz, A., 1956.** Geology and ground-water resources of the Missoula Basin, Montana. Montana Bureau of Mines and Geology; Bulletin 47,35 p,
Geologic map of the Alberton quadrangle, Missoula, Sanders, and Mineral counties, Montana.	1974	Alberton Quad	**Wells, J.D., 1974**. Geologic map of the Alberton quadrangle, Missoula, Sanders, and Mineral counties, Montana. United States Geological Survey Map GQ-1157, scale 1 :65,000.

Conceptual Model and Assumptions

The spring water may originate as fracture flow, or flow from a fault, which is located upslope of the point where the spring water surfaces. If this is, the case, the spring water could be traveling several hundred feet downslope through the thin colluvial cover, prior to surfacing. The flow could also originate from fractures or a fault directly under the spring site. In this case the spring water would have limited interaction with the colluvium. The presence of the slope break several hundred feet upslope of the spring, and the presence of the small spring up slope of the developed springs both suggest that the spring water originates from bedrock above the spring site. In either case, the recharge area for the spring is most likely a broad area extending upward from the spring to the Nine Mile divide. Because of the complex structure in the area, it may not be possible to accurately define the recharge area. The source of recharge for the spring, regardless of the recharge area, is probably from infiltration of rain and snowmelt on the slopes above the spring.

Well/Spring Information

Table 2. Source well information for the Town of Alberton (Appendix H)

Information	**Backup Well**	**Spring**
PWS Source Code	WL003	IG002
Well Location (T, R, Sec or lat, long)	lat 47°00' 08", long 114 °28' 45"	lat 47°00' 32", long 114°29' II"
MBMG #	71338	Not Known
Water Right #	P01394-00	Not Known
Date Well was Completed	1978	1968
Total Depth	300’	Spring boxes 5-6’bgs
Perforated Interval	Unknown	
Static Water Level	100’	

Pumping Water Level	145’	Not Applicable
Drawdown	Not Reported	Not Applicable
Test Pumping Rate	100gpm	Not Applicable
Specific CapaTown	Not Reported	300,000 gallons

Methods and Criteria

The control zones for both the well and the spring were delineated using a simple 100’ fixed radius. The inventory region for the well was delineated using a simple 1,000’ fixed radius approach as per the criteria set forth in the Montana Source Water Protection Program (1999) for wells tapping confined aquifers. The combined inventory-recharge region for the spring was delineated using simple topographic mapping.

Delineation Results

The inventory regions for the Town of Albertson are shown in Appendix B.

Limiting Factors

A simple fixed radius approach was used to delineate the inventory regions for the well and spring. This approach may over or under estimate the extent of the area actually contributing water to the PWS intakes. The results of the hydrogeologic assessment indicate that the Alberton spring may be under the direct influence of surface water on a seasonal basis. Additional effort is recommended to determine if the spring is under the direct influence of surface water.

CHAPTER 3
INVENTORY

An inventory of potential sources of contamination was conducted for the Town of Alberton within the control and inventory regions. Potential sources of all primary drinking water contaminants and Cryptosporidium were identified; however, only significant potential contaminant sources were selected for detailed inventory. The significant potential contaminants in the Town of Alberton inventory region are nitrate, pathogens, fuels, solvents, herbicides, pesticides, and metals.

The inventory for the Town of Alberton focuses on all activities in the control zone, certain sites or land use activities in the inventory region, and general land uses and large facilities in the recharge region.

Inventory Method

The inventory for the Town of Alberton focuses on all activities found within the control zone, and certain types of municipal and private facilities found within the inventory region.

Available databases were initially searched to identify businesses and land uses that are potential sources of regulated contaminants in the inventory region. The following steps were followed:

Step 1: Urban and agricultural land uses were identified from landcover data collected by the Montana Gap Analysis project (Redmond et al., 1998).

Step 2: EPA's Envirofacts System was queried to identify EPA regulated facilities. This system accesses the following databases: Resource Conservation and Recovery Information System (RCRIS), Biennial Reporting System (BRS), Toxic Release Inventory (TRI), Permit Compliance System (PCS), and Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS). The available reports were browsed for facility information including the Handler/Facility Classification to be used in assessing whether a facility is a significant potential contaminant source.

Step 3: DEQ databases were queried to identify Underground Storage Tanks (UST), hazardous waste contaminated sites, landfills, and abandoned mines.

Step 4: Major road and rail transportation routes were identified.

Potential contaminant sources are designated as significant if they fall into one of the following categories:

1) Large quantity hazardous waste generators
2) Landfills
3) Hazardous waste contaminated sites
4) Underground storage tanks
5) Major roads or rail transportation routes
6) Cultivated cropland
7) Animal feeding operations
8) Wastewater lagoons or spray irrigation
9) Septic systems
10) Sewered residential areas
11) Storm sewer outflows
12) Floor drains, sumps, or dry wells
13) Abandoned or active mines

Inventory Results/Control Zone

The control zone consists of a 100-foot radius around the backup well and a 100-foot radius around the spring. A well house, constructed of cinder blocks and concrete, encloses the wellhead with submersible pump, and a chlorine room. The chlorine room is separated from the pump room and is accessed from a separate entry door. The well house is fenced to prevent access by the public. The control zone around the spring is forested without any other structures.

Inventory Results/Inventory Region

The 1,000' inventory region for the backup well includes land uses common to most small Montana towns including retail stores, businesses, school, residences, town hall, fire department, and a main transportation route. Significant potential contaminant sources include the above ground fuel storage tanks on the Cenex property located several hundred feet northeast of the backup well, municipal sewer mains, Interstate 90, and the old Milwaukee Road Roundhouse Site.

There are no apparent significant potential contaminant sources in the inventory region of the spring however, wildfire in the inventory region possibly could negatively impact spring flow and water quality. Each of these items is discussed in more detail below.

Backup Well:

When wells tap a confined aquifer, discrete potential contaminant sources (point sources) are considered low hazard unless there are pathways for contaminant travel through the confining layer. In Alberton, pathways (ungrouted wells) do not appear to exist within the inventory region so the backup well has low susceptibility to leaks or spills from *Cenex above ground storage tanks* and the *Milwaukee Road Roundhouse.*

Municipal Sewer Lines-the Town of Albertson utilizes a municipal sewer system and services residences within the 1,000' inventory region. Hazard due to potential leaks is ranked moderate since the sewer collection system underlies about 40-50% of the inventory region. The depth of the well intake is considered a single barrier so the susceptibility of the well is moderate.

Interstate 90-found within the southern portion of the inventory region and ranked as moderate hazard to potential spills. The depth to the intake and the fact that the interstate is located down-gradient from the well are barriers hence the susceptibility is ranked low.

Sewage Lagoon-found outside and down gradient from both the spring and backup well and is not considered a significant potential contaminant source for the backup well.

Roundhouse-In May 2000, DEQ contractors conducted a site inspection at the Alberton Roundhouse Facility. Soil and groundwater samples were collected. No chemicals of concern were detected in groundwater. Analytical results from the soil sampling identified the presence of benzo(a)pyrene, dieldrin, and arsenic at concentrations exceeding EPA PRGs and/or SSLs. Benzo(a)pyrene and dieldrin were detected in soil samples collected from 8-10 feet bgs near the former waste oil building at the facility. They are associated with some petroleum contamination. Arsenic was detected in every sample collected, with the highest concentration in the background sample. The estimated depth to unconfined groundwater is approximately 45 feet bgs. These compounds are not likely to reach the deeper groundwater in the underlying bedrock aquifer. DEQ listed the site and ranked it as a low priority. Overall, the site is considered clean with a small area of petroleum related contamination near the former waste oil building (pers.comm. DEQ Remediation Div. 2004)

Table 3. Significant potential contaminant sources for the Town of Alberton

Source	Potential Contaminants	Description
Cenex Storage Tanks	*Gasoline*	*Northeast portion of inventory region*
Sanitary Sewer Main	*Pathogens and Nitrates*	*Town of Alberton utilizes Municipal Sewer*
Municipal Sewer Lines	*Pathogens and Nitrates*	*Town of Alberton utilizes Municipal Sewer*
Interstate 90	*Hazardous Materials*	*Large Scale Spill of Hazardous Materials*

Spring:

Forest Fire-In the event of a fire in the inventory region, the spring could be vulnerable to sediment deposition impacts and water quality degradation. Most significant is likely a change in the flow regime.

Inventory Results/Recharge Region

The recharge region for the backup well has not been identified. The recharge region for the spring is the same as the inventory region.

Inventory Update

The certified operator will update the inventory every year. Changes in land uses or potential contaminant sources will be noted and additions made as needed. The complete inventory will be submitted to DEQ every five years to ensure re-certification of the source water delineation and assessment report.

Inventory Limitations

The extent of the potential contaminant source inventory is limited in several respects. The inventory is based on data that is readily available though state documents, published maps and reports, and GIS data. Documentation may not be readily available on some potential sources. As a result, all potential contaminant sources may not have been identified or recognized as being significant potential contaminant sources.

CHAPTER 4
SUSCEPTIBILITY ASSESSMENT

Susceptibility is the potential for a public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. Susceptibility is assessed in order to prioritize potential pollutant sources for management actions by local entities, in this case the Town of Alberton.

The goal of Source Water Management is to protect the source water by 1) controlling activities in the control zone, 2) managing significant potential contaminant sources in the Inventory Region, and 3) ensuring that land use activities in the Recharge Region pose minimal threat to the source water. Management priorities in the Inventory Region are determined by ranking the significant potential contaminant sources identified in the previous chapter according to susceptibility. Alternative management approaches that could be pursued by the Town of Alberton to reduce susceptibility are recommended.

Susceptibility is determined by considering the hazard rating for each potential contaminant source and factoring in the existence of barriers that decrease the likelihood that contaminated water will flow to the Town of Alberton wells. Hazard is rated by the type and proximity of a potential contaminant source to the well(s). The susceptibility of each water source to potential contaminants is assessed separately in Table 7.

Table 4. Susceptibility assessment for significant potential contaminant sources in the Control Zone and Inventory Region**.**

Potential Contaminant Source	Contaminant	Hazard	Hazard Rating	Barriers	Susceptibility	Management
Backup Well						
Cenex Storage Tanks	**gasoline**	**leakage**	**low**	**Depth of intake >100'**	**low**	**Vigorous monitoring and maintenance**
Milwaukee Rd Roundhouse	**Fuels, solvents**	**Leaching from historic contamination**	**low**	**Depth of intake >100'**	**low**	**Oversight by DEQ Remediation Div**
Municipal Sewer Mains	**Nitrate, pathogens**	**leakage**	**high**	**Depth of intake >100'**	**moderate**	**Maintenance to repair leaking lines**
Interstate 90	**Various Hazardous Materials**	**Large spills**	**high**	**Down-gradient location, Depth of intake >100'**	**low**	**Emergency Planning, training of local emergency response personnel**
Spring						
Fire in watershed	**Sediments, fire fighting chemicals (retardants), other solutes released from ash**	**Sediment clogging of drainage, fire related chemicals entering fracture flow system.**	**High**	**None**	**High**	**Develop source water protection plan including fire management.**

REFERENCES

English, Alan (1999) Hydrogeologic Assessment of the Alberton Public Water Supply for Ground Water Under the Direct Influence of Surface Water.

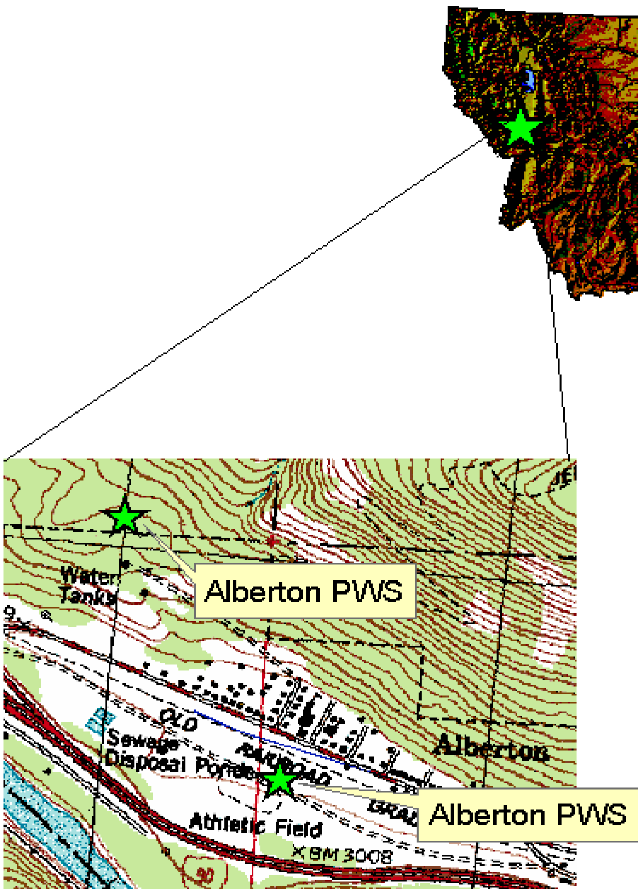
EPA US (2001) Protect our Health from Source to Tap. Report No. EPA 816-K-01-001

Montana Bureau of Mines and Geology (2004) Ground-Water Information Center Site Report, Town of Alberton.

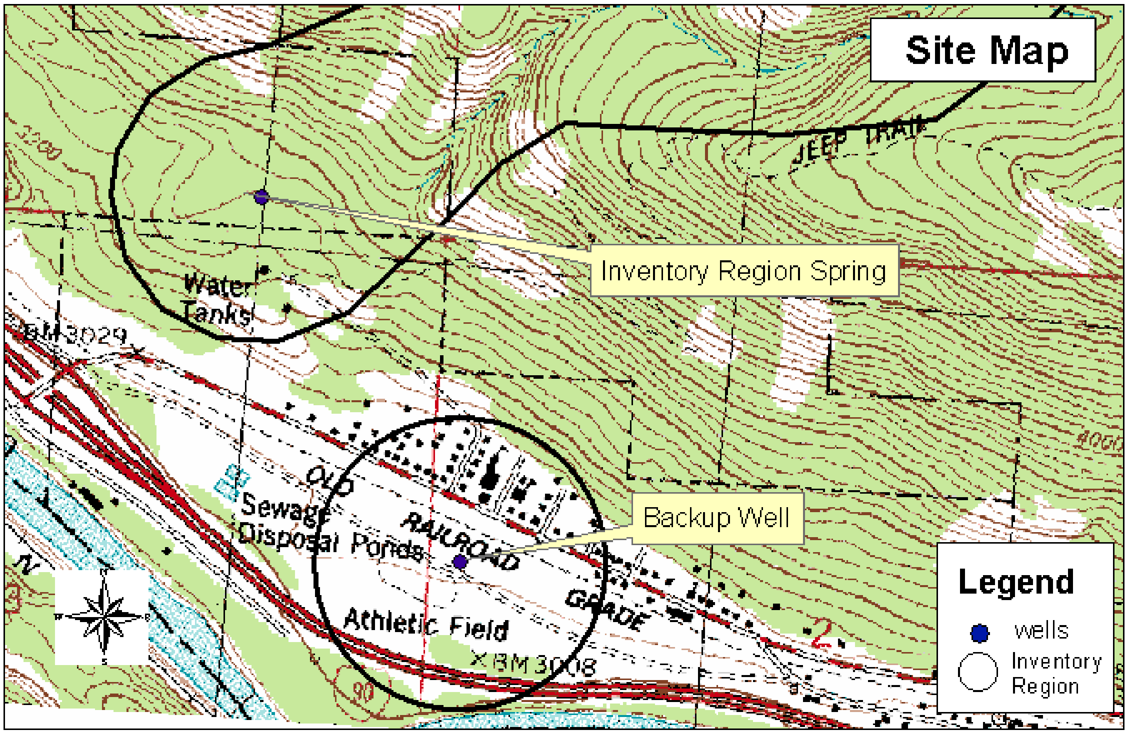
(NRIS) MSL-NRIS (2000) 1:24,000 compressed quadrangle, national landcover dataset and various shapefiles. USGS

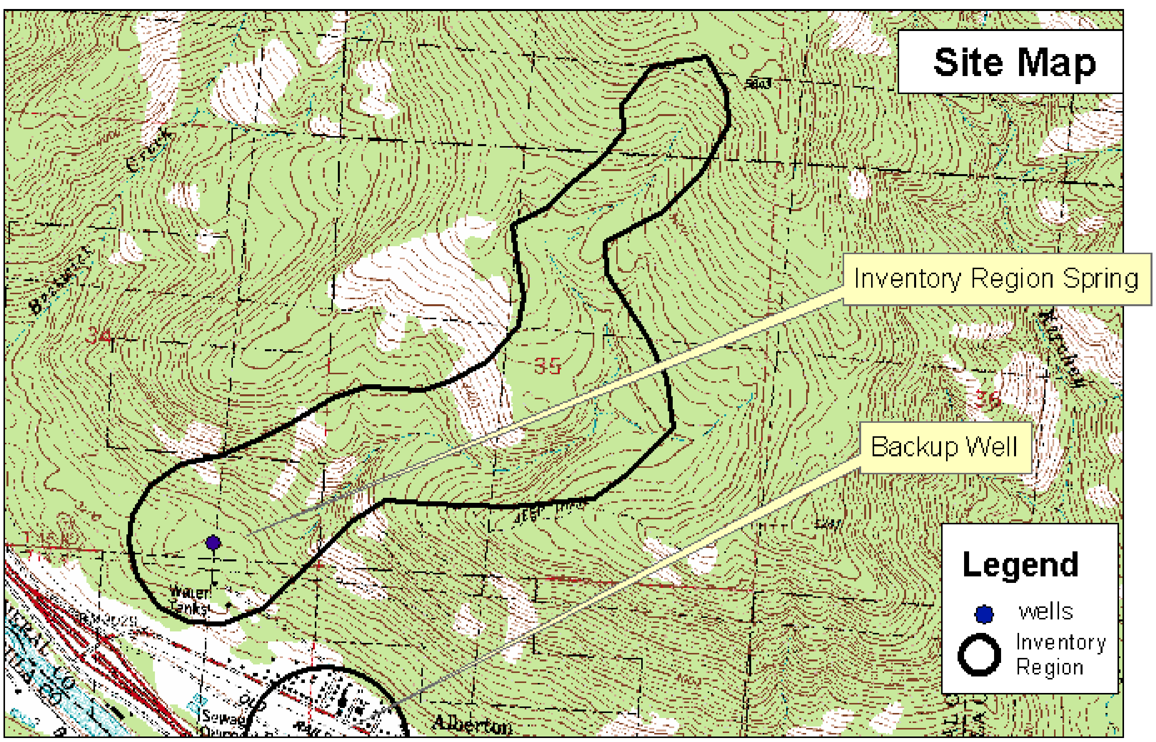
APPENDICES

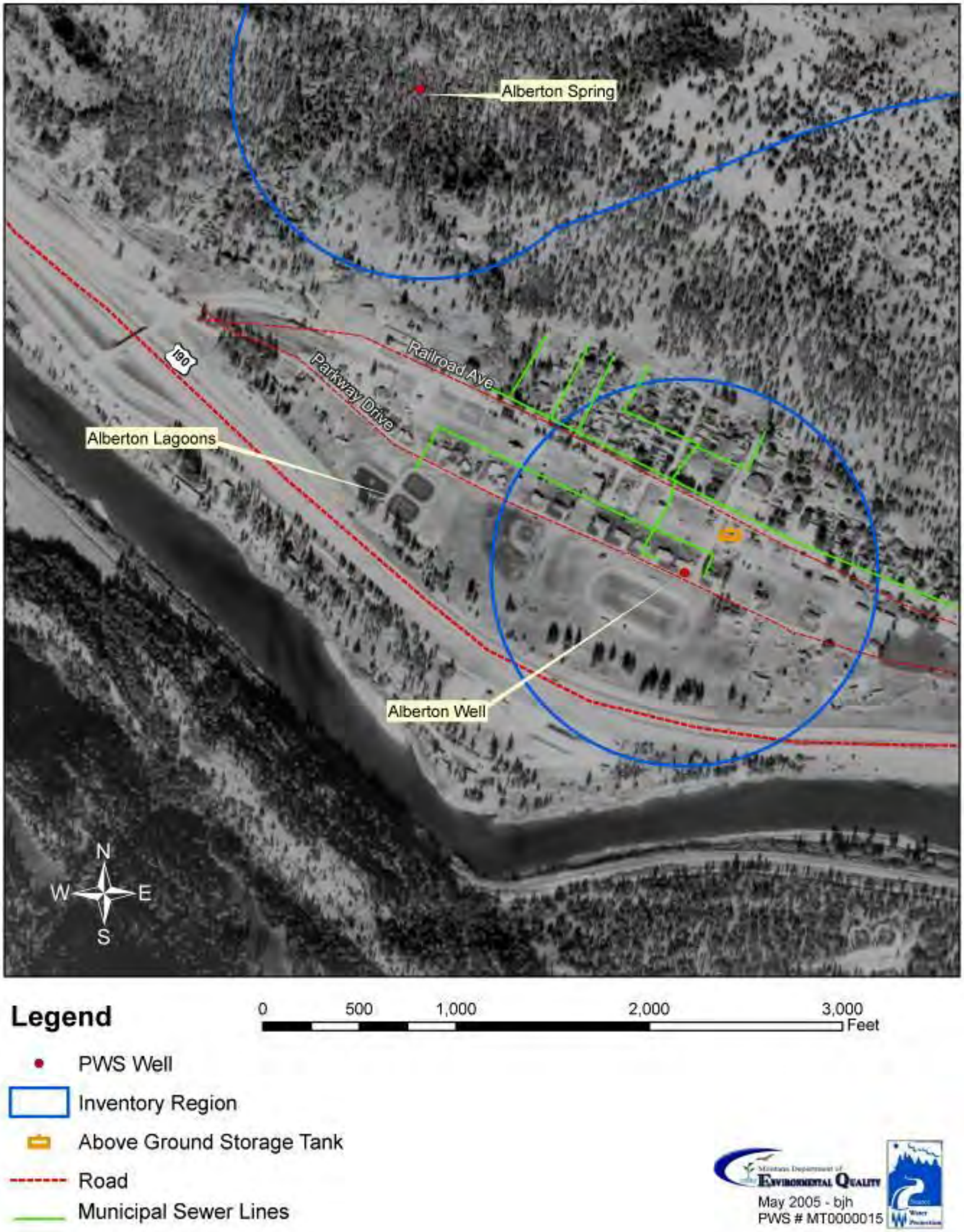
APPENDIX A: VICINITY MAP

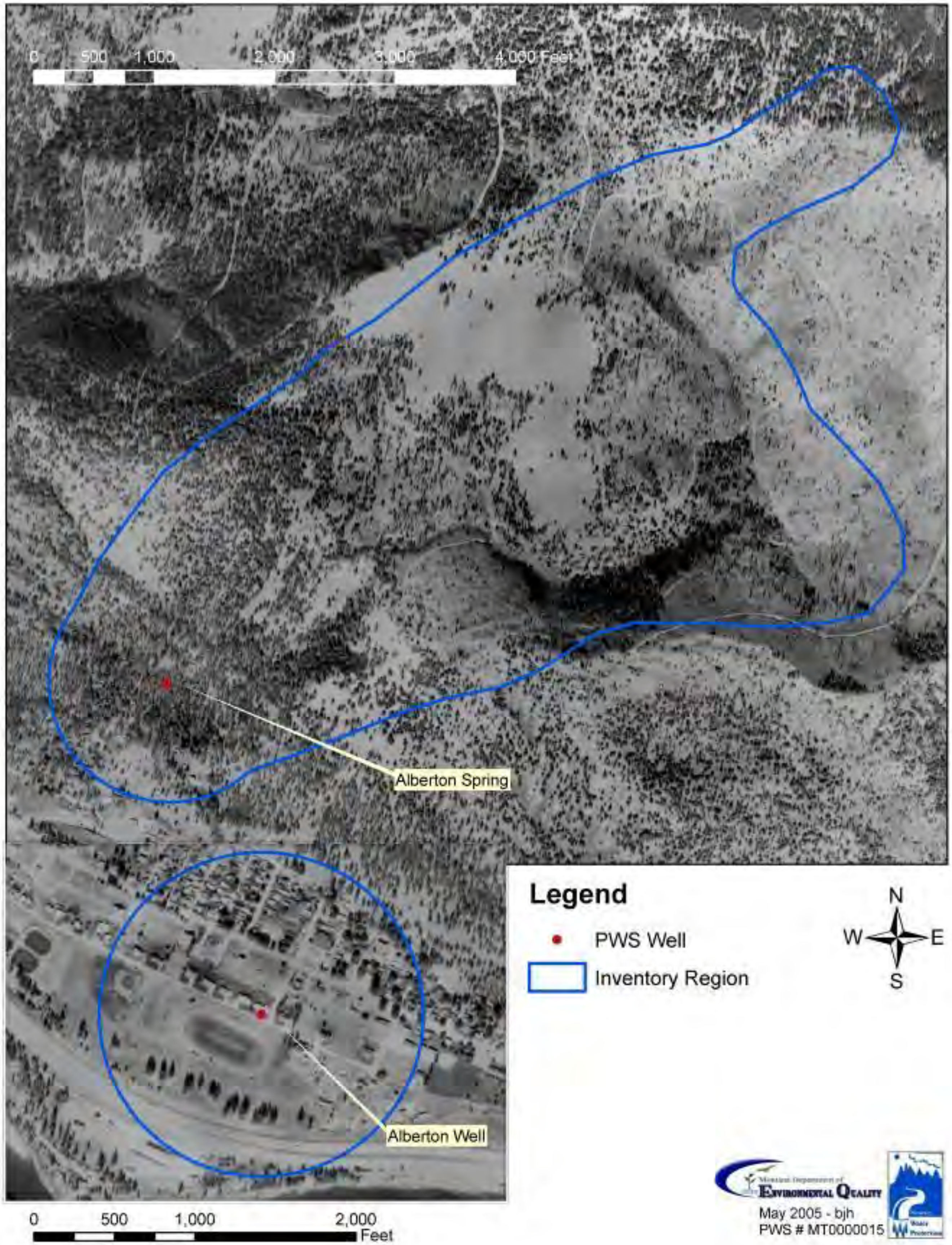


APPENDIX B: INVENTORY REGIONS


Site Map
Inventory Region Spring
Backup Well
Water Tanks
BM 3029
OLD RAILROAD GRADE
Sewage Disposal Ponds
Athletic Field
BM 3008
JEEP TRAIL
Legend
wells
Inventory Region

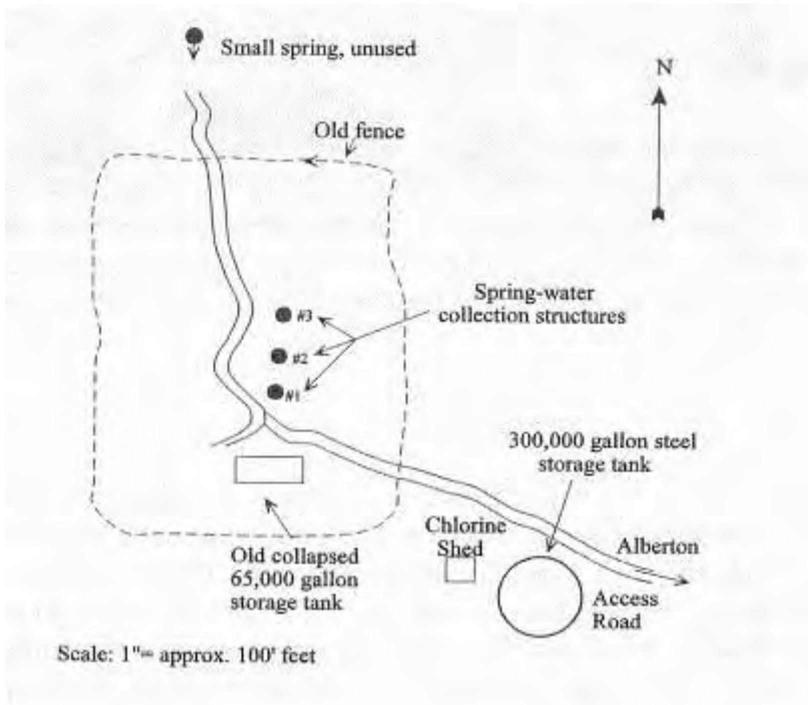

Site Map
Inventory Region Spring
Backup Well
Legend
wells
Inventory Region
Water Tanks
Alberton


Alberton Spring
Railroad Ave
Parkway Drive
90
Alberton Lagoons
Alberton Well
N
W
E
S
Legend
0
500
1,000
2,000
3,000
Feet
PWS Well
Inventory Region
Above Ground Storage Tank
Road
Municipal Sewer Lines
Montana Department of Environmental Quality
May 2005 - bjh
PWS # MT0000015

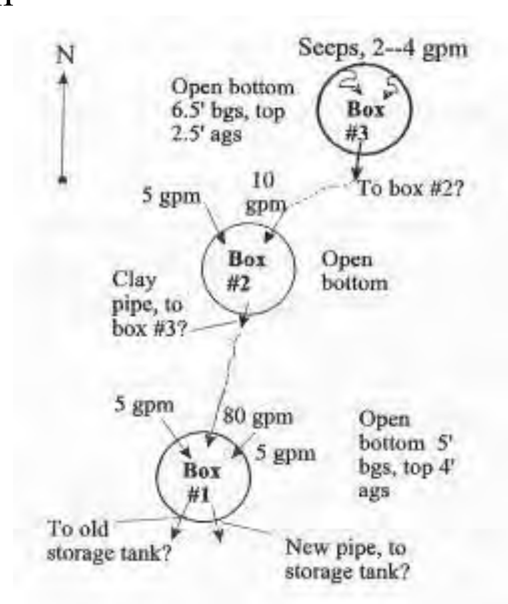

0 500 1,000 2,000 3,000 4,000 Feet
Alberton Spring
Alberton Well
0 500 1,000 2,000
Feet
Legend
PWS Well
Inventory Region
N
W
E
S
Montana Department of Environmental Quality
May 2005 - bjh
PWS # MT0000015

APPENDIX C: SPRING SITE PLAN

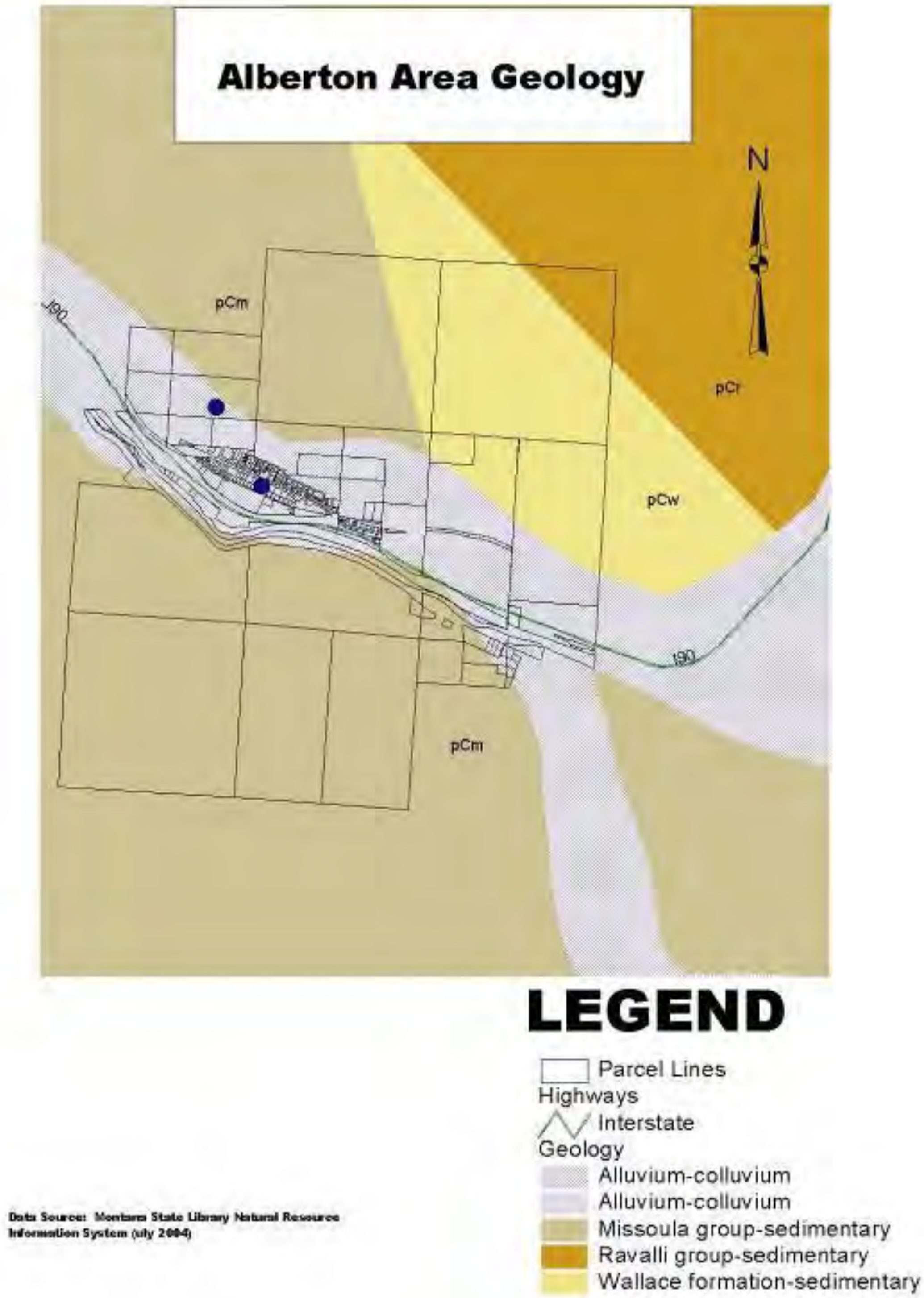
Spring Area Map



Spring Infiltration System



APPENDIX D: GEOLOGIC MAP(s)



APPENDIX E: WELL LOG

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
TOWN OF ALBERTON

Plot this site on a topographic map
View Hydrograph for this Site

Location Information

GWIC Id:	71338	Source of Data:	COMBO
Location (TRS):	14N 23W 02 BCCD	Latitude (dd):	47.0027
County (MT):	MINERAL	Longitude (dd):	-114.4798
DNRC Water Right:	P013904-00	Geomethod:	NAV-GPS
PWS Id:	00015003	Datum:	NAD27
Block:		Altitude (feet):	3035.00
Lot:		Certificate of Survey:	
Addition:		Type of Site:	WELL

Well Construction and Performance Data

Total Depth (ft):	300.00	How Drilled:	CABLE
Static Water Level (ft):	100.00	Driller's Name:	LIBERTY
Pumping Water Level (ft):	145.00	Driller License:	WWC052
Yield (gpm):	100.00	Completion Date (m/d/y):	2/1/1978
Test Type:	PUMP	Special Conditions:	
Test Duration:	4.00	Is Well Flowing?:	
Drill Stem Setting (ft):		Shut-In Pressure:	
Recovery Water Level (ft):		Geology/Aquifer:	400BELT
Recovery Time (hrs):		Well/Water Use:	PUBLIC WATER SUPPLY

Well Notes: 8IN STEEL CASING; METAL PLATE BOLTED ON TOP; VENT HOLE ALLOWS ACCESS; SUB PUMP. WELL USED FOR SUMMER IRRIGATION. DISCHARGE WAS ESTIMATED BY MAINTINANCE MAN-LARGE VOLUME IS DISCHARGED OUT OF LARGE DIA VENT PIPE

Hole Diameter Information

No Hole Diameter Records currently in GWIC.

Casing Information[1]

From	To	Dia	Wall Thickness	Pressure Rating	Joint	Type
-2.5	203.0	8.0				

Annular Seal Information

From	To	Description
0.0	30.0	CEMENT GROUT

Completion Information[1]

From	To	Dia	# of Openings	Size of Openings	Description
203.0	300.0	6.0			OPEN HOLE

Lithology Information

From	To	Description
0.0	2.0	SANDY BLACK TOP SOIL
2.0	11.0	TAN SILTY SABD

11.0	32.0	BROWN SANDY CLAY
32.0	42.5	GRAVEL IMBEDDED IN BROWN SILTY CLAY
42.5	52.0	GRAVEL MIXED IN BROWN SILTY CLAY
52.0	71.0	SAND AND SILTY BROWN CLAY WITH A FEW GRAVELS MIXED IN SEEP OF WATER AT 58 FEET
71.0	74.0	DENSE BROWN SILTY AND SANDY CLAY
74.0	78.0	GRAVEL IMBEDDED IN BROWN SANDY CLAY
78.0	86.5	GRAYISH TAN SILTY SAND GRAVEL AND COBBLESTONES
86.5	89.0	GRAVEL & COBBLESTONES IMBEDDED IN LIGHT BROWN CLAY
89.0	92.0	GRAVEL IMBEDDED IN GRAYISH TAN CLAY
92.0	94.5	GRAYISH TAN SILTY SAND AND GRAVEL
94.5	103.0	TAN CLAY WITH SOME GRAVEL MIXED IN
103.0	112.0	GRAVEL EMBEDDED IN REDDISH TAN SILTY CLAY SEEP OF WATER AT 111 FEET
112.0	114.0	GRAVEL IMBEDDED IN LIGHT BROWN SILTY CLAY
114.0	118.0	LIGHT BROWN SILTY SAND AND GRAVEL WITH SOME STRINGERS OF CLAY
118.0	126.0	GRAVEL IMBEDDED IN REDDISH TAN SILTY CLAY
126.0	127.2	RED TO DARK BRWON ROCK SEEP OF WATER
127.2	133.0	BROWN ROCK 5 TO 10 GPM
133.0	135.0	FRACTURED PURPLE ROCK WITH SEAMS OF BROWN CLAY
135.0	147.0	FRACTURED PURPLE BROWN GREEN AND GRAY ROCK IN ALTERNATE LAYERS SOME SEAMS OF BROWN CLAY
147.0	150.0	BROKEN BROWN ROCK WITH SEAMS OF BROWN CLAY
150.0	151.0	BROKEN RED ROCK. 30 GPM WATER @150
151.0	158.0	BROKEN REDDISH BROWN ROCK SOME THIN SEAMS OF GREEN & GRAY ROCK AND BROWN CLAY
158.0	163.0	CLEAN REDDISH BROWN BROKEN ROCK
163.0	190.0	BROKEN REDDISH BROWN ROCK WITH SOME THIN SEAMS OF GREEN GRAY AND PURPLE ROCK
190.0	202.0	SOLID REDDISH BROWN ROCK
202.0	215.0	BROKEN REDDISH BROWN ROCK
215.0	248.0	FRACTURED REDDISH BROWN ROCK WITH SOME THIN SEAMS OF GRAY PURPLE CLAY GRAY PURPLE AND GREEN ROCK
248.0	269.0	HARD BROWN ROCK
269.0	276.5	HARD PINKISH RED ROCK
276.5	277.5	SOFTER PINKISH RED ROCK WITH BROWN CLAY SEAMS
277.5	282.5	HARD PINKISH RED ROCK
277.5	300.0	RED ROCK

[1] - All diameters reported are **inside** diameter of the casing.

These data represent the contents of the GWIC databases at the Montana Bureau of Mines and Geology at the time and date of the retrieval. The information is considered unpublished and is subject to correction and review on a daily basis. The Bureau warrants the accurate transmission of the data to the original end user. Retransmission of the data to other users is discouraged and the Bureau claims no responsibility if the material is retransmitted. Note: non-reported casing, completion, and lithologic records may exist in paper files at GWIC.

No 603 (Rev. 7-76)

STATE OF MONTANA

File No. P13904

Department of Natural Resources and Conservation

filmed WELL LOG REPORT

13904

White-Department
Yellow-Department
Pink-Well Owner
Gold-Driller

State law requires that this form be filed by the water well driller within 60 days after completion of the well, and Form 602 Notice of Completion of Groundwater Development, be filed by the well owner within 60 days after the water has been put to beneficial use

1. WELL OWNER
Name TOWN OF ALBERTON

2. CURRENT MAILING ADDRESS
ALBERTON, MT 59820

3. PROPOSED USE ______ domestic (includes lawn and garden); ______ stock; X municipal; ______ industrial; ______ irrigation; ______ other (specify) ______

4. WELL LOCATION

NW | NE
SW | SE

NA ¼ NW ¼ NE ¼ NE ¼ Section 3
T. 14N N or S R. 23W E or W
OR, Lot ______ Block ______
Subdivision ______
City ALBERTON County MINERAL
Elevation ______ Accuracy: ___ ±10'; ___ ±50'; ___ ±100';

5. DRILLING METHOD ______ cable, ______ bored, ______ forward rotary, ______ reverse rotary, ______ jetted, X other (specify) CABLE TOOL

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations and/or Screen Kind Size	From (feet)	To (feet)
8"	8 5/8" OD 24.70 #	+2'½"	203			

Was casing left open end? X Yes, ______ No
Was a packer or seal used? ______ Yes, X No
If so, what material ______
Was the well gravel packed? ______ Yes, X No
Was the well grouted? X Yes, ______ No
To what depth? 50'
Material used in grouting CEMENT GROUT
Well head completion: Pitless adapter ______
12 in. above grade ______, other X
(if other, specify) 2'3½" ABOVE GRADE
Pump horsepower ______, pump type ______
Pump intake level ______ feet below land surface
Power (electric, diesel, etc.) ______

7. WATER LEVEL
Static water level 99' 10" feet below land surface
If flowing, closed-in pressure ______ psi
______ gpm flow through ______ inch pipe
Controlled by: ______ valve, ______ reducers, ______ other
(if other, specify) ______

8. WELL TEST DATA X pump ______ bailer ______ other
(if other, specify) ______
Pumping level below land surface:
______ ft. after ______ hrs. pumping ______ gpm
145 ft. after 4 hrs. pumping 100 gpm

9. WAS WELL PLUGGED OR ABANDONED? ______ Yes X No
If yes, how? ______

10. DATE STARTED 12/21/77
DATE COMPLETED 04/01/78

11. WELL LOG
Depth (ft.)

From	To	Formation
0	2	SANDY BLACK TOPSOIL
2	11	TAN SILTY SAND
11	32	BROWN SANDY CLAY
32	42'6"	GRAVEL EMBEDDED IN BROWN SILTY CLAY
42'6"	52	GRAVEL MIXED IN BROWN SILTY SAND
52	71	SANDY AND SILTY BROWN CLAY WITH A FEW GRAVELS MIXED IN. SEEP OF WATER AT 58'.
71	74	DENSE BROWN SILTY AND SANDY CLAY
74	78	GRAVEL EMBEDDED IN BROWN SANDY CLAY
78	86'6"	GRAYISH - TAN SILTY SAND, GRAVEL AND COBBLESTONES
86'6"	89	GRAVEL AND COBBLESTONES EMBEDDED IN LIGHT BROWN CLAY
89	92	GRAVEL EMBEDDED IN GRAYISH TAN CLAY
92	94'6"	GRAYISH - TAN SILTY SAND AND GRAVEL
94'6"	103	TAN CLAY WITH SOME GRAVEL MIXED IN
103	112	GRAVEL EMBEDDED IN REDDISH TAN SILTY, SANDY CLAY. SEEP OF WATER AT 111
112	114	GRAVEL EMBEDDED IN LIGHT BROWN SILTY CLAY
114	118	LIGHT BROWN SILTY SAND AND GRAVEL WITH SOME STRINGERS OF CLAY
118	126	GRAVEL EMBEDDED IN REDDISH TAN SILTY CLAY
126	127'3"	RED TO DARK BROWN ROCK. SEEP OF WATER.
127'3"	133	BROWN ROCK. 5 TO 10 GPM OF WATER TOTAL.
133	135	FRACTURED PURPLE ROCK WITH SEAMS OF BROWN CLAY
135	147	FRACTURED PURPLE, BROWN, GREEN AND GRAY ROCK IN ALTERNATE LAYERS, SOME SEAMS OF BROWN CLAY

CONTINUED ON (separate sheet if necessary)

12. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

7/17/78
Date

LIBERTY DRILLING COMPANY
Firm Name

3850 HWY. 93 SOUTH, KALISPELL, MT 59901
Address

Wm F. Osborne
Signature

52
License No.

13904

147	- 150	BROKEN BROWN ROCK WITH SEAMS OF BROWN CLAY
150	- 151	BROKEN RED ROCK. 30 GPM OF WATER TOTAL AT 150'.
151	- 158	BROKEN REDDISH BROWN ROCK, SOME THIN SEAMS OF GREEN AND GRAY ROCK AND BROWN CLAY
158	- 163	CLEAN REDDISH BROWN BROKEN ROCK
163	- 190	BROKEN REDDISH BROWN ROCK WITH SOME THIN SEAMS OF GREEN, GRAY AND PURPLE ROCK
190	- 202	SOLID REDDISH BROWN ROCK
202	- 215	BRO·EN REDDISH BROWN ROCK
215	- 248	FRACTURED REDDISH BROWN ROCK WITH SOME THIN SEAMS OF GRAY, PURPLE CLAY, GRAY, PURPLE AND GREEN ROCK
248	- 269	HARD BROWN ROCK
269	- 276' 6"	HARD PINKISH - RED ROCK
276' 6"	- 277' 6"	SOFTER PINKISH RED ROCK WITH BROWN CLAY SEAMS
277' 6"	- 282' 6"	HARD PINKISH - RED ROCK
282' 6"	- 300	RED ROCK

ALBERTON, MONTANA WELLHEAD PROTECTION PLAN

PWSID # 00015

Howard Hogan,
Certified Operator

Howard Hogan,
WHP contact
204 Adams
Alberton, MT 59820

phone:(406) 722-4942

ACKNOWLEDGMENTS
This Wellhead Protection Plan was completed by Bill O'Connell, MRWS, at the request of Howard Hogan, Alberton's operator and with the approval of the Town Council.

PURPOSE
To meet the requirements of the 1986 SDWA amendments, Montana has implemented a wellhead protection program in which each community voluntarily submits a plan following a format prescribed by the Department of Environmental Quality.

In 1991 the National Rural Water Association, under EPA guidance, established their Wellhead Protection Program for small water systems in thirteen states. As of May 1994, Montana Rural Water Systems received funding to begin offering wellhead protection plans to Montana's small groundwater utilities.

This report presents the technical requirements for the completion of the wellhead protection plan for Alberton, Montana, as required by the 1986 amendments to the Safe Drinking Water Act (SDWA).

A wellhead protection plan is designed to protect the groundwater used by communities from contamination. The plan establishes protected areas overlying the aquifer yielding water to the well and extends upgradient a prescribed distance. The extent of the upgradient protection area is determined by computer modeling of the aquifer and projecting the well's capture zone as determined for one, five, and ten year scenarios. Such long term planning is necessary to provide an early warning mechanism is the event of upgradient contamination, however, preventing the contamination of a water supply through education and public awareness remains the primary goal.

Most instances of aquifer contamination become known when trace levels of a contaminant are detected through routine monitoring. Drinking water systems that have completed a wellhead protection plan will have information on groundwater flow and aquifer hydraulic characteristics as well as a contaminant source inventory and thus will be in a good position to determine the best response to ensure the continued quality of the water supply.

CHAPTER 1
INTRODUCTION

LOCATION AND GEOLOGY

Alberton is located in northwest, Montana approximately 30 miles west of Missoula along I-90. Alberton is sited on a terrace deposit on the north side of the Clark Fork River Valley. I-90 is the Town's southern boundary and is also on the terrace. The Clark Fork River has cut a new channel south and over 100 feet below the terrace. The new channel was cut during the draining of Glacial Lake Missoula. See site map in appendix 1.

Employment within the community for the 402 residents is limited to local government, and some small businesses serving the residents and tourists. Montana Rail link operates trains on the BN-SF railroad south of the Clark Fork River.

The physiographic Region is within the Northern Rocky Mountain Province and the structural province is the Rocky Mountain fold-thrust belt. Basically this means that the area is geologically complex. Tectonic activities have folded and thrust the crustal formations, forming the Rocky Mountains. Subsequent natural processes have eroded deep channels and then filled them with sediments eroded from the mountains as continued geologic activities have changed the drainage gradients. See geological map in appendix 2.

HYDROGEOLOGY

Alberton's water supply has two sources, springs and a 300 foot deep well. The main water source is a series of spring boxes located northwest of town. The springs are between 160 and 200 feet above town, the area and region is forest and accessible by heavily rutted jeep trails or on foot. The area around the springs and water tank has a much more gentle slope than the area above and to the east. The reason for the reduces slope is a remanent sedimentary deposit left from Glacial Lake Missoula. The sediments were trapped behind a bedrock out-crop that forms the western boundary of the sediments. See base map in appendix 5.

The Clark Fork River changes from a due west course to a northwest trend at Alberton. At the northwest end of town, bedrock of the Precambrian McNamara Formation is exposed. Bedrock is exposed all along the Valley due to the steep slopes and the erosion due to the River. The exposed bedrock at the northern interchange onto I-90 acted as a dam and prevented the sediments behind it from

washing downstream as Glacial Lake Missoula drained. These sediments make up the remnant terrace on which Alberton is located as well as the sediments in which the springs formed. The sediments holding the springs elevation is from 3200 feet to 3400 feet. The mountains rise steeply from 3400 feet to over 5000 feet where Ninemile divide separates the drainages. Much of the area between recharges the springs. An intermittent stream disappears when it encounters the sediments.

A geologic map completed in 1974, classifies the area around the springs as McNamara Formation bedrock. However, on-site investigations show only the bedrock outcrops mentioned above. Also, stereoscopic evaluation of aerial photos show the sediments in the spring area. A copy of the photo is in appendix 4.

The well is located on the southwest side of town near the sports field. The well is 300 feet deep and the well log records silty sand, clay and gravels down to 135 feet. From 135 feet down the well is in bedrock. The well is grouted to 30 feet and cased down to 201 feet the final 100 feet are open hole. See well logs in appendix 9.

ECONOMY

Alberton has approximately 402 residents. The economy is based on tourism, local government and employment in other locations. There is some farming on the land along the River. All the homes and businesses are sewered. A more comprehensive listing is included in the potential contaminant inventory section and in appendix 8.

WATER SYSTEM, WELL COMPLETION AND STRATIGRAPHY

Alberton's water supply has two sources, springs and a 301 foot deep well. The main water source is a series of spring boxes located northwest of town. The springs are between 160 and 200 feet above town, the area and region is forest and accessible by heavily rutted jeep trails or on foot. The area around the springs and water tank has a much more gentle slope than the area above and to the east. The reason for the reduces slope is a remanent sedimentary deposit left from Glacial Lake Missoula.

Albertons well is located in T14N, R23W, Section 3. The well is located on the south side of town between the community and I-90. The well was constructed in 1978 and produces 100 G.P.M. of water. The static water level is 99' 10" BGS, at 100 G.P.M. the pumping water level stabilizes at 145' after 4 hours.

The well's stratigraphy was taken from the drilling log. The log show 126 feet of *silt, sand gravel and clay, from 126 to 301 feet, are fractured rock and some seams of brown clay. The hole is grouted with cement grout to 30 feet and cased to 203 feet, from 203 to 301 feet the hole is open.*

The depth of the well and the well being over 1000 feet away and about 70 feet above the River make surface contamination of the well unlikely. Fractures can allow contaminants to move rapidly and over considerable distances relative to normal groundwater flow. However, the drillers log indicates clay seams within the bedrock. The clay is probably fault gouge that resulted from displacement along the fault. The clay in the fractures would slow down and inhibit contaminant transport through the fractures.

The springs are currently being evaluated to determine if they fall under the Groundwater Under the Direct Influence of Surface Water (GWUDISW) regulations. The evaluation is being completed by Alan English of the Montana Bureau of Mines and Geology (MBMG).

Alberton, public water supply system is under the control the Town council. Howard Hogan, certified operator, and the council will make all management decisions regarding wellhead protection plan implementation (see also chapter 3).

CHAPTER 2
DELINEATION

The capture zones for the well was modeled using the semi-analytical option for the General Particle Tracking Module of the WHPA model package. The WHPA Code, version 2.1, 1991 was developed for the U.S. EPA, office of Groundwater Protection, by HydroGeoLogic, Inc.

The capture zone delineated for Alberton is for a fi e and ten year scenario. The model was constructed assuming the well was pumped continuously at maximum capacity for the duration of each time step. The model requires values be assigned for the following parameters to delineate a capture zone:

- *Transmissivity (T); the rate at which water can move through a unit width of an aquifer under a unit hydraulic gradient. It is a function of the type and thickness of the aquifer material. The transmissivity for this model was calculated using the USGS empirical formula,(T=2000Q/s) using the specific capacity from the driller's log. The calculated transmissivity is 586*
- *Hydraulic gradient (I); the change in total head per unit distance along the direction of maximum head decrease. The hydraulic gradient for the well used the gradient and direction of flow for the Clark Fork River. The River follows the main faults mapped in appendix 2. The hydraulic gradient for this area I=.018.*
- *Aquifer thickness; estimated to be 175' based on driller's log.*
- *Discharge rate; the model assumes a constant discharge over a 24 hour period. The input value is based on an estimated maximum production of 100 G.P.M. per 24 hour period or 19251 ft³/day. The model assumes the pump runs for the entire time. This yields a conservative capture zone delineation that will still be safe as the water demand increases.*

The WHPA delineation for a 10 year time of travel is shown on the base map (see appendix 5).

Two major assumptions are used in the application of groundwater flow models; 1) flow in the aquifer is uniform, and 2) flow in the aquifer is horizontal. A groundwater flow model for any specific set of conditions should be considered within these limitations as groundwater flow is generally not uniform nor strictly horizontal. Any particular modeling effort merely represents the best estimate of groundwater flow conditions based on known and estimated hydrogeologic and pumping conditions and should be modified as additional information becomes available.

Specific limitations on the Alberton delineation include potential unknown factors relating to the structural configuration of the faults and fractures. For instance, the delineation assumes recharge is along the major faults, this may not be true. Recharge could come from secondary faults and fractures which can be oriented 90 degrees to the main fault. These local effects cannot be factored by the WHPA model. Additionally, the model assumes the discharge rate is valid for every day of the model run time while the actual rate is probably much lower. Another major consideration is the thickness of the aquifer, the value used reflects the bottom of the hole and doesn't consider the actual formation thickness. The equations used to model the aquifer assumes the well fully penetrates the aquifer. The partial penetration is assumed to represent the thickness of the aquifer, this results in a larger capture zone because it neglects the true storage within the aquifer.

The delineation shown on the base map (appendix 5) represents the estimated capture zone which assumes the flow direction is valid within 45 degrees and is based on a maximum daily pumping rate. This should yield a capture zone that will still be safe as the water demand increases.

The springs are located in a remnant sand and gravel deposit located 160 feet up the side of the mountain north of town. The sedimentary deposit is between the 3200 foot and the 3480 foot elevation, the mountain rises to over 5800 feet in this area. At one point several hundred feet north of the spring boxes, beyond where the sediment layer pinches out, a spring begins at the base of a steep bedrock outcrop. This spring shows that some of the recharge to the town's springs probably comes from fractures which drain water higher up the mountain. However, because the sediments terminate the surface drainage from the higher elevations (See the site base in appendix 5) the capture zones were delineated using surface recharge.

The capture zone delineation for the springs was completed by on-site hydrogeologic and photogeologic analysis. The major assumption used in delineating the spring capture zones is that recharge to the sediments is from surface runoff. This means that the control zone should include all of the sediment area. See the base map in appendix 5.

Groundwater Under the Direct Influence of Surface Water.

The depth of the water bearing formation, the distance to the nearest surface water, and the bacteriological history of the source indicate Alberton's well is not under the direct influence of surface water. As mentioned earlier the springs are currently undergoing GWUDISW evaluations. A DEQ 'Preliminary

Assessment' form is attached as appendix 6.

The GWUDISW for the spring is being conducted by the MBMG.

CHAPTER 3
INVENTORY

A potential contaminant source inventory generally lists the location of potential contaminant sources in relation to the well. At Alberton, the confined nature, and upward pressure gradient of the aquifer attest to the natural protection of the aquifer. However, the lack of certainty of groundwater flow direction and the nature of secondary recharge (fracture flow) have resulted in the inventory covering all the Alberton area. The main area of interest upon which to focus is in the vicinity of the wellhead and relates to contamination threats which could enter the well through the casing or borehole.

The springs are located in the mountains above Alberton and the area is undeveloped. The lack of development reduces the potential contaminant sources to possible logging and GWUDISW.

The land area above the identified 10 year capture zone for the well is controlled by the Town. The potential contaminants identified are:
Above ground fuel storage tanks in this area.
Private wells .
I-90
Weed control may be used by the County along the county road and has been identified as 2-4-d.
Storm sewer

For organic chemical monitoring waiver application purposes, all land uses within one mile of the well are shown on the attached 7.5 minute quad map (appendix 5). Completed MDHES Forms 1 and 2 are as well as a MDHES Form 3 for each identified land use with the 1 mile radius of the well are found in appendix 9..

The inventory will be updated by the certified operator annually with the update forwarded to DEQ every five years in order to ensure continued certification of the wellhead protection plan.

CHAPTER 4
MANAGEMENT

The goal of Alberton's Wellhead Protection Plan is to, 1) protect the source water by keeping potentially polluting materials and activities out of the control zone, and, 2) to manage the special protection region to ensure land use activities pose minimal threat to the source water. 3) to have an effective emergency response plan should the water system be off line.

The state recommends the delineated wellhead protection area be subdivided into three management zones. At Alberton the control zone is the area within a 100 foot radius of the well. A portion of this area is fenced off. Within this radius all development will be restricted to existing levels only. Maintenance of surface water run-off away from the wellhead will be a priority and all spills of potentially contaminating materials will be promptly cleaned up.

The springs area is partially fenced in and access is by foot only. Due to the vunerability of this source the control zone includes all the area from the water tank road, west to the bedrock outcrop and north to where the bedrock rises out of the sediments.

The next zone is the special protection region and will consist of the Town limits. Within this area standard water quality protection practices will be used to protect the aquifer. For example, pesticides will be applied at label rates by licensed applicators. Wells will be constructed in accordance with the applicable administrative rules to ensure they are properly sealed and maintained and all new construction will be sewered.

The springs special protection region is the same as the control region due to the potential for surface water to rapidly reach the spring boxes.

The third zone is the managed (protected) area and covers the recharge area for the well. This area is hard to define for the well, but should include the Town limits north, south, west and extend southeast to the Clark Fork River approximately 3 miles. The managed area is generally under the control of the U.S. Forest Service. No special management efforts relating to groundwater protection in this area are proposed at this time.

The protected region for the springs extends from the sediments north up the mountain to its' crest. The hydrologic boundaries for the drainage to this area will serve as the lateral limits. See the delineated areas on the base map in appendix 5.

The land use activities identified in this section will be managed by:

Howard Hogan — *Certified Operator* — *(406) 722-4942*

The certified operator maintains the PWS wells and distribution system in satisfactory condition. The operator will also be responsible for all spills, spill clean-up, and for keeping potential pollution sources out of the 100 foot control zone around the well and the area around the springs.

The success of the management effort will be measured by changes noted on the annual inventory update. A decrease in land use activities in the special protection or managed area which require the use of water quality protection practices will be considered an indicator of success. Conversely, an increase in potentially polluting activities in this area will indicate that the education component is insufficient and additional efforts will need to be employed. This type of evaluation will be performed every five years at the same time the inventory is updated to maintain state certification..

Resolution No. 138

A RESOLUTION RELATING TO WELLHEAD PROTECTION

WHEREAS, the Town Council of the Town of Alberton, Montana deems it appropriate and in the interest of the public health, safety and welfare of the citizens to adopt regulations to prevent contamination of the groundwater that supplies potable water to the Town of Alberton, henceforth, adopts a resolution that allows for the establishment of separate zones of protection and provides for various protection strategies based upon proximity to the water supply wells and/or springs and lines.

Resolved this 5th day of March 1996 by the Town Council

Council Memebers::

Donna Atteri

Sandra Doriel

Mayor

C. E. Curtis

Attest:

CHAPTER 5
EMERGENCY PLANNING

The emergency plan for Alberton was developed with the assistance of the DEQ and the Mineral County DES coordinator. A general description of important aspects of the plan are described here, however, the emergency plan document can be found in it's entirety as appendix 7.

The emergency plan identifies the principal threats to the source water, designates an emergency coordinator, and then describes a series of potential responses planned in the event of a problem arises. Other important aspects of the plan is an estimate of the equipment and materials that would be needed in the event of an emergency, a description of how a short-term replacement water supply would be handled, and a description of the funding available to deal with an emergency response.

Important emergency contacts and phone

Howard Hogan	722-4942	Emergency coordinator and PWS operator	all PWS issues
-QUELINE ALLISON	722-3372	Clerk	all PWS issues
		Mineral County Disaster and Emergency Services	all spills or releases of hazardous materials
		Health Department	PWS regulatory questions, spill questions
MT Spill Hotline	444-6911 24 hr phone		all reportable spills
John Arrigo	444-0379	DEQ Enforcement Division	spill regulatory and response questions
Greg Murfitt	444-5400	MT Dept of Agriculture	All agricultural chemical or fertilizer spills or questions

CHAPTER 6
ALTERNATE WATER SOURCES

The current well and spring system has proven adequate for the needs of Alberton and no new wells are anticipated in the foreseeable future. However, should the Alberton loose the springs as a drinking water source a new well will be needed.

REFERENCES

1. *Alt, David and Donald W. Hyndman. Roadside Geology of Montana. 1986*

2. *Taylor, Robert L. and Joseph M. Ashley. Geological Map of Montana.*

3. *Montana Department of Environmental Quality. Circular WQB-1, Standards for Water Works. 1992*

4. *Montana Department of Environmental Quality. Montana Wellhead Protection Program. 1994*

5. *C. W. Fetter. Applied Hydrogeology. 1994*

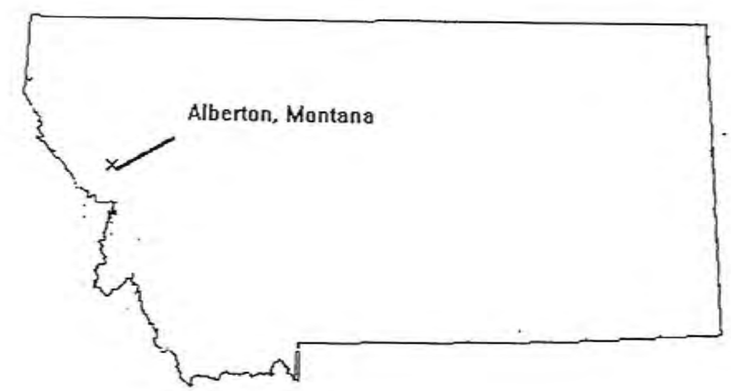
6. *Wells, John D., Geologic Map of the Alberton Quadrangle, Missoula, Sanders and Mineral Counties, MT, 1974*

7. *Driscoll, Groundwater and Wells, 1987*

APPENDICES

APPENDIX 1

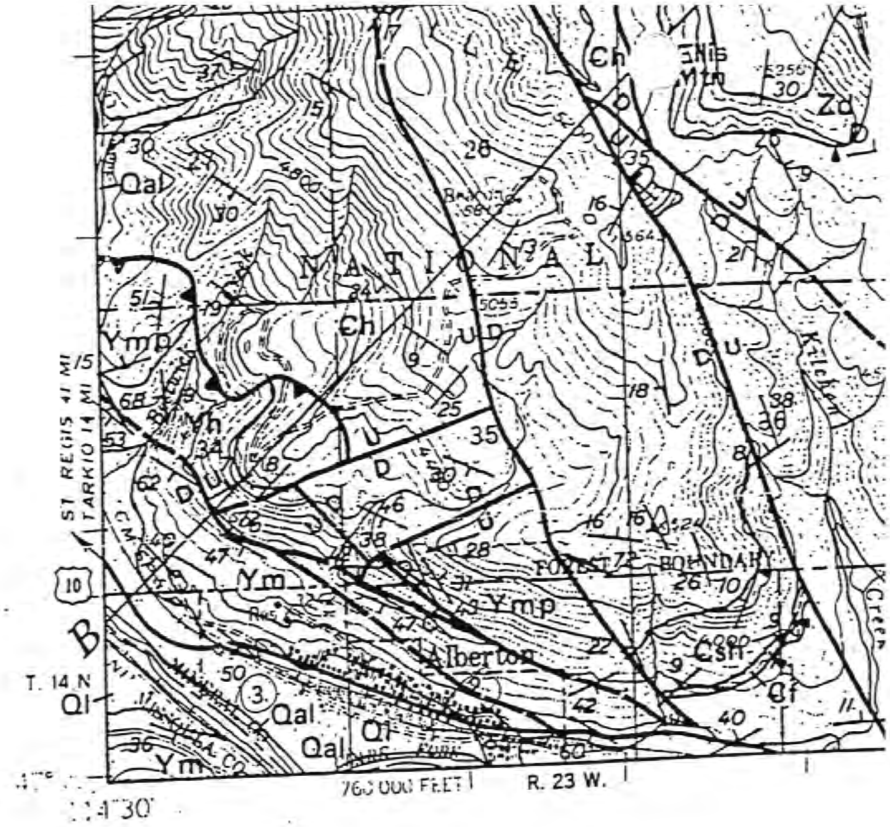
VICINITY MAP



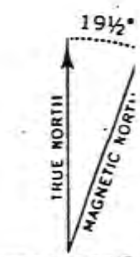
APPENDIX 2

GEOLOGIC MAP OF THE ALBERTON QUADRANGLE

(WELLS, 1974)



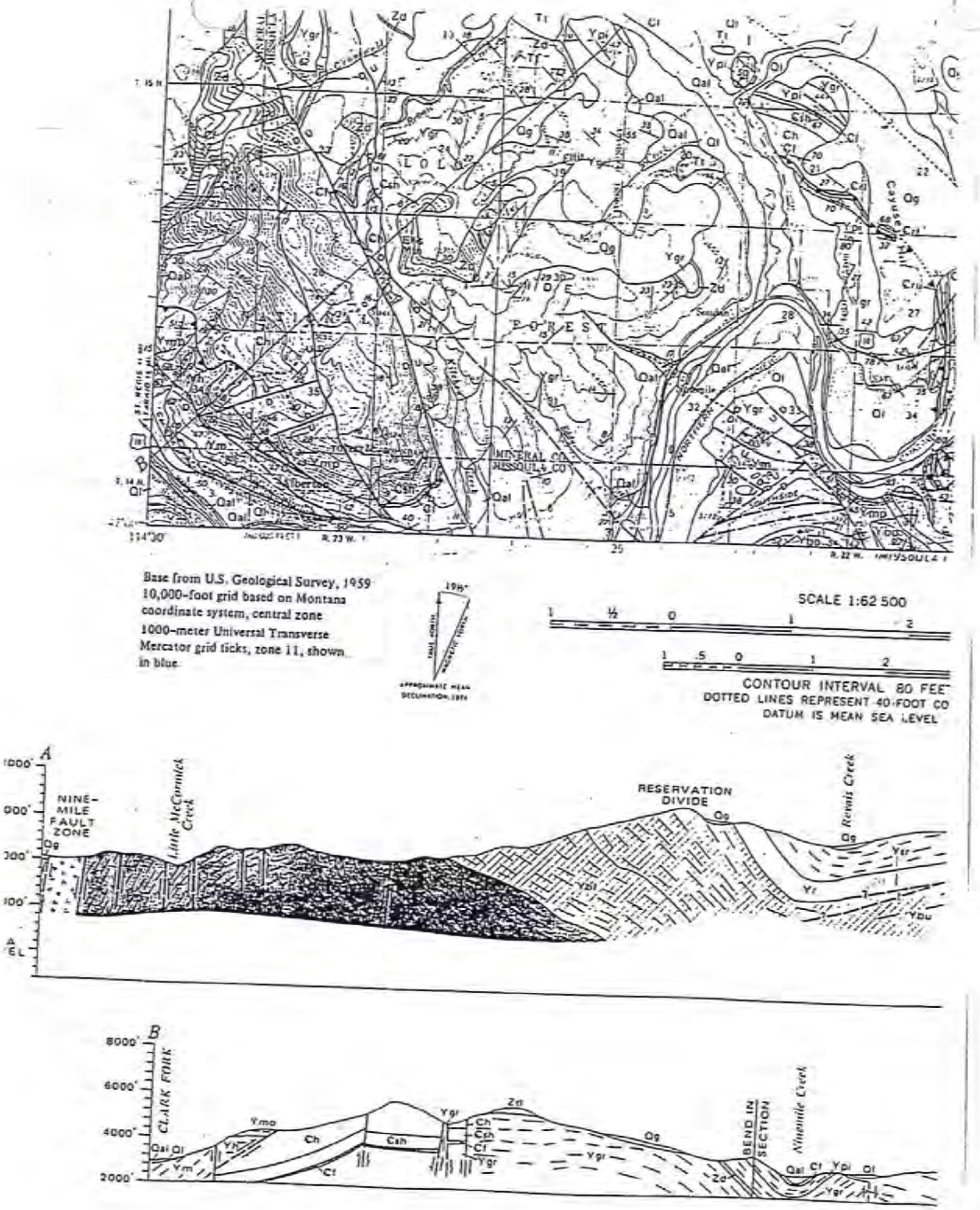
Base from U.S. Geological Survey, 1959
10,000–foot grid based on Montana coordinate system, central zone
1000–meter Universal Transverse Mercator grid ticks, zone 11, shown in blue



APPROXIMATE ME
DECLINATION, 19

APPENDIX 3

PWS SITE PLAN



17-2

GEOLOGIC

Public Water Supply Number 00015
WHP Region ______

Source Number ______
Inventory Person H. M. HOGAN
Attached Map Number 1

INVENTORY FORM

Occupant's Name ______
Site Address TOWN of ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

NATURE OF PROPERTY

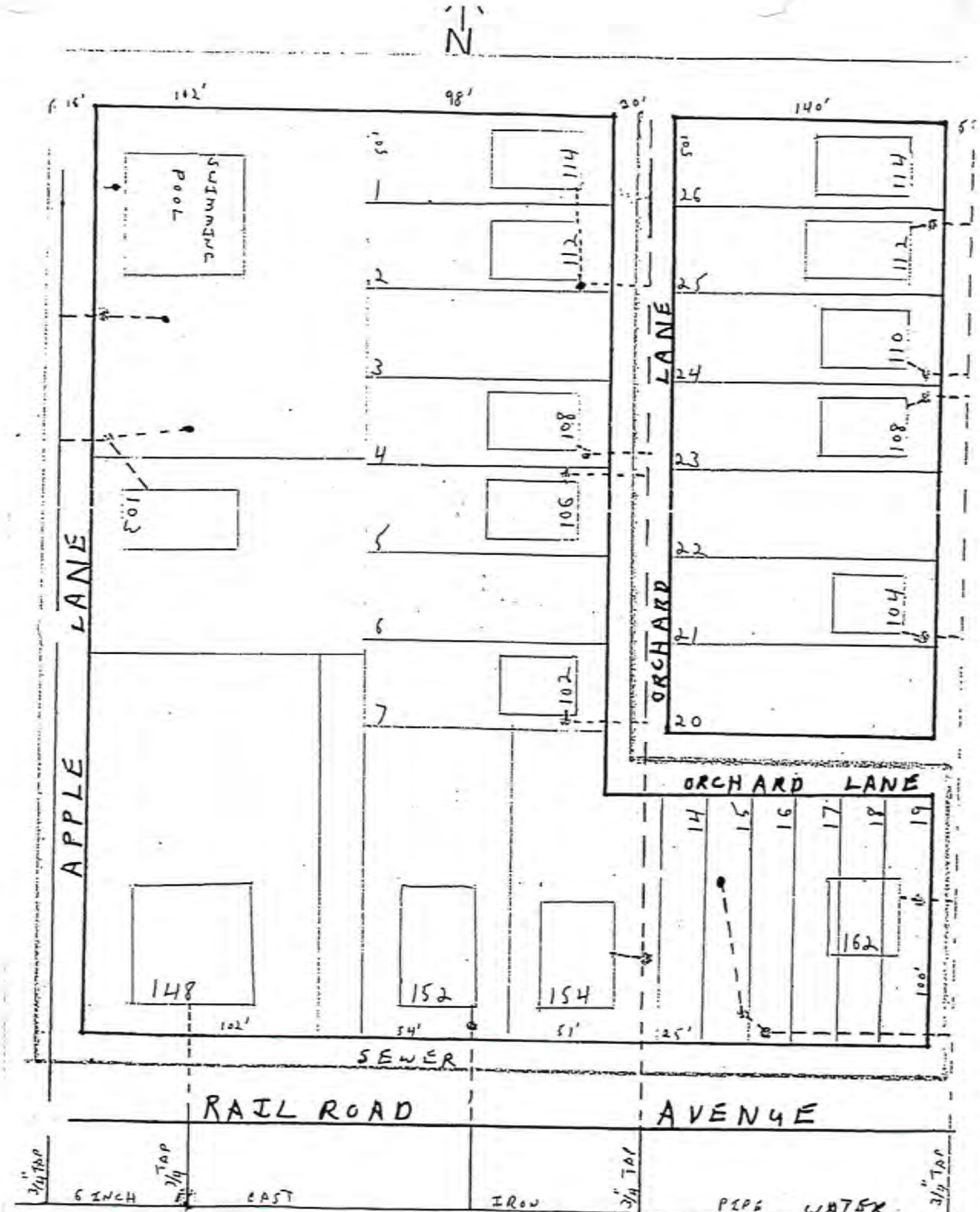
Residential	X	Retail Business	__	Agricultural	__
Industrial	__	Government	__	Other (describe on back)	__

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	__	(W) ______	__

15-2



19-3

Public Water Supply Number 00015
WHP Region ____________

Source Number ____________
Inventory Person H M Hofan
Attached Map Number 2

INVENTORY FORM

Occupant's Name ____________
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ____________
Phone Number 406-722-4942 Lat/Long ____________
Name, address and phone number of property owner if different from above ____________

NATURE OF PROPERTY

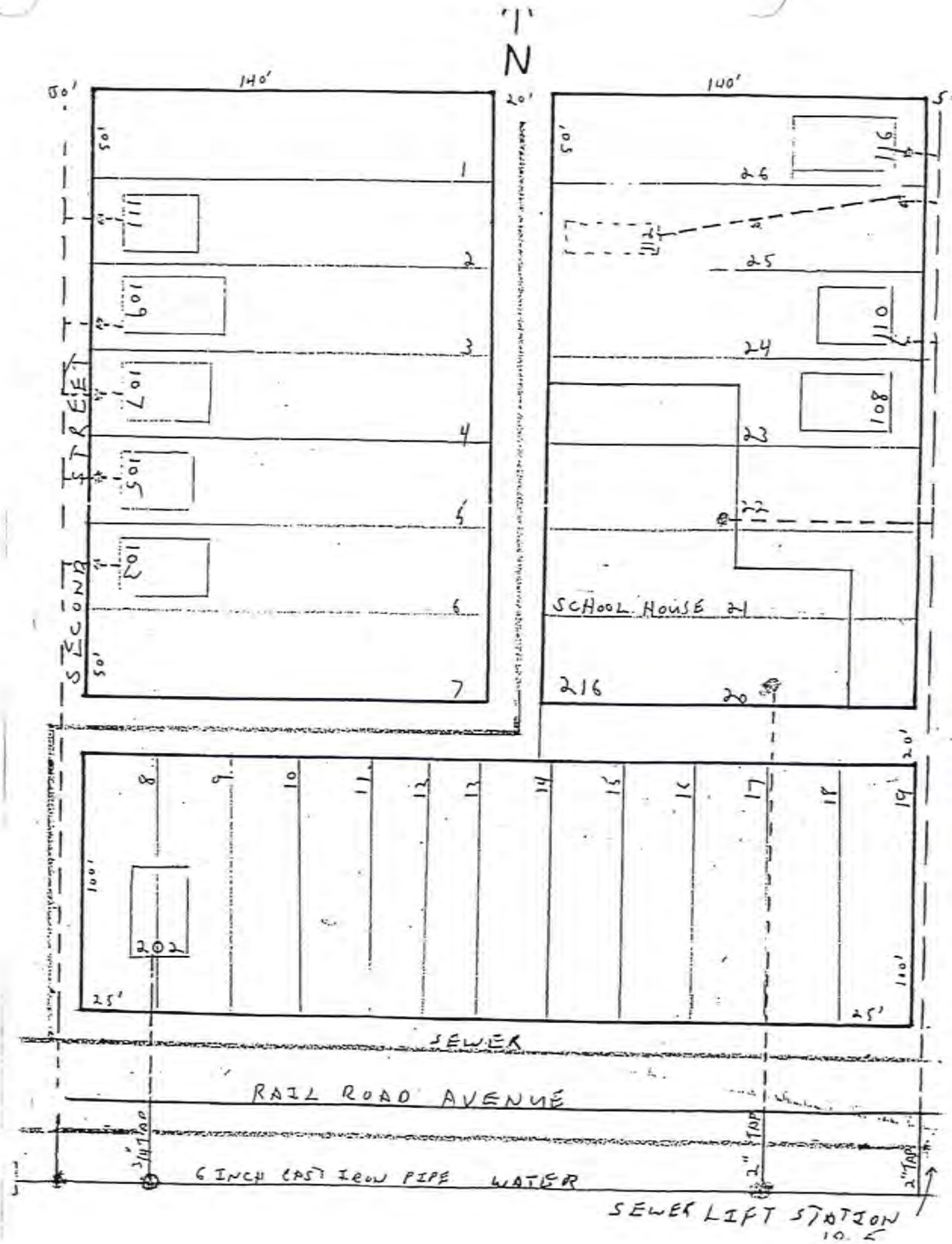
Residential X Retail Business ___ Agricultural
Industrial ___ Government ___ Other (describe on back) X SCHOOL

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	___	(I) Above ground storage tank	___
(2) Water well abandoned	___	(J) Chemical storage facility	___
(3) Chemigation well	___	(K) Fertilizer/pesticide use	___
(4) Oil/gas well	___	(L) Chemical mixing/loading site	___
(5) Exploration bore hole	___	(M) Land application of waste	___
(6) Injection well	___	(N) Grain storage bin	___
(7) Mine/Quarry	___	(O) Animal feedlot	___
(A) Septic tank/privy	___	(P) Auto salvage yard	___
(B) Landfill/dump	___	(Q) Irrigated land	___
(C) Pipeline	___	(R) Artificial recharge project	___
(D) Wastewater lagoon	___	(S) Drainage canal	___
(E) Brine pit	___	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	___	(U) Railroad frontage	___
(G) Stormwater drain	___	(V) Stream, river, lake, pond	___
(H) Underground storage tank	___	(W) ____________	___

15-4



Public Water Supply Number 000 15
WHP Region ______

Source Number ______
Inventory Person H. M. NOLAN
Attached Map Number 3

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

NATURE OF PROPERTY

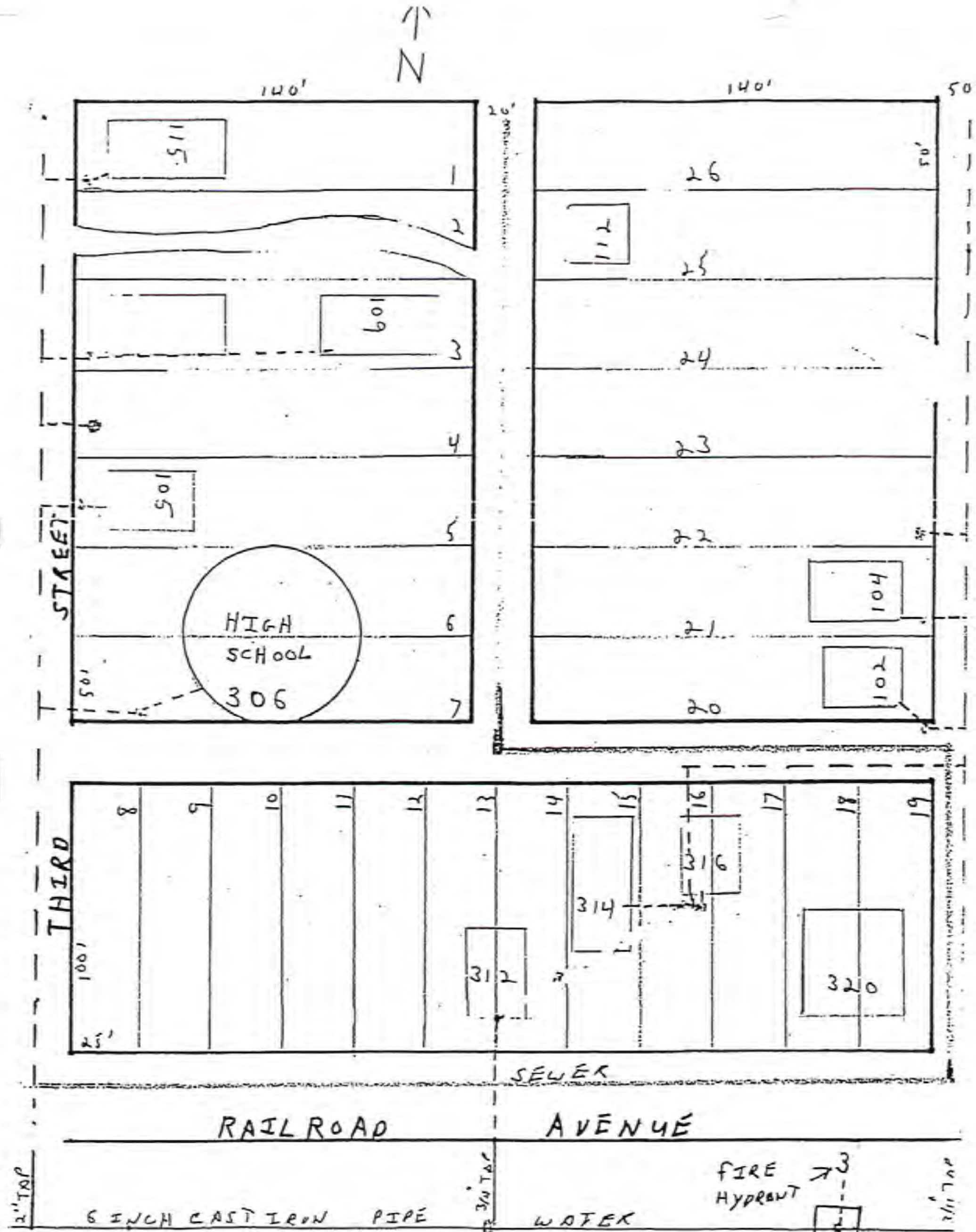
Residential	X	Retail Business	__	Agricultural	
Industrial	__	Government	__	Other (describe on back)	X SCHOOL

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank __		(W) ______	__

18-6



18-7

Public Water Supply Number 00015
WHP Region ____________

Source Number ____________
Inventory Person H M HOGAN
Attached Map Number 4

INVENTORY FORM

Occupant's Name ____________
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ____________
Phone Number 406-722-4942 Lat/Long ____________
Name, address and phone number of property owner if different from above ____________

NATURE OF PROPERTY

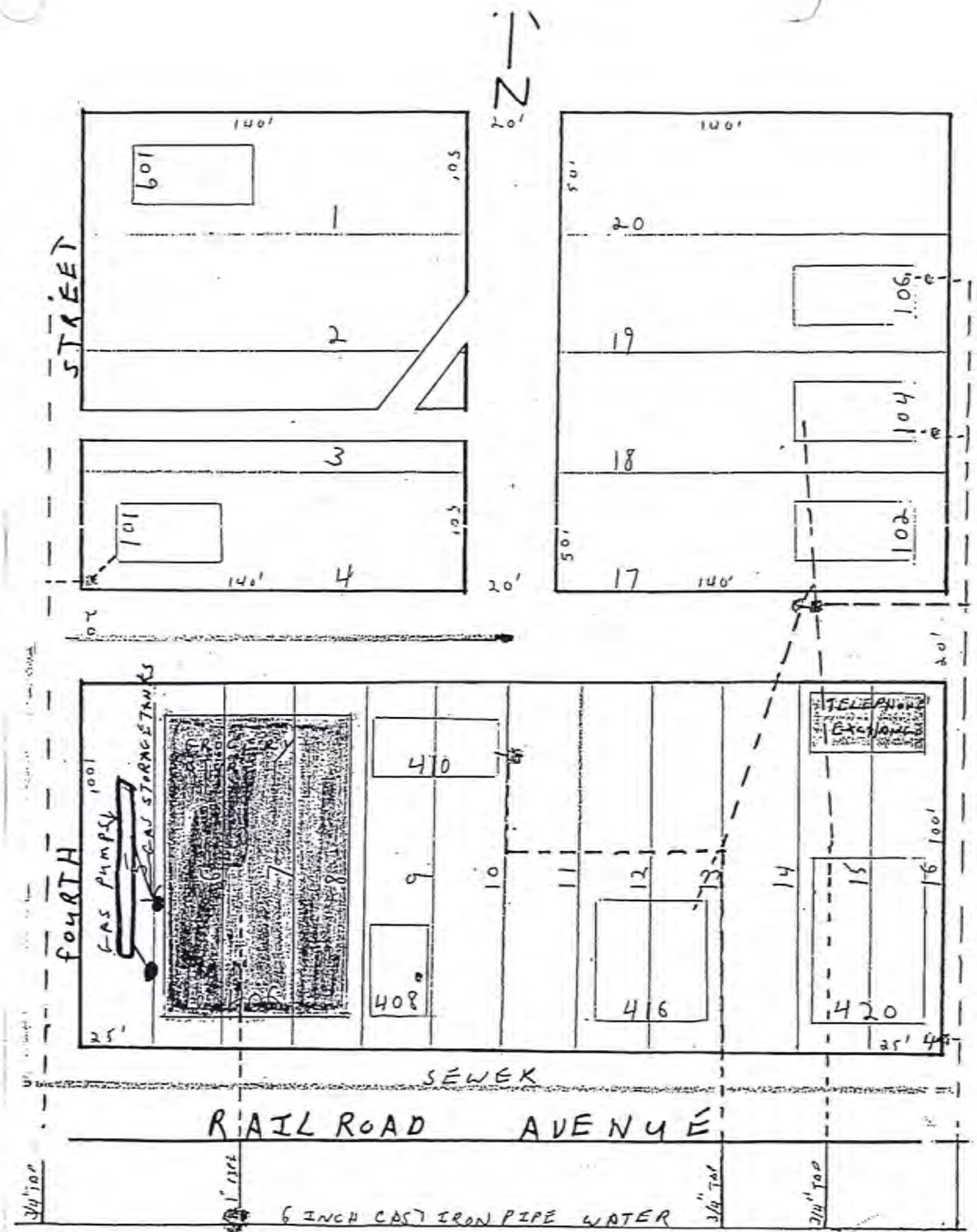
Residential	X	Retail Business	X	Agricultural	___
Industrial	___	Government	___	Other (describe on back)	___

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	___	(I) Above ground storage tank	___
(2) Water well abandoned	___	(J) Chemical storage facility	___
(3) Chemigation well	___	(K) Fertilizer/pesticide use	___
(4) Oil/gas well	___	(L) Chemical mixing/loading site	___
(5) Exploration bore hole	___	(M) Land application of waste	___
(6) Injection well	___	(N) Grain storage bin	___
(7) Mine/Quarry	___	(O) Animal feedlot	___
(A) Septic tank/privy	___	(P) Auto salvage yard	___
(B) Landfill/dump	___	(Q) Irrigated land	___
(C) Pipeline	___	(R) Artificial recharge project	___
(D) Wastewater lagoon	___	(S) Drainage canal	___
(E) Brine pit	___	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	___	(U) Railroad frontage	___
(G) Stormwater drain	___	(V) Stream, river, lake, pond	___
(H) Underground storage tank	2	(W) ____________	___

18-8



18-9

Public Water Supply Number 00013
WHP Region ______

Source Number ______
Inventory Person H.M. HOGAN
Attached Map Number 5

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

NATURE OF PROPERTY

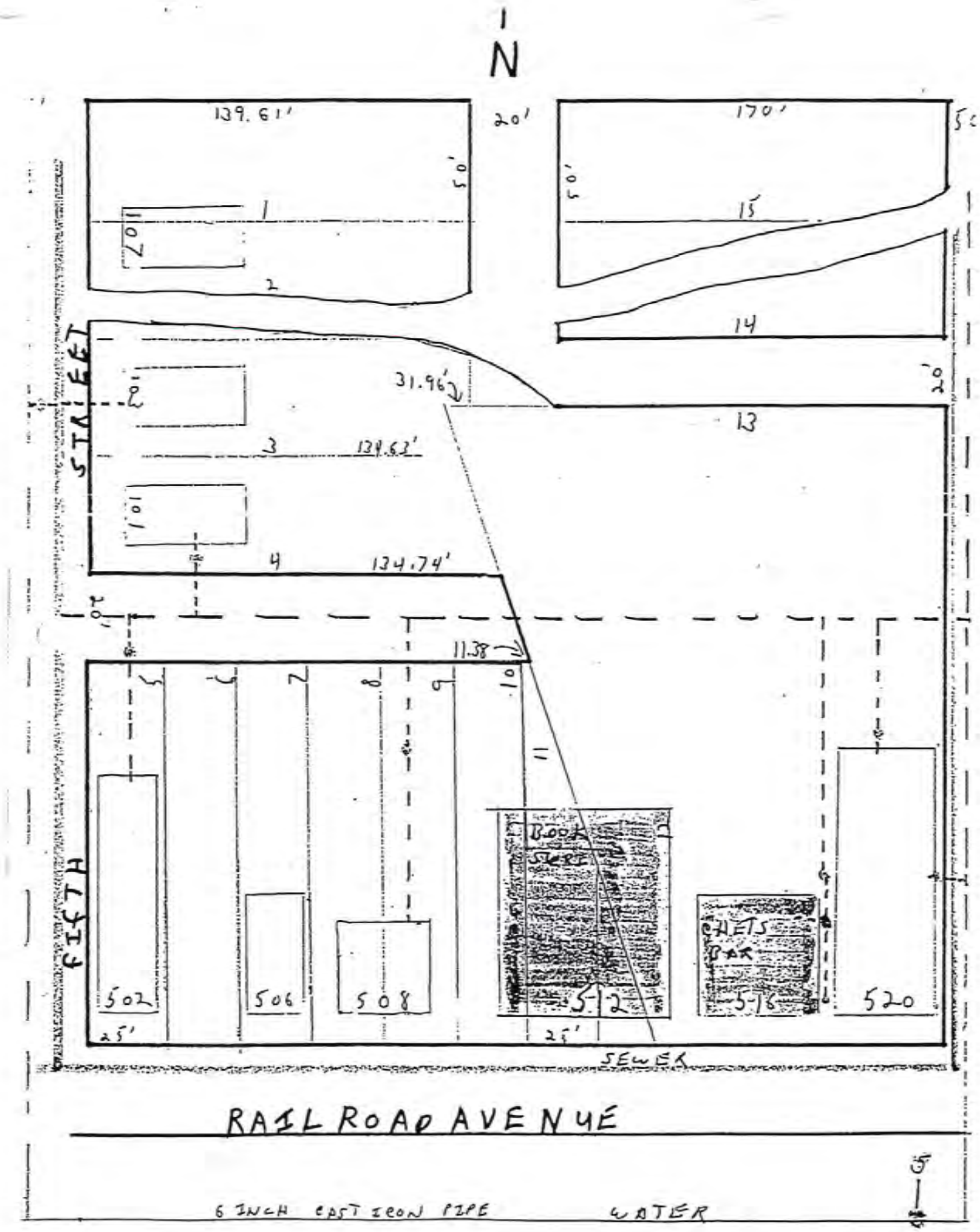
Residential X Retail Business X Agricultural ___
Industrial ___ Government ___ Other (describe on back) ___

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	___	(I) Above ground storage tank	___
(2) Water well abandoned	___	(J) Chemical storage facility	___
(3) Chemigation well	___	(K) Fertilizer/pesticide use	___
(4) Oil/gas well	___	(L) Chemical mixing/loading site	___
(5) Exploration bore hole	___	(M) Land application of waste	___
(6) Injection well	___	(N) Grain storage bin	___
(7) Mine/Quarry	___	(O) Animal feedlot	___
(A) Septic tank/privy	___	(P) Auto salvage yard	___
(B) Landfill/dump	___	(Q) Irrigated land	___
(C) Pipeline	___	(R) Artificial recharge project	___
(D) Wastewater lagoon	___	(S) Drainage canal	___
(E) Brine pit	___	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	___	(U) Railroad frontage	___
(G) Stormwater drain	___	(V) Stream, river, lake, pond	___
(H) Underground storage tank	___	(W) ______	___

18-10



18-11

Public Water Supply Number 00015
WHP Region ______

Source Number ______
Inventory Person H M HOGAN
Attached Map Number 8

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

NATURE OF PROPERTY

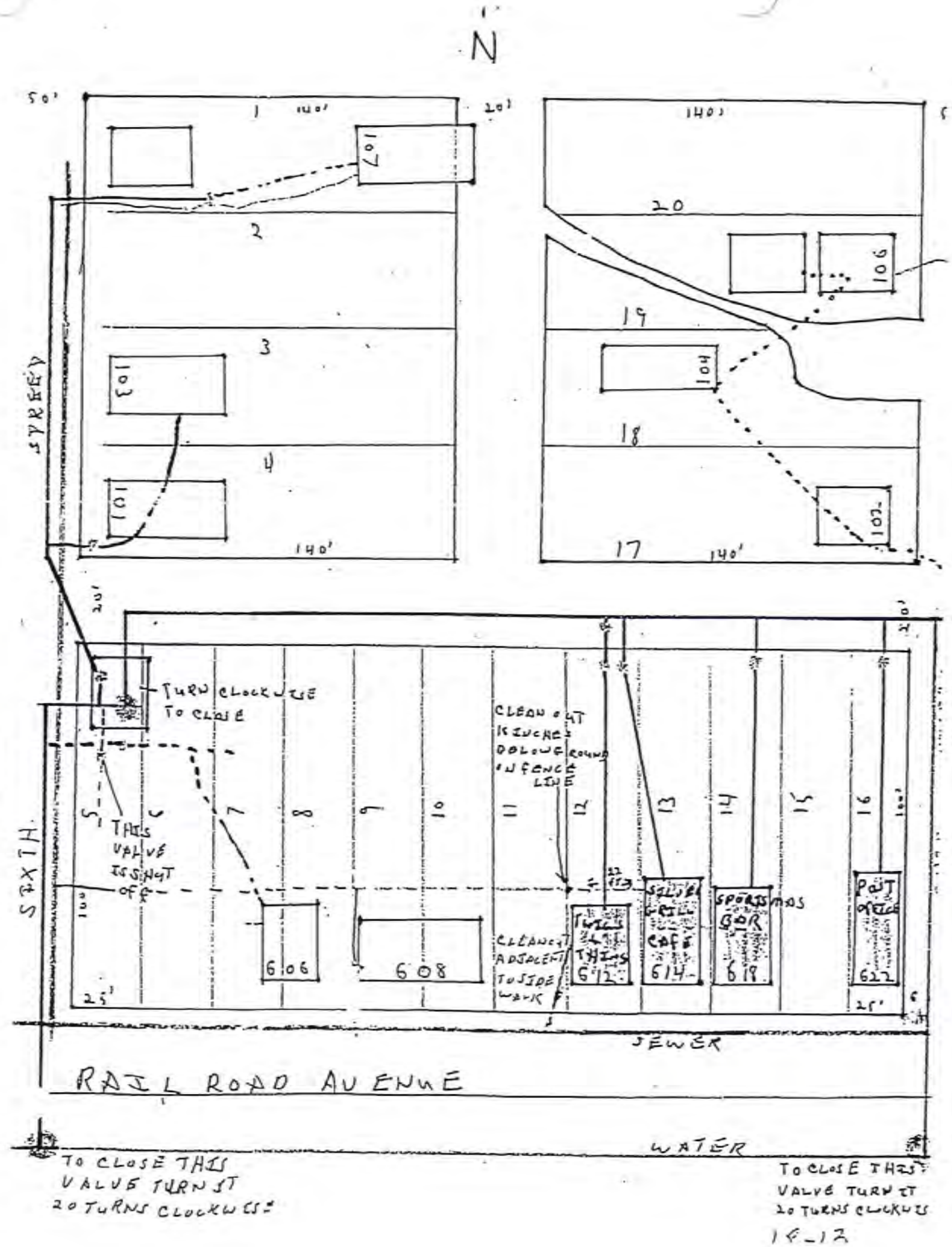
Residential X Retail Business X Agricultural __
Industrial __ Government X Other (describe on back) __

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	__	(W) ______	__

18-12



18-12

Public Water Supply Number 00015
WHP Region ____________

Source Number ____________
Inventory Person H. M. HOGAN
Attached Map Number 7

INVENTORY FORM

Occupant's Name ____________
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ____________
Phone Number 406-722-4942 Lat/Long ____________
Name, address and phone number of property owner if different from above ____________

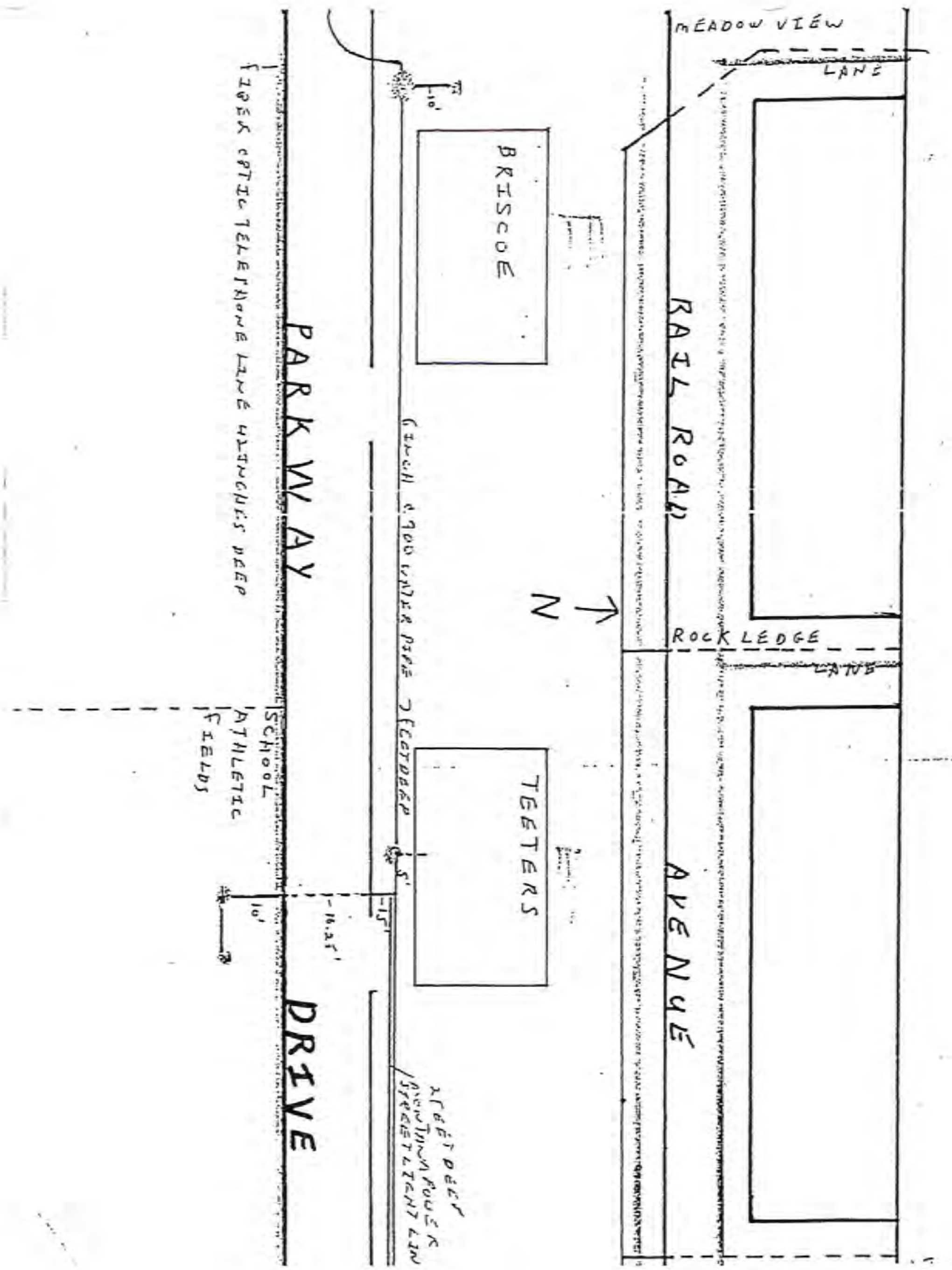
NATURE OF PROPERTY

Residential	X	Retail Business	__	Agricultural	__
Industrial	__	Government	__	Other (describe on back)	__

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/[redacted]	2	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	__
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	__	(W) ____________	__



Public Water Supply Number 00015.
WHP Region ______

Source Number ______
Inventory Person H.M. HOGAN
Attached Map Number 8

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

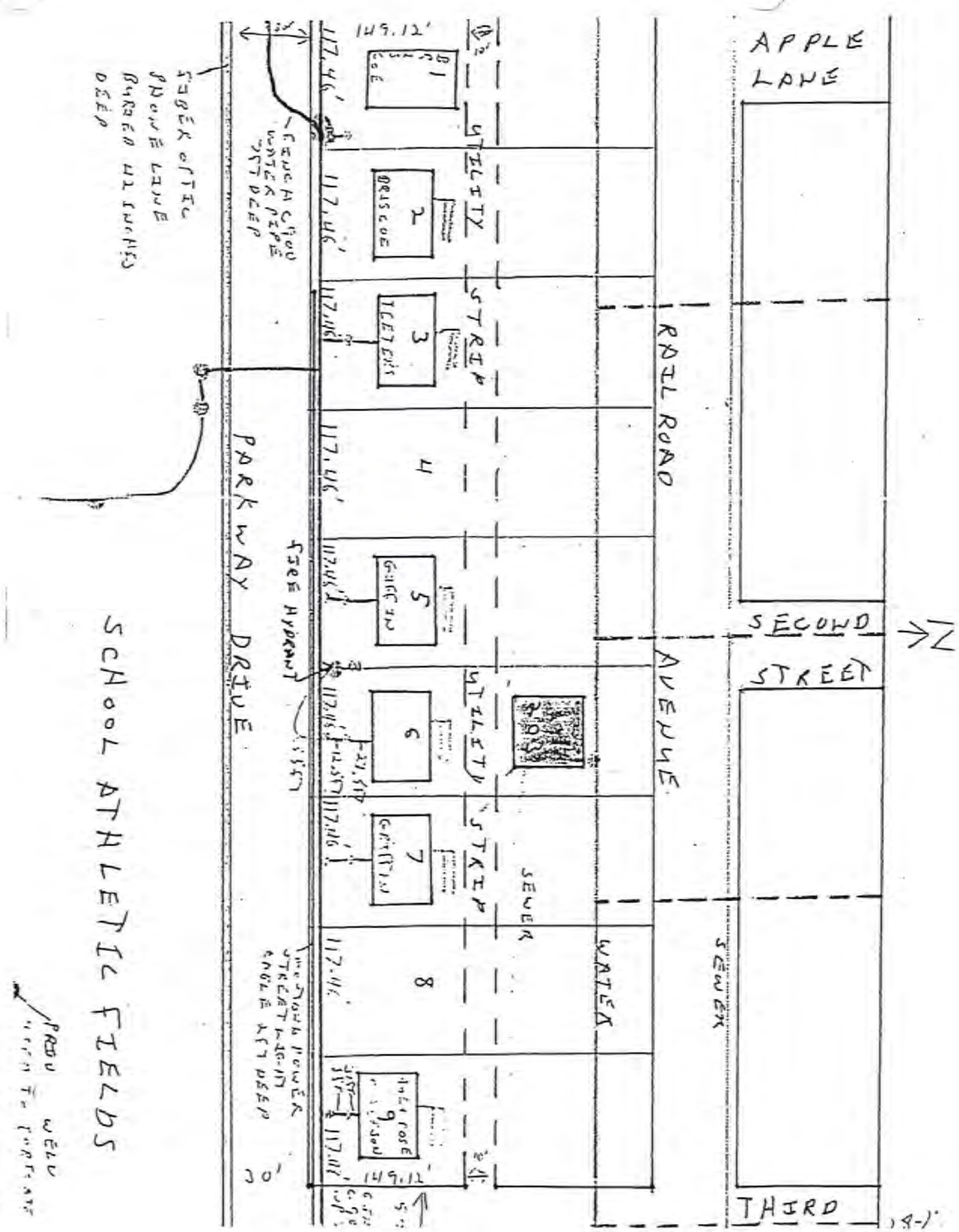
NATURE OF PROPERTY

Residential	X	Retail Business	X	Agricultural	__
Industrial	__	Government	__	Other (describe on back)	__

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	1	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	6	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	__
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank __		(W) ______	__



Public Water Supply Number 00016
WHP Region ______

Source Number ______
Inventory Person H. M. HOGAN
Attached Map Number #9

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALDERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

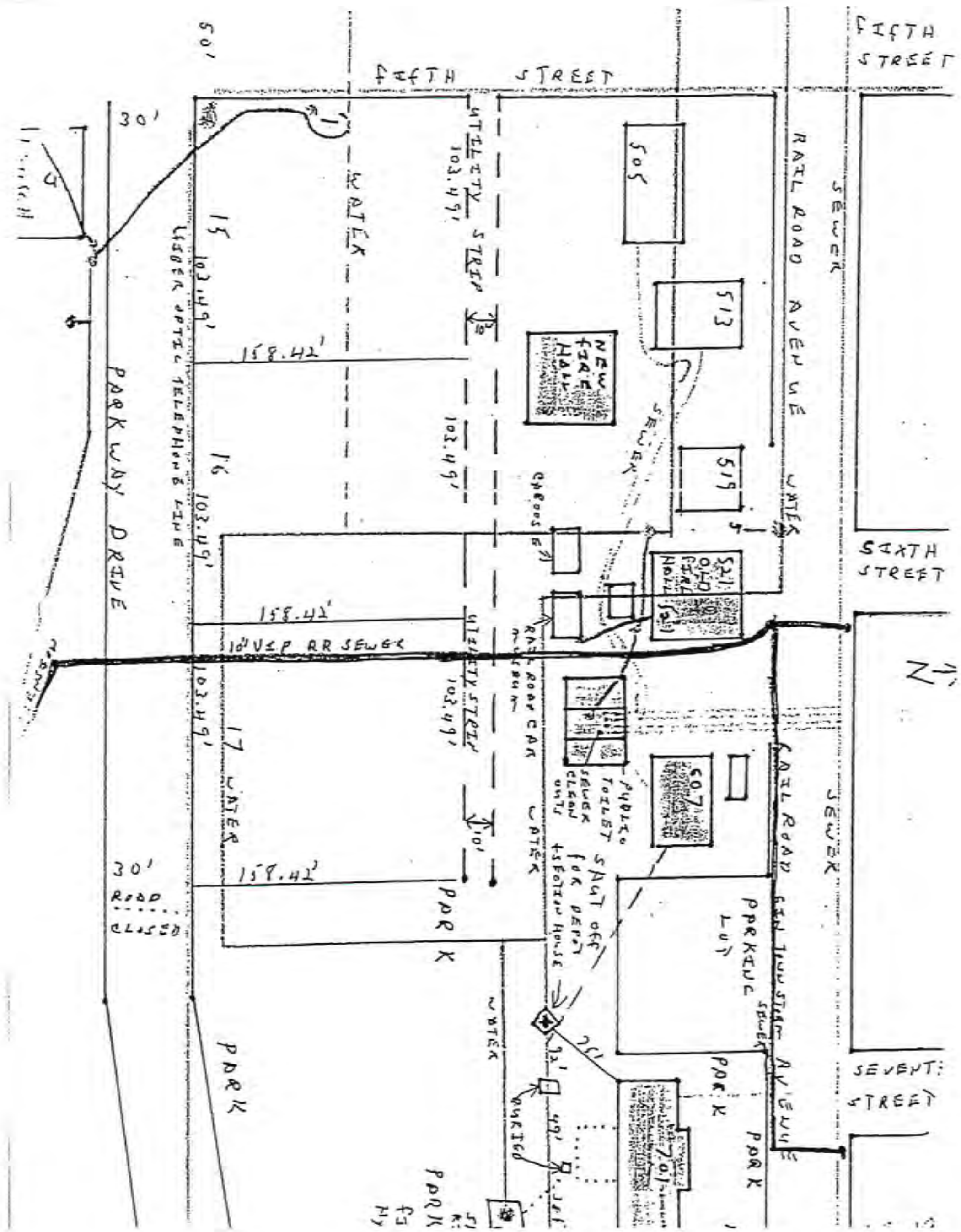
NATURE OF PROPERTY

Residential	X	Retail Business	__	Agricultural	__
Industrial	__	Government	X	Other (describe on back)	__

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	1	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	__
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	3	(V) Stream, river, lake, pond	__
(H) Underground storage tank __		(W) ______	__



Public Water Supply Number 00015 　　　Source Number ________
WHP Region ________ 　　　Inventory Person H.M. HOGAN
　　　Attached Map Number 10

INVENTORY FORM

Occupant's Name ________
Site Address TOWN of ALBERTON
City ALBERTON 　Zip Code 59820
County MINERAL 　T/R/S ________
Phone Number 406-722-4942 　Lat/Long ________
Name, address and phone number of property owner if different from above ________

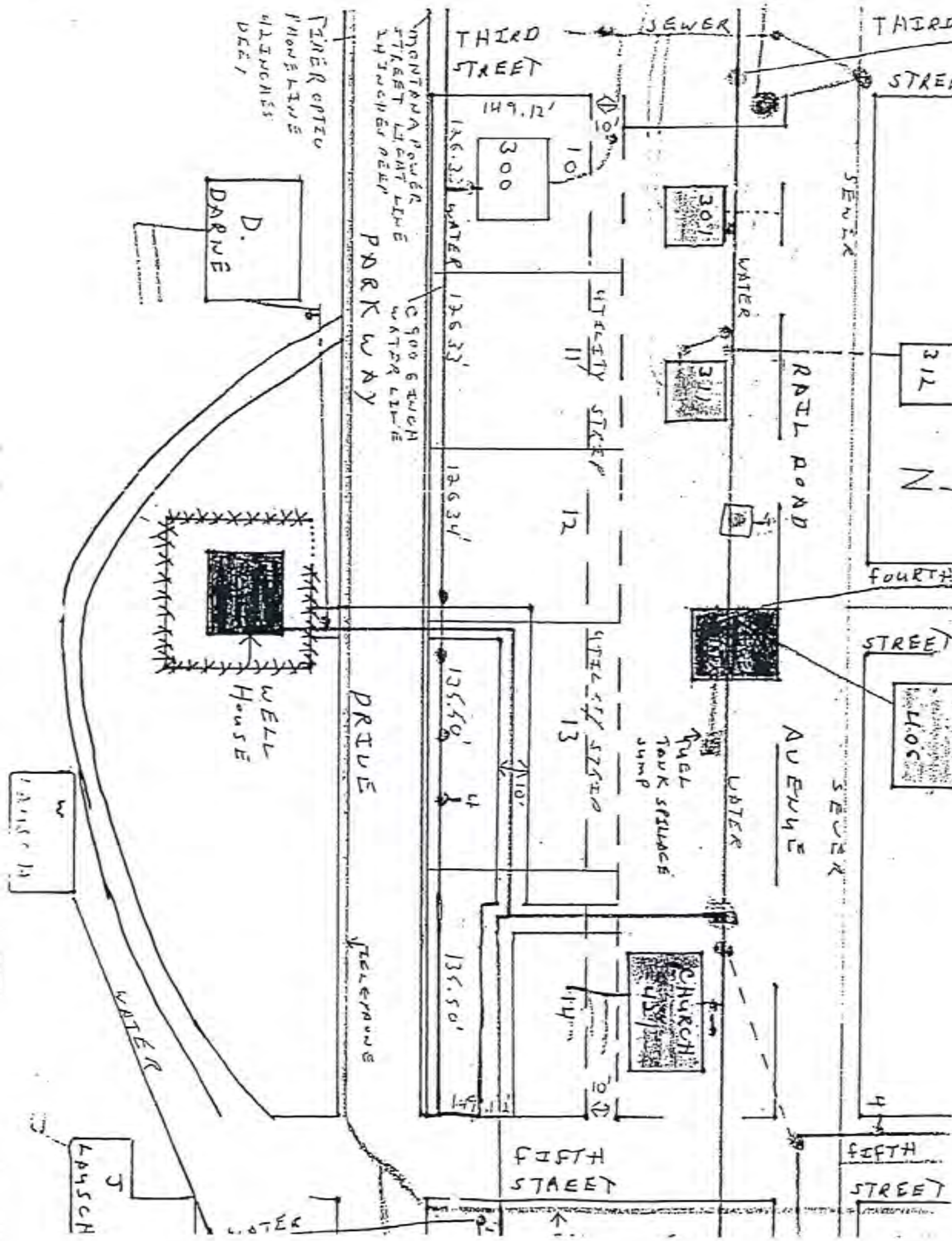
NATURE OF PROPERTY

Residential	X	Retail Business	X	Agricultural	___
Industrial	___	Government	X	Other (describe on back)	___

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	1	(I) Above ground storage tank	4
(2) Water well abandoned	___	(J) Chemical storage facility	___
(3) Chemigation well	___	(K) Fertilizer/pesticide use	___
(4) Oil/gas well	___	(L) Chemical mixing/loading site	___
(5) Exploration bore hole	___	(M) Land application of waste	___
(6) Injection well	___	(N) Grain storage bin	___
(7) Mine/Quarry	___	(O) Animal feedlot	___
(A) Septic tank/privy	4	(P) Auto salvage yard	___
(B) Landfill/dump	___	(Q) Irrigated land	___
(C) Pipeline	___	(R) Artificial recharge project	___
(D) Wastewater lagoon	___	(S) Drainage canal	___
(E) Brine pit	___	(T) Highway/interstate frontage SEE REVERSE	
(F) Service station dry well	1	(U) Railroad frontage	___
(G) Stormwater drain	___	(V) Stream, river, lake, pond	___
(H) Underground storage tank ___		(W) ________	___



Public Water Supply Number 00015
WHP Region ____________

Source Number ____________
Inventory Person H. M. HOGAN
Attached Map Number 14

INVENTORY FORM

Occupant's Name ____________
Site Address TOWN OF ALBERTON
City ALBERTON   Zip Code 59820
County MINERAL   T/R/S ____________
Phone Number 406-722-4942   Lat/Long ____________
Name, address and phone number of property owner if different from above ____________

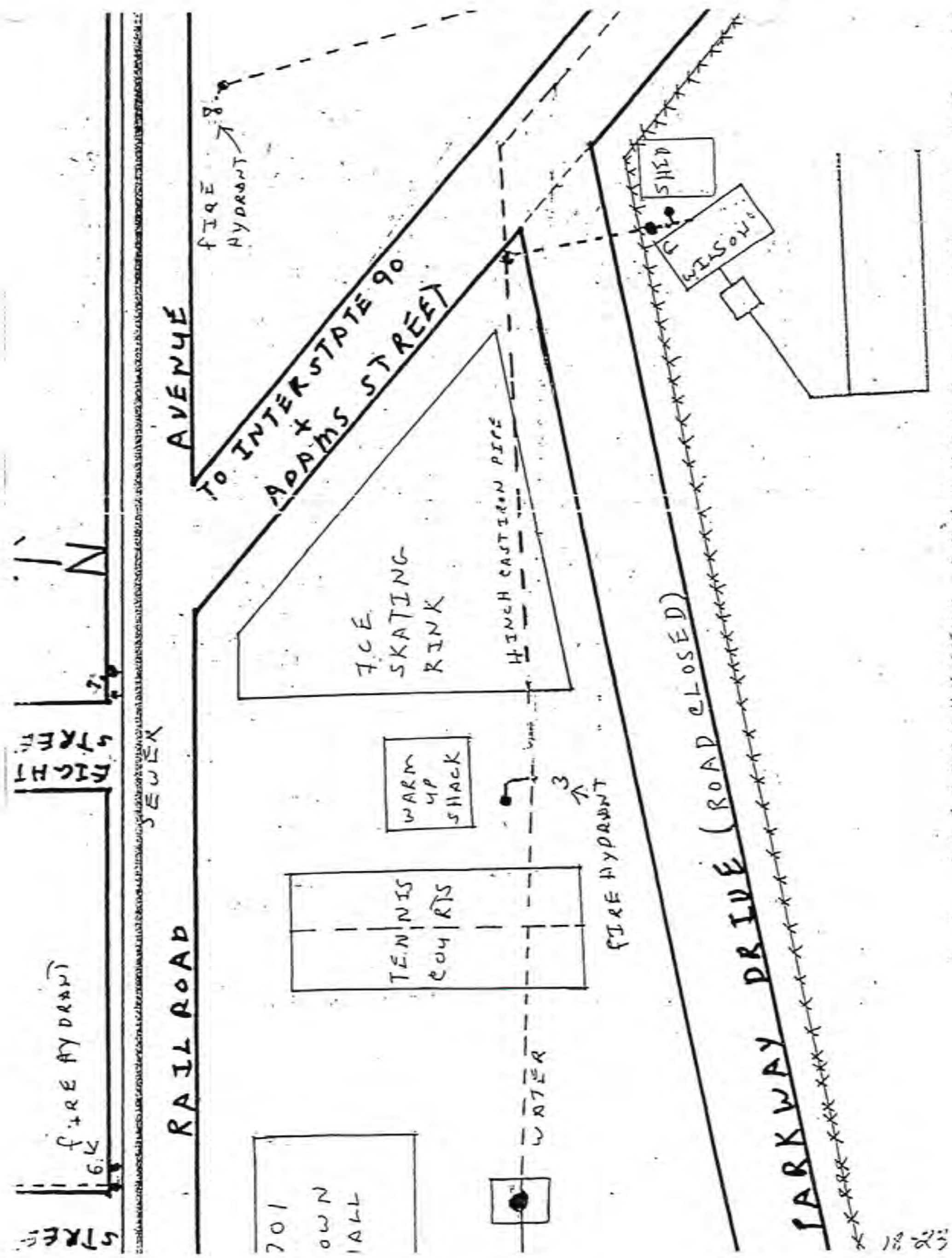
NATURE OF PROPERTY

Residential	X	Retail Business	___	Agricultural	___
Industrial	___	Government	X	Other (describe on back)	___

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	___	(I) Above ground storage tank	___
(2) Water well abandoned	___	(J) Chemical storage facility	___
(3) Chemigation well	___	(K) Fertilizer/pesticide use	___
(4) Oil/gas well	___	(L) Chemical mixing/loading site	___
(5) Exploration bore hole	___	(M) Land application of waste	___
(6) Injection well	___	(N) Grain storage bin	___
(7) Mine/Quarry	___	(O) Animal feedlot	___
(A) Septic tank/privy	___	(P) Auto salvage yard	___
(B) Landfill/dump	___	(Q) Irrigated land	___
(C) Pipeline	___	(R) Artificial recharge project	___
(D) Wastewater lagoon	___	(S) Drainage canal	___
(E) Brine pit	___	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	___	(U) Railroad frontage	___
(G) Stormwater drain	___	(V) Stream, river, lake, pond	___
(H) Underground storage tank	___	(W) ____________	___



Public Water Supply Number 00015
WHP Region ______

Source Number ______
Inventory Person H M HOGAN
Attached Map Number 13

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4542 Lat/Long ______
Name, address and phone number of property owner if different from above ______

NATURE OF PROPERTY

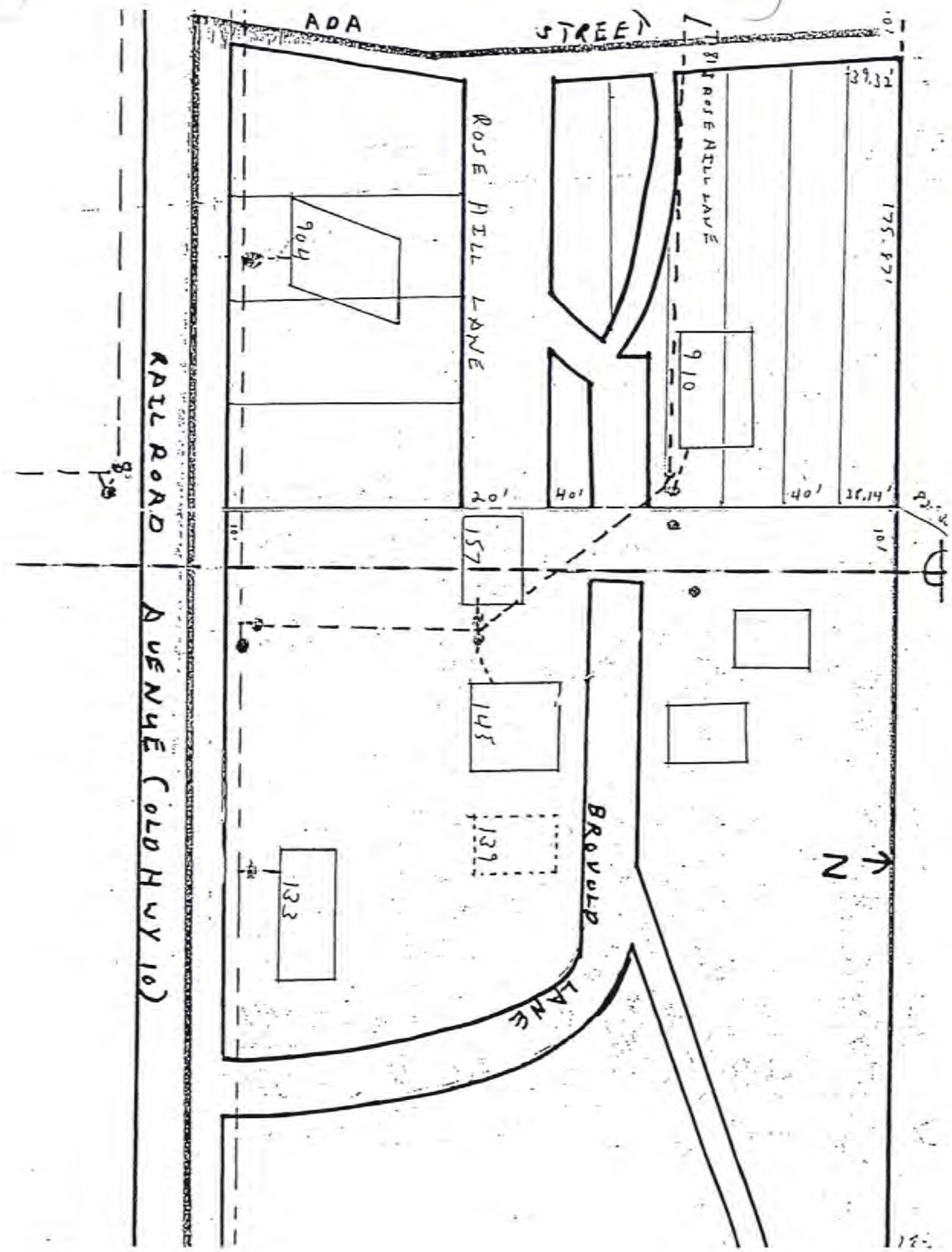
Residential	X	Retail Business	__	Agricultural	__
Industrial	__	Government	__	Other (describe on back)	__

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	__
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	__	(W) ______	__

18-24



Public Water Supply Number 00015
WHP Region ____________

Source Number ____________
Inventory Person H m HOGAN
Attached Map Number 12

INVENTORY FORM

Occupant's Name ____________
Site Address TOWN OF ALBERTON
City ALBERTON. Zip Code 59820
County MINERAL T/R/S ____________
Phone Number 406-722-4942 Lat/Long ____________
Name, address and phone number of property owner if different from above ____________

NATURE OF PROPERTY

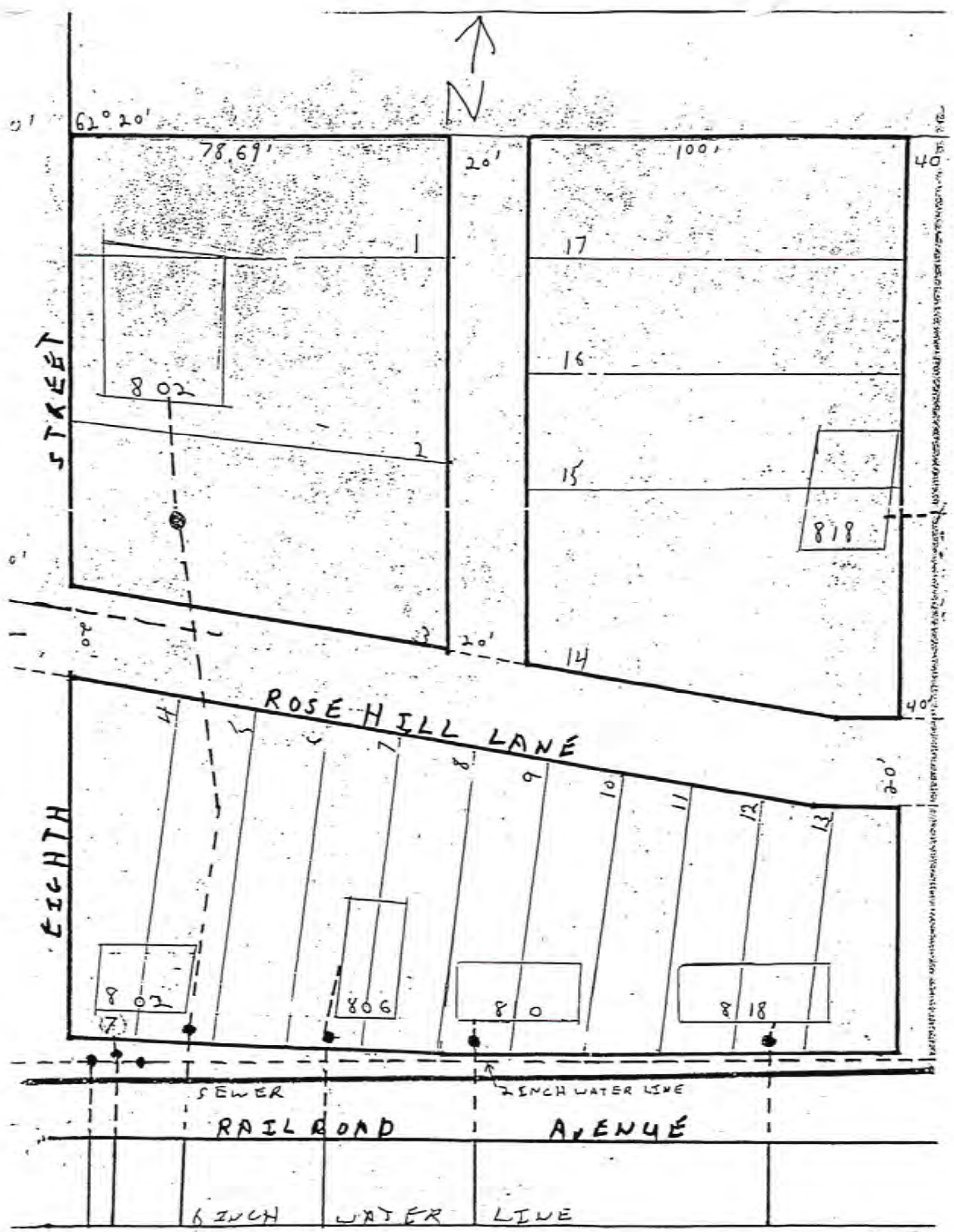
Residential	X	Retail Business	__	Agricultural	__
Industrial	__	Government	__	Other (describe on back)	__

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	__	(W) ____________	__

18-21



10-22

Public Water Supply Number 000 15
WHP Region ______

Source Number ______
Inventory Person H. m. NOGAN
Attached Map Number 11

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

NATURE OF PROPERTY

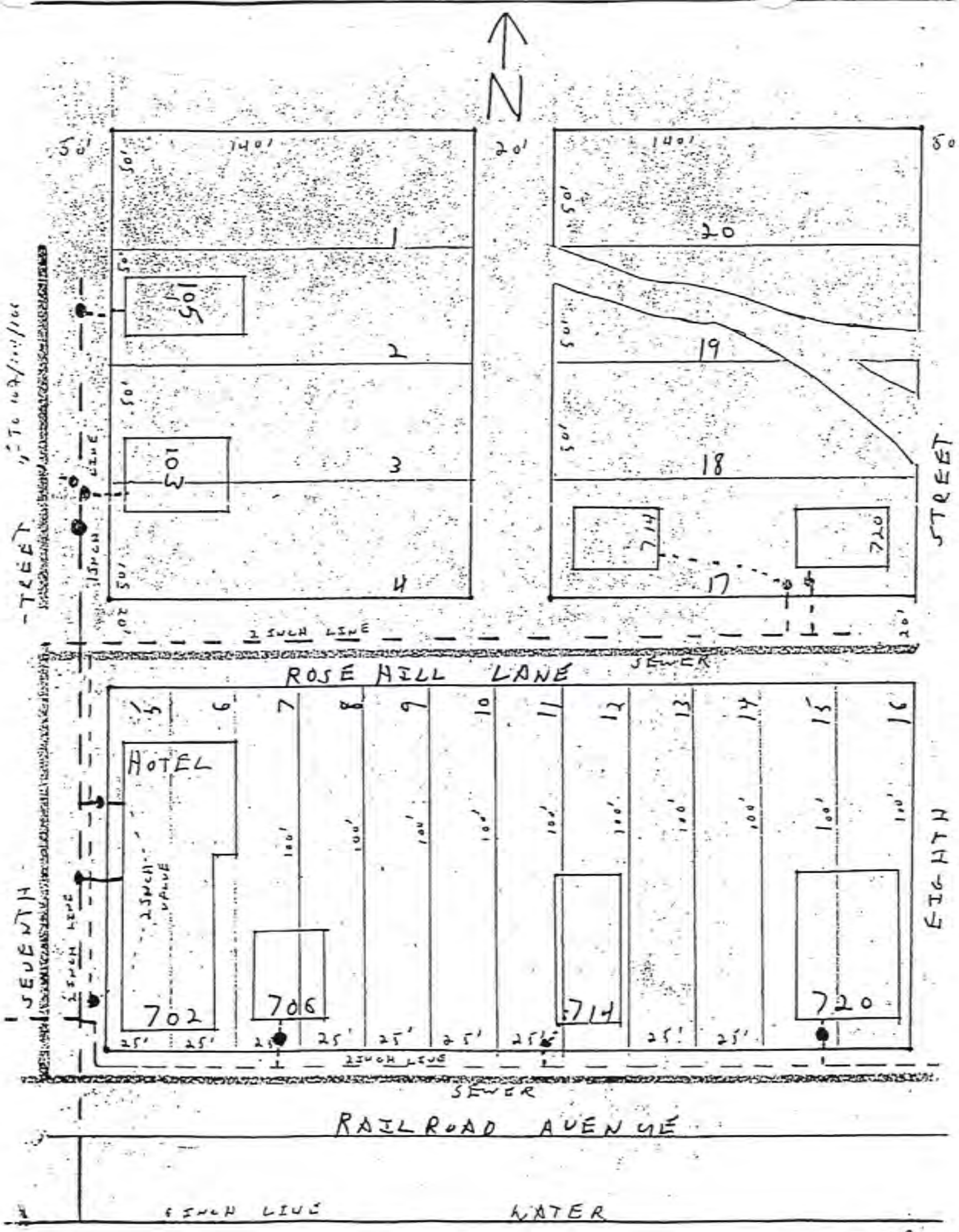
Residential X Retail Business X Agricultural __
Industrial __ Government __ Other (describe on back) __

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	__	(W) ______	__

9-28



10-29

Public Water Supply Number 0001Ŝ
WHP Region ______

Source Number ______
Inventory Person H. M. HOGAN
Attached Map Number 15

INVENTORY FORM

Occupant's Name ______
Site Address TOWN OF ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ______
Phone Number 406-722-4942 Lat/Long ______
Name, address and phone number of property owner if different from above ______

NATURE OF PROPERTY

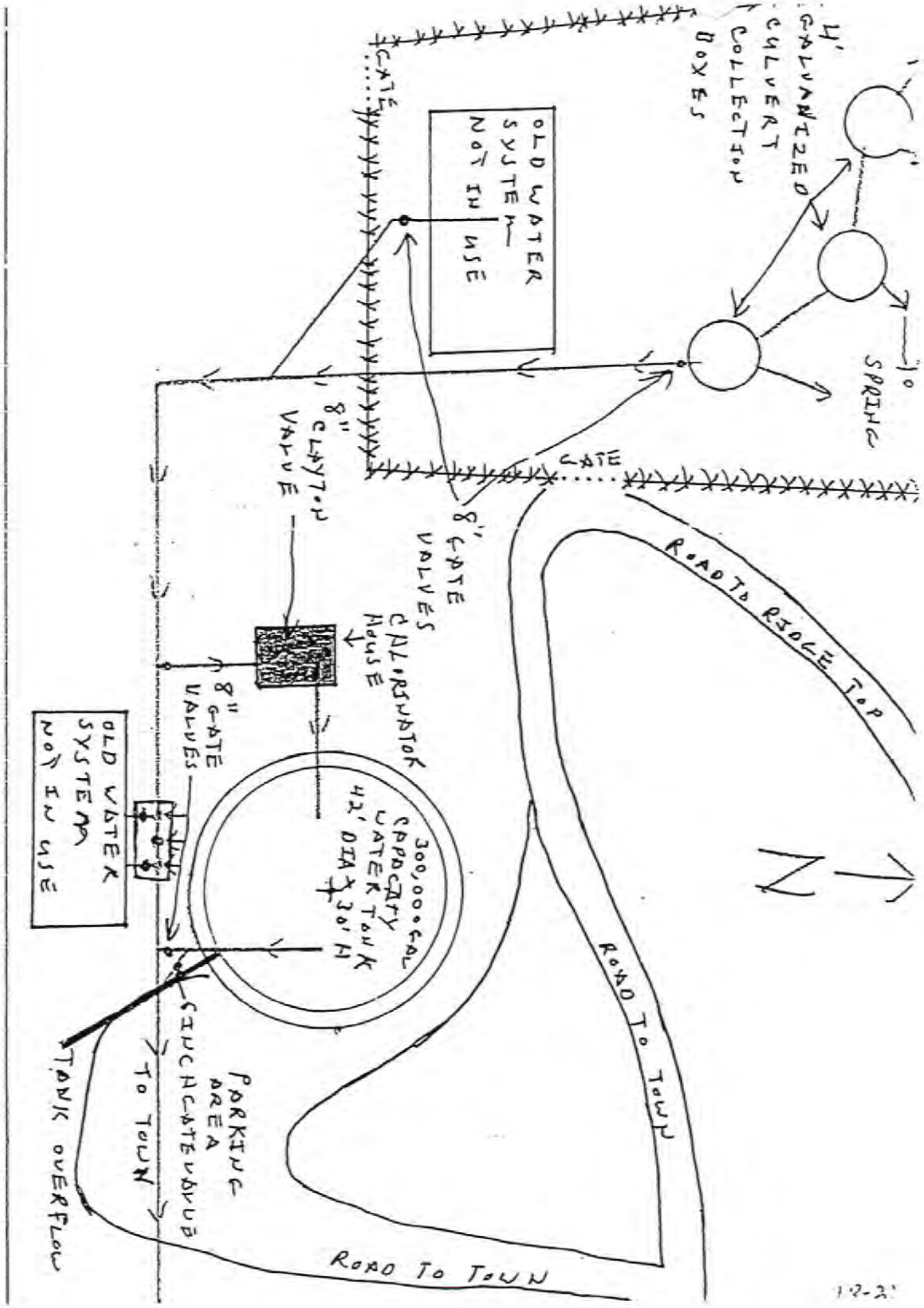
Residential __ Retail Business __ Agricultural __
Industrial __ Government . X Other (describe on back) __

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	1
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	__
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	1	(W) SPRING	1

18-20



18-21

Public Water Supply Number 00015
WHP Region ____________

Source Number ____________
Inventory Person H M HOGAN
Attached Map Number 16

INVENTORY FORM

Occupant's Name ____________
Site Address TOWN of ALBERTON
City ALBERTON Zip Code 59820
County MINERAL T/R/S ____________
Phone Number 406-722-4942 Lat/Long ____________
Name, address and phone number of property owner if different from above ____________

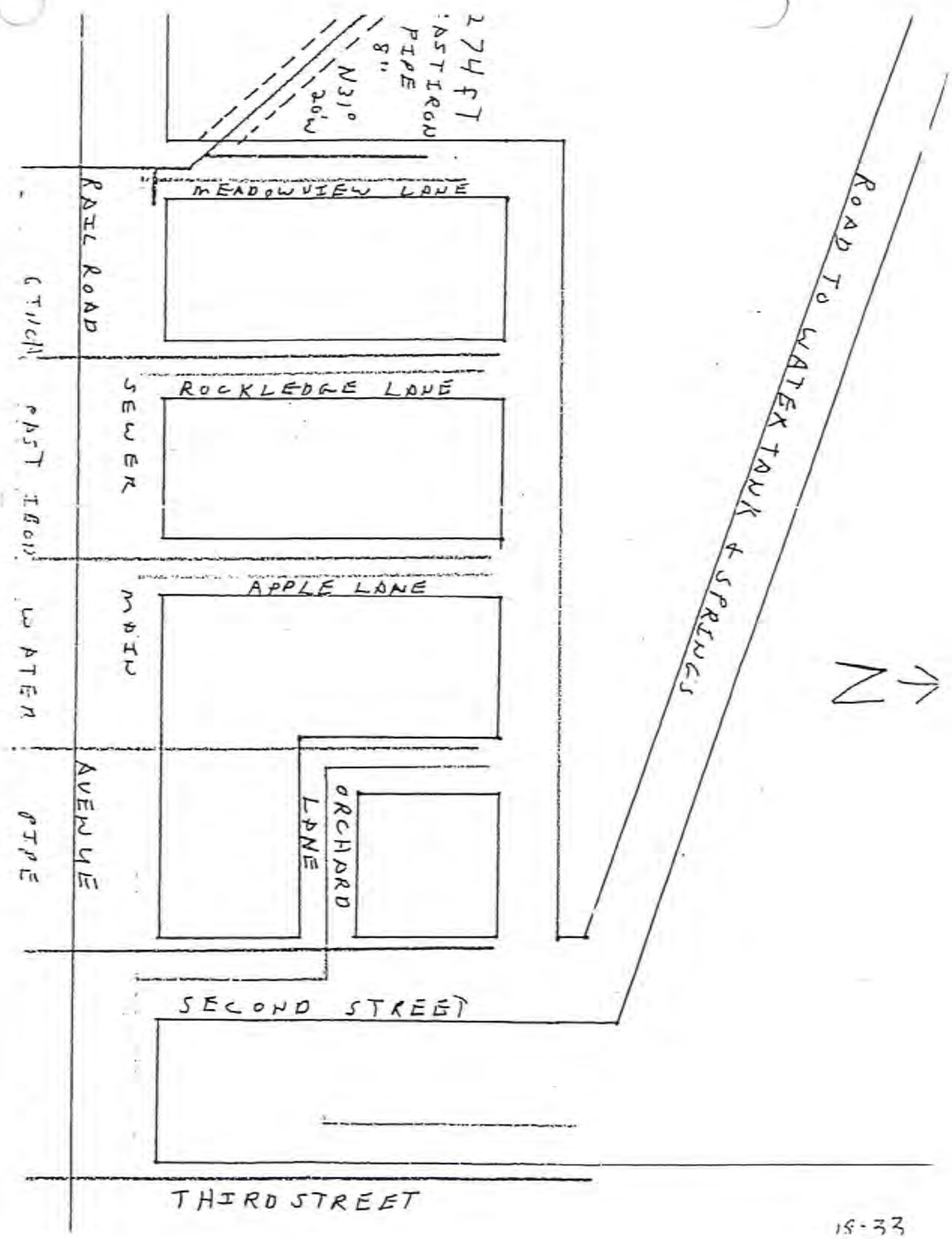
NATURE OF PROPERTY

Residential __ Retail Business __ Agricultural __
Industrial __ Government X Other (describe on back) __

POTENTIAL SOURCES OF CONTAMINATION

Circle the number or letter of each source found at this site. Under quantity, indicate how many. Place the number or letter on the attached map to indicate the location of the source. List the chemicals used or stored on back of the form.

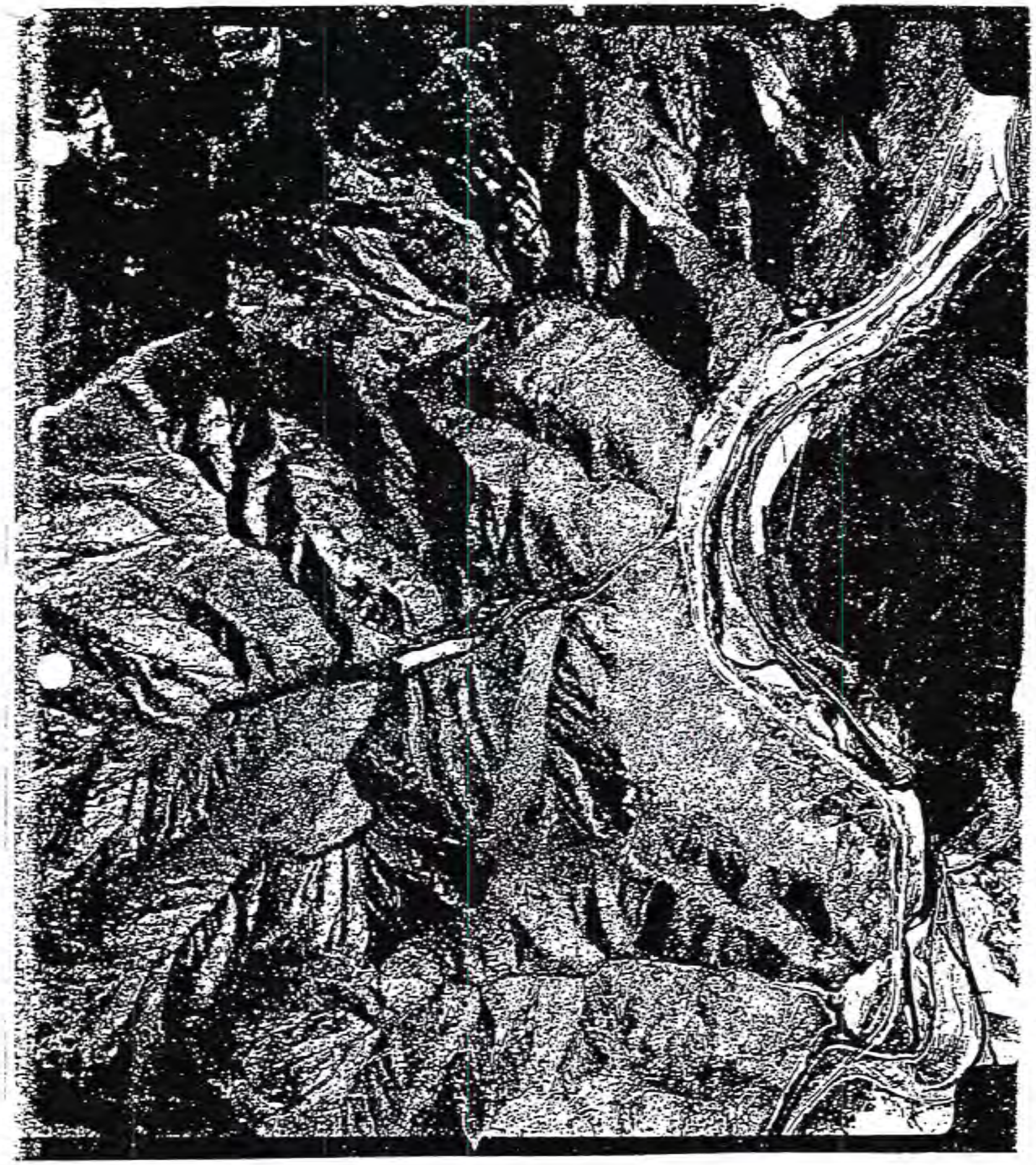
POTENTIAL SOURCE	QUANTITY	POTENTIAL SOURCE	QUANTITY
(1) Water well in use	__	(I) Above ground storage tank	__
(2) Water well abandoned	__	(J) Chemical storage facility	__
(3) Chemigation well	__	(K) Fertilizer/pesticide use	__
(4) Oil/gas well	__	(L) Chemical mixing/loading site	__
(5) Exploration bore hole	__	(M) Land application of waste	__
(6) Injection well	__	(N) Grain storage bin	__
(7) Mine/Quarry	__	(O) Animal feedlot	__
(A) Septic tank/privy	__	(P) Auto salvage yard	__
(B) Landfill/dump	__	(Q) Irrigated land	__
(C) Pipeline	__	(R) Artificial recharge project	__
(D) Wastewater lagoon	__	(S) Drainage canal	__
(E) Brine pit	__	(T) Highway/interstate frontage	SEE REVERSE
(F) Service station dry well	__	(U) Railroad frontage	__
(G) Stormwater drain	__	(V) Stream, river, lake, pond	__
(H) Underground storage tank	__	(W) ____________	__



15-33

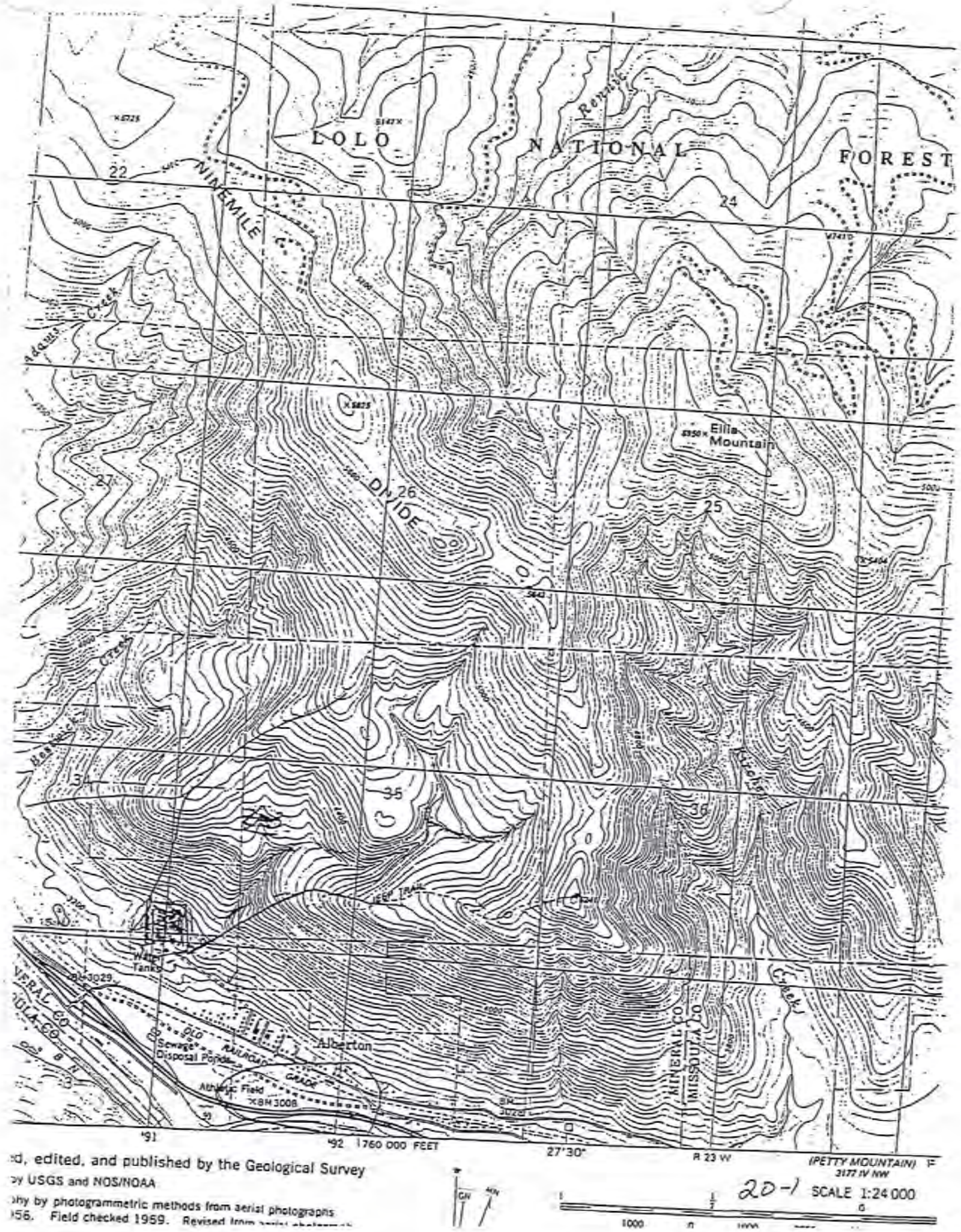
APPENDIX 4

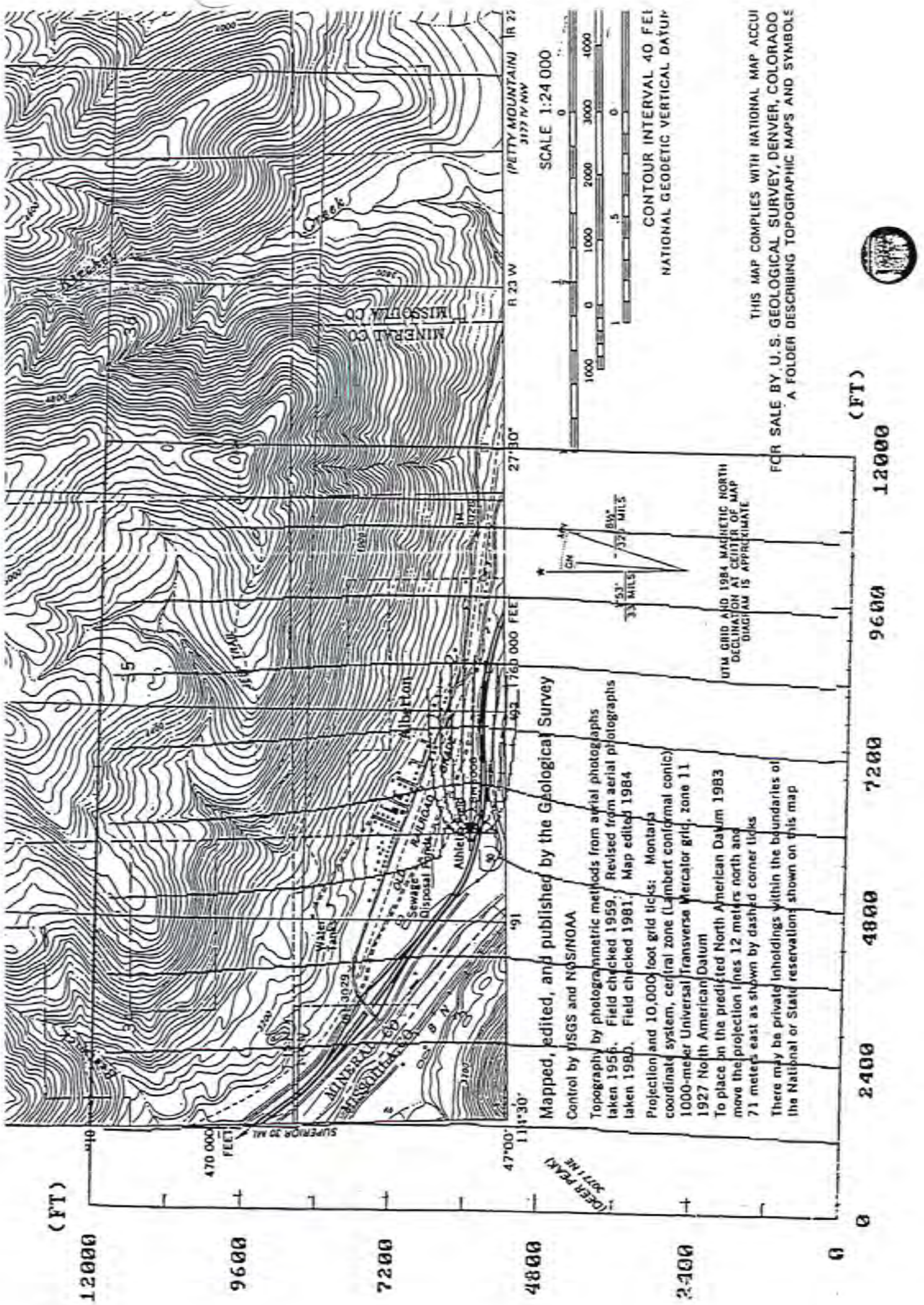
AERIAL PHOTO OF ALBERTON AREA



APPENDIX 5

BASE MAP





20-2

```
PROBLEM SUMMARY: GPTRAC SEMI-ANALYTICAL OPTION

                 Aquifer Type:  Confined Aquifer
      Number of Pumping Wells:        1
     Number of Recharge Wells:        0
               Transmissivity:      586. ft**2/d
           Hydraulic Gradient:   0.018000 ft/ft
       Angle of Ambient Flow:     180.00 degrees
             Aquifer Porosity:      0.10 dimensionless
            Aquifer Thickness:       97. ft
   Boundary Type and Location:  no boundary
              Simulation Time:     1825. days
            Capture Zone Time:     1825. days


     Would you like to see well parameters? (Y/N)
```

```
                    -- GPTRAC --

          ** PUMPING WELL PARAMETERS **

            Pumping Well Number  1

        X - Coordinate (ft):  6000.0
        Y - Coordinate (ft):  6000.0
       Discharge (ft**3/d):  22000.0
          Well Radius (ft):  0.3

  Delineate Capture Zone for this Well:  1
            1 = Yes, 0 = No

       Number of Pathlines Desired:  10
            (Default = 20)

<Enter> = select value   <Esc> = options menu   <F1> = DOS shell
```

20-3

APPENDIX 6

GUDISW P.A.

DEPARTMENT OF ENVIRONMENTAL QUALITY
METCALF BUILDING
POB 200901
Helena, MT 59601-0901

Preliminary Assessment of Groundwater Sources that may be under the Direct Influence of Surface Water

SYSTEM NAME ALBERTON PWS ID# 00015
SOURCE NAME WELL COUNTY MINERAL
DATE 10-28-97 NC NTNC (C) POPULATION 402

Index

Points

A. TYPE OF STRUCTURE (CIRCLE ONE)

X well.................................. GO TO SECTION B
Spring... 40
Infiltration Gallery............................... 40

B. HISTORICAL PATHOGENIC ORGANISM CONTAMINATION

History or suspected outbreak of *Giardia*, or other pathogenic organisms associated with surface water, with current system configuration.................... 40
X No history or suspected outbreak of *Giardia*........ 0

C. HISTORICAL MICROBIOLOGICAL CONTAMINATION (Circle all that apply)

Record of acute MCL violations of the Total Coliform Rule over the last 3 years (circle the one that applies)
X No violations.............................. 0
One violation................................ 5
Two violations............................... 10
Three violations............................. 15

Record of non-acute MCL violations of the Total Coliform Rule over the last 3 years (circle the one that applies)
X One violation or less........................ 0
Two violations............................... 5
Three violations............................. 10

DHES-verified complaints about turbidity............ 5

D. HYDROGEOLOGICAL FEATURES (Circle all that apply)

Horizontal distance between a surface water and the source*
X greater than 500 feet........................ 0
250-500 feet................................. 5
100-250 feet................................. 10
less than 100 feet........................... 15

E. WATER CONSTRUCTION (Circle all that apply)

Unknown well construction.......................... 30

Poorly constructed well (uncased, or casing not sealed to depth of at least 18 feet below land surface), or casing construction is unknown 15

In wells tapping unconfined or semiconfined aquifers, depth below land surface to top of perforated interval or screen

- X great than 100 feet.......................... 0
- 50 -100 ft.................................. 5
- 25 - 50 ft.................................. 10
- 0 - 25 ft................................... 15
- unknown..................................... 15

D. WELL INTAKE CONSTRUCTION

Unknown intake construction......................... 25

In wells tapping unconfined or semiconfined aquifers, depth to static water level below land surface

- X greater than 100 feet......................... 0
- 50 - 100 ft.................................. 5
- 0 - 50 ft.................................... 10
- unknown...................................... 10

Poor sanitary seal, seal without acceptable material, or unknown seal type....................... 15

ANALYST BILL O'CONNELL TOTAL SCORE 0

PRELIMINARY ASSESSMENT DETERMINATION (circle the one that applies)

I) X PASS: Well is classified as groundwater.
II) FAIL: Well must undergo further GWUDISW determination.
III) FAIL: Spring or infiltration gallery; must undergo further GWUDISW determination.
IV) FAIL: Well will Pass if intake construction deficiencies (section F) are repaired.
V) FAIL: Well may PASS if well construction details (section E) become available.

COMMENTS

DEPARTMENT OF ENVIRONMENTAL QUALITY
METCALF BUILDING
POB 200901
Helena, MT 59601-0901

Preliminary Assessment of Groundwater Sources that may be under the Direct Influence of Surface Water

SYSTEM NAME ALBERTON PWS ID# 00015
SOURCE NAME SPRING COUNTY MINERAL
DATE 10-28-97 NC NTNC (C) POPULATION 402

Index

Points

A. TYPE OF STRUCTURE (CIRCLE ONE)

- well................................ GO TO SECTION B
- X Spring.. 40
- Infiltration Gallery................................ 40

B. HISTORICAL PATHOGENIC ORGANISM CONTAMINATION

History or suspected outbreak of *Giardia*, or other pathogenic organisms associated with surface water, with current system configuration.................... 40
X No history or suspected outbreak of *Giardia*........ 0

C. HISTORICAL MICROBIOLOGICAL CONTAMINATION (Circle all that apply)

Record of acute MCL violations of the Total Coliform Rule over the last 3 years (circle the one that applies)

- X No violations................................ 0
- One violation................................... 5
- Two violations.................................. 10
- Three violations................................ 15

Record of non-acute MCL violations of the Total Coliform Rule over the last 3 years (circle the one that applies)

- X One violation or less........................ 0
- Two violations.................................. 5
- Three violations................................ 10

DHES-verified complaints about turbidity............ 5

D. HYDROGEOLOGICAL FEATURES (Circle all that apply)

Horizontal distance between a surface water and the source

- X greater than 500 feet......................... 0
- 250-500 feet.................................... 5
- 100-250 feet.................................... 10
- less than 100 feet.............................. 15

E. WATER CONSTRUCTION (Circle all that apply)

Unknown well construction.......................... 30

Poorly constructed well (uncased, or casing not sealed to depth of at least 18 feet below land surface), or casing construction is unknown 15

In wells tapping unconfined or semiconfined aquifers, depth below land surface to top of perforated interval or screen

great than 100 feet	0
50 -100 ft	5
25 - 50 ft	10
0 - 25 ft	15
unknown	15

D. WELL INTAKE CONSTRUCTION

Unknown intake construction........................ 25

In wells tapping unconfined or semiconfined aquifers, depth to static water level below land surface

greater than 100 feet	0
50 - 100 ft	5
0 - 50 ft	10
unknown	10

Poor sanitary seal, seal without acceptable material, or unknown seal type....................... 15

ANALYST BILL O'CONNELL TOTAL SCORE 40

PRELIMINARY ASSESSMENT DETERMINATION (circle the one that applies)

I) PASS: Well is classified as groundwater.
II) FAIL: Well must undergo further GWUDISW determination.
III) X FAIL: Spring or infiltration gallery; must undergo further GWUDISW determination.
IV) FAIL: Well will Pass if intake construction deficiencies (section F) are repaired.
V) FAIL: Well may PASS if well construction details (section E) become available.

COMMENTS The MBMG has [illegible] waiting for the results before proceeding with additional [illegible].

21-4

APPENDIX 7

EMERGENCY PLAN

Alberton's
EMERGENCY PLAN

I. Identification of possible disruption threats

The principal threat to the PWS has been identified as a spill, leak, or discharge in the control zone which could contaminate the source water by entering through the well bore or perhaps along with contaminated shallow groundwater through a failed casing. Included are spills from vehicles, spills from mobile liquid holding tanks, leaks from septic systems.

The main thrust of the WHPP is to control activities around the wellhead and spring boxes by maintaining water quality protection practices in the control zone,and by informing nearby land owners of the WHPP. It is the responsibility of the certified operator to ensure that the this education occurs.

A secondary threat to the PWS has been identified as a wellbore collapse causing an immediate loss of the water supply.

II. Designation of an emergency coordinator

The emergency coordinator for Alberton is Howard Hogan. His phone number is (406) 722-4942.

The emergency coordinator is familiar with the county and state DES procedures and is responsible for contacting the appropriate officials should a spill or other threat to the source water occur. The Mineral County DES coordinator 24 hour phone number is 243-4152. The State of Montana 24 hour Spill Hotline phone number is (406)444-6911.

III. Equipment and material resources

The principal identified threats to the well are generally limited to spills in the control zone. Resources that may be needed to respond to a spill are heavy equipment for berm and excavation work and absorbent materials. A list of possible contractors is maintained and updated by the DEQ Enforcement Division (406)444-0379.

A collapse of the wellbore causing an immediate loss of water will require the contracted services of a design engineer, and a well driller.

IV. Procedures to shut down the well

The well or springs can be turned off and isolated from the water supply system. Important valves are located as shown on appendix 3. Under ideal conditions the system can operate without the well or springs by using water in the water storage tank and either the well or springs indefinitely. Well or spring shut down is the responsibility of the certified operator.

V. Coordination Procedures

A copy of this plan will be made available to the Mineral County DES coordinator. Additionally, reportable spills will be handled as per the mandated reporting requirements as follows:

- *Agricultural chemical or fertilizer spills will be reported to the MT Department of Agriculture (406)444-5400*
- *Any refined petroleum product such as gasoline, diesel, asphalt, road oil, kerosene, fuel oil, and derivatives of mineral, animal, or vegetable oil spills in excess of 25 gallons will be reported to the DES hotline (406)444-6911.*

VI. Procedures to communicate with water users

The town is large enough that mailings and placing notification in public places would be required to reach as many people as possible. In case of a more immediate emergency additional help would be requested. This type of notification was successfully used to evacuate the town during the chlorine gas contamination which resulted from the 1996 MRI train wreck.

The nature of the PWS should allow the well to be isolated from the distribution system in the event of a spill in the control zone which threatens source water quality. If it is determined that the source water was exposed to a contaminant the well will remain off line until sampling proves the water to be safe, an evaluation that will be done is cooperation with the MT DEQ, PWS Section.

VII. Source of emergency water

If the well or springs is out of service, the other will meet the communities needs. Should a collapse of the wellbore occur, the services of a design engineer and well driller will be retained to assess the options. Plans and specifications for any new well will require DEQ-PWS Section review and approval prior to construction.

VIII. Disinfection and resumption of water service

The well and storage tank can be disinfected for bacteriological contamination as per the water systems standard disinfection and tank cleaning procedures under the direction of the certified operator.

Normal water service resumption will occur after sample results indicate the supply is safe as approved by DEQ-PWS Section and the certified operator.

IX. Funds

The funding of emergency response is a process controlled town Council of Alberton. Sufficient funding is available to handle all identified threats and responses.

X. Replacement well

The current two source system meets the requirements for a backup water source. This setup should be adequate for the needs of the Alberton for the foreseeable future.

Important emergency contacts and phone

Howard Hogen	722-4942	Emergency coordinator and PWS operator	all PWS issues
Jackline Eallison	722-3372	Clerk	all PWS issues
		Mineral County Disaster and Emergency Services	all spills or releases of hazardous materials
		Health Department	PWS regulatory questions, spill questions
MT Spill Hotline	444-6911 24 hr phone		all reportable spills
John Arrigo	444-0379	DEQ Enforcement Division	spill regulatory and response questions
Greg Murfitt	444-5400	MT Dept of Agriculture	All agricultural chemical or fertilizer spills or questions

APPENDIX 8

ORGANIC CHEMICAL MONITORING WAIVER FORMS

PWSID Name & ID #'_ ____________ Site ID Number ____________ (Corresponds with map locator number)

WHP Region ____________ Inventory Person ____________

WHP INVENTORY FORM

Site Name__Alberton__________ Owner Name_

Site Address____________

City__Alberton________ Zip Code __59820____ County Mineral________

Phone 722-4942 T/R/S__T14N R23W Sec. 3__ Lat/Long________

Property owner (if different from above)____________

Address____________ Phone________

City____________ Zip Code________

NATURE OF PROPERTY

__Service Business __Industrial/Mfg. _x_Retail Business __Agricultural

_X Residential _x Government __Other (describe on back)

LAND USES or POTENTIAL CONTAMINANT SOURCES

Place a check by he letter or number of each land use activity or potential source found at this site. Also place the number or letter and the map locator number (found in upper right corner of this sheet) on the base map to indicate the location of each important land use activity or potential contaminant source. List the chemicals used or stored and approximate volume on back of the form. Also include any other important or useful site information.

__(A) Ag chemical use site
__(B) Brine pit
exploration borehole
X_© Chemical storage
__(D) Chemigation well
__(E) Chemical mixing/loading site
__(F) Drain ditch/canal
__(G) Feedlot
__(H) Grain storage
__(I) Greenhouse/nursery/orchard
_X_(J) Highway/county road
__(F) Injection well
(L) Irrigated land
__(M) Irrigation canal
(N) Land application of waste site
__(O) Landfill/dump

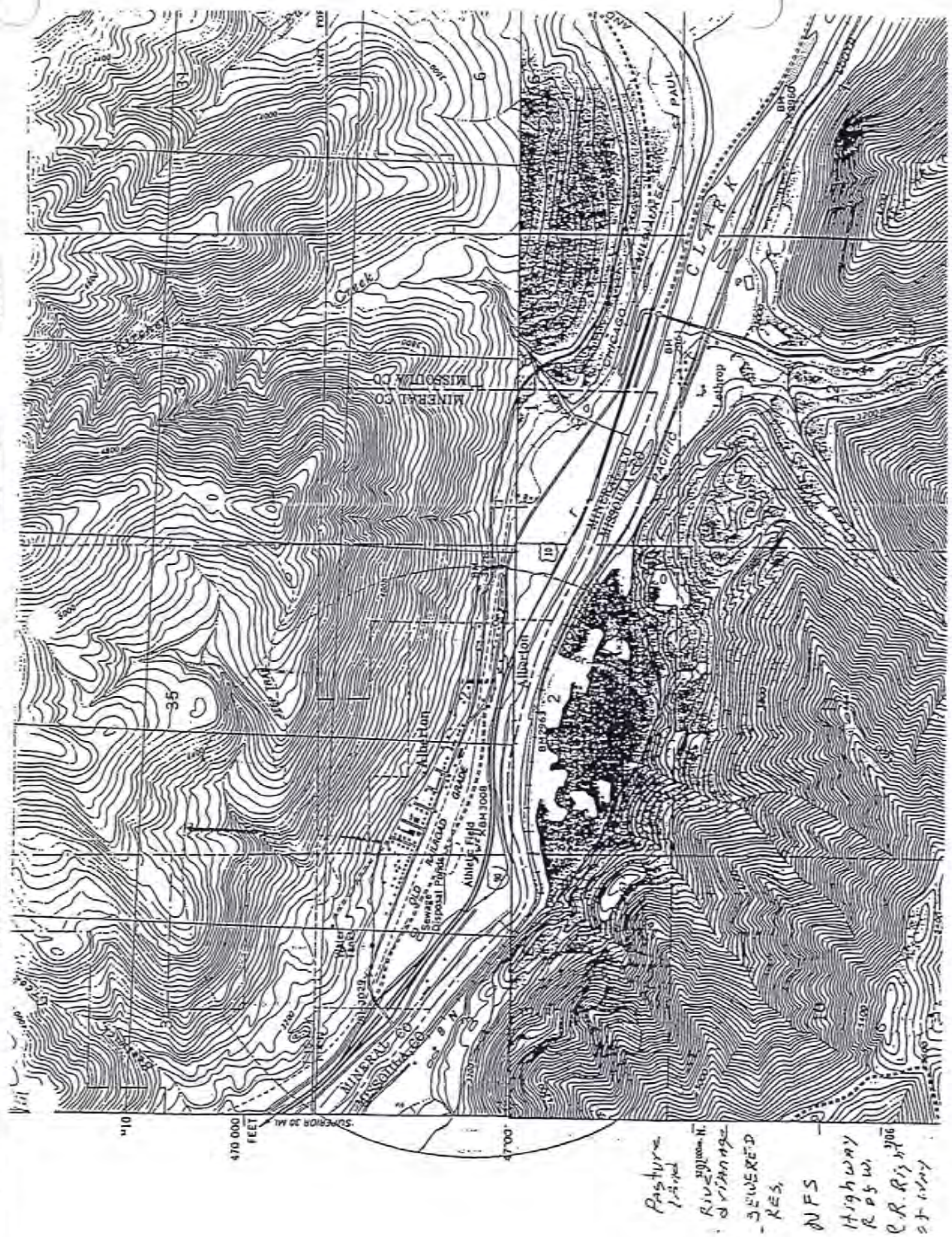
__(P) Mine/quarry/gravel pit
__(Q) Oil/gas well or
__(R) Pipeline
_X(S) Railroad right-of-way
__(T) Salvage yard
_X(U) Septic tank
__(V) Service Station well/sump
X_(W) Storm water drain/sump
__(X) Stream/river/lake/pond
__(Y) Underground storage tank
__(Z) Utility substation/transformer storage
x_(1) Wastewater lagoon
x_(2) Water well in use

CHEMICALS USED OR STORED AT THIS SITE

Map Locator # and Source ID	Land Use	Associated Chemicals
1	Highway right of way	
2	Rail road right of way	
3	Clark Fork River	
4	River floodplain	
5	sewage lagoon	
6	Sewered residential	
7	Cemetary	
8	National Forest	

Additional site information

Sketch of Site(optional)



APPENDIX 9

WELL LOG

3. PROPOSED USE ______ domestic (includes lawn and garden); ______ stock; X municipal; ______ industrial; ______ irrigation; ______ other (specify) ______

4. WELL LOCATION

NW | NE | SW | SE

¼ ______ ¼ ______ ¼ ______ ¼ ______ ¼ Section ______
T. ______ N or S R. ______ E. or W
OR, Subdivision ______ Lot ______ Block ______
City ______ County ______
Elevation ______ Accuracy: ___ ±10'; ___ ±50'; ___ ±100';

5. DRILLING METHOD ______ cable, ______ bored, ______ forward rotary, ______ reverse rotary, ______ jetted, ______ other (specify) ______

6. WELL CONSTRUCTION AND COMPLETION

Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations / Screen: Kind Size	From (feet)	To (feet)
9"	8 5/8" OD 24.70 #	+2' ½"	205			

Was casing left open end? ___ Yes, ___ No
Was a packer or seal used? ___ Yes, X No
If so, what material ______
Was the well gravel packed? ___ Yes, X No
Was the well grouted? X Yes, ___ No
To what depth? ______
Material used in grouting ______
Well head completion: Pitless adapter ______
12 in. above grade ______, other ______
(if other, specify) ______
Pump horsepower ______, pump type ______
Pump intake level ______ feet below land surface
Power (electric, diesel, etc.) ______

7. WATER LEVEL
Static water level ______ feet below land surface
If flowing, closed-in pressure ______ psi
______ gpm flow through ______ inch pipe
Controlled by: ___ valve, ___ reducers, ___ other
(if other, specify) ______

8. WELL TEST DATA X pump ___ bailer ___ other
(if other, specify) ______
Pumping level below land surface:
______ ft. after ______ hrs. pumping ______ gpm
145 ft. after 2 hrs. pumping 100 gpm

9. WAS WELL PLUGGED OR ABANDONED? ___ Yes X No
If yes, how? ______

10. DATE STARTED 12/21/77
DATE COMPLETED 02/01/78

11. WELL LOG

Depth (ft.) From	To	Formation
0	2	SANDY BLACK TOPSOIL
2	11	TAN SILTY SAND
11	32	BROWN SANDY CLAY
32	42'5"	GRAVEL EMBEDDED IN BROWN SILTY CLAY
42'6"	52	GRAVEL MIXED IN BROWN SILTY SAND
52	71	SANDY AND SILTY BROWN CLAY WITH A
		FEW GRAVELS MIXED IN. SEEP OF WATER
		AT 58'.
71	74	DENSE BROWN SILTY AND SANDY CLAY
74	78	GRAVEL EMBEDDED IN BROWN SANDY CLAY
78	86'6"	GRAYISH - TAN SILTY SAND, GRAVEL
		COBBLESTONES
[illegible]	89	GRAVEL AND COBBLESTONES EMBEDDED
		LIGHT BROWN CLAY
89	92	GRAVEL EMBEDDED IN GRAYISH TAN CLAY
92	94'6"	GRAYISH - TAN SILTY SAND AND GRAV
[illegible]	103	TAN CLAY WITH SOME GRAVEL MIXED I
[illegible]	112	GRAVEL EMBEDDED IN REDDISH TAN SI
		SANDY CLAY. SEEP OF WATER AT 111
112	114	GRAVEL EMBEDDED IN LIGHT BROWN SI
		CLAY
114	116	LIGHT BROWN SILTY SAND AND GRAVEL
		WITH SOME STRINGERS OF CLAY
116	126	GRAVEL EMBEDDED IN REDDISH TAN SI
		CLAY
126	127'3"	RED TO DARK BROWN ROCK. SEEP OF
127'3"	135	BROWN ROCK. 5 TO 10 GPM OF WATER
		TOTAL.
[illegible]	145	FRACTURED [illegible] ROCK WITH SEAMS
		OF BROWN CLAY
[illegible]	[illegible]	FRACTURED [illegible] BROWN, GREEN AN
		GRAY ROCK IN ALTERNATE LAYERS. SO
		SEAMS OF BROWN CLAY

CONTINUED ON (use separate sheet if necessary)

12. DRILLER'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Date ______

Firm Name ______

Address ______

Signature ______ License No. ______

147	- 150	Broken brown rock with seams of brown clay
150	- 151	Broken red rock. 30 GPM of water total at 150'.
151	- 158	Broken reddish brown rock, some thin seams of green and gray rock and brown clay
158	- 163	Clean reddish brown broken rock
163	- 190	Broken reddish brown rock with some thin seams of green, gray and purple rock
190	- 202	Solid reddish brown rock
202	- 215	Broken reddish brown rock
215	- 248	Fractured reddish brown rock with some thin seams of gray, purple clay, gray, purple and green rock
248	- 269	Hard brown rock
269	- 276' 6"	Hard pinkish - red rock
276' 6"	- 277' 6"	Softer pinkish red rock with brown clay seams
277' 6"	- 282' 6"	Hard pinkish - red rock
282' 6"	- 300	Red rock

WATER USAGE: 169

115 gpm intake low point

6900 gals. per hour

165,600 gals per day

4,968,000 per month   60,444,000 per yr.

Summer:

165,600 per day   (115 gals. per min.) est.

Winter:

108,000 per day   (75 gals per min.) est.

Form No. 601R12-78

Permit No. 13904-c76M

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

PERMIT TO APPROPRIATE WATER

THIS IS TO CERTIFY, that a PROVISIONAL Permit to appropriate water is hereby granted to TOWN OF ALBERTON of ALBERTON, State of MONTANA, pursuant to Application No. 13904-c76M, with a priority date from July 8, 1977 at 8:05 a.m., upon finding that the criteria of Section 89-885, R.C.M. 1947, have been met.

The source and point of diversion of this appropriation shall be groundwater by means of a well at a point in the NW¼ NE¼ NE¼ of Section 3, Township 14 North, Range 23 West, M.P.M., Mineral County, Montana.

The water appropriated pursuant to this Permit shall be used for municipal purposes from January 1 to December 31, inclusive, of each year, in the town of Alberton, Montana, located in Sections 2 and 3, Township 14 North, Range 23 West, M.P.M., Mineral County, Montana.

The waters appropriated shall be diverted at a rate not to exceed .66 cubic foot per second or 300 gallons per minute and a quantity of 300 acre-feet per annum.

The diversion and distribution works for this appropriation shall be completed, and water shall be applied to beneficial use as specified above, on or before October 15, 1979, or within any authorized extension of time. The Notice of Completion of Ground Water Development, Form No. 617, shall be filed on or before December 15, 1979.

This Permit is SUBJECT TO ALL PRIOR WATER RIGHTS, and the following limitations, terms, conditions, and restrictions:

See Exhibit "A", attached hereto and made a part hereof.

Upon a change in ownership of all or any portion of this permit, pursuant to Section 89-893(2) R.C.M., 1947, the person receiving the interest shall notify the department.

NOTICE: Failure to comply with all terms and conditions herein may result in the loss of the right to appropriate the water granted by this Permit.

Robert M. Culver

ASSISTANT ADMINISTRATOR
WATER RESOURCES DIVISION

Date: January 9, 1979

[signature]

Witness

Recorded in State Record of Water Rights Permits, Volume 16, Page 291.

Permit No. 13904-c76M

EXHIBIT "A"

1. Any final determination of existing water rights as provided by Montana law.

2. The permit shall be subject to Section 89-2926, R.C.M. 1947, which requires that all wells be constructed so that they do not allow water to be wasted, contaminate other water supplies or sources, and that all flowing artesian wells be capped or equipped so that the flow of water may be stopped when not being put to beneficial use.

3. That the final completion of the well include an access port of at least 0.50-inch diameter, located so that the static water level in the well may be accurately measured.

DRAFT
CERTIFICATE OF WATER RIGHT
(FOR PERFECTED PERMIT TO APPROPRIATE WATER)

THIS CERTIFICATE OF WATER RIGHT IS HEREBY ISSUED TO:

ALBERTON, TOWN OF
PO BOX 115
ALBERTON MT 59820

UPON FINDING THAT THE REQUIREMENTS OF SECTION 85-2-315 MCA HAVE BEEN MET.

CERTIFICATE NUMBER: 13904-G76M

PRIORITY DATE: JULY 08, 1977 AT 8:05 A.M.

SOURCE: GROUNDWATER WELL

TOTAL FLOW RATE: 120.00 GPM

TOTAL VOLUME: 161.00 ACRE FEET PER YEAR

DIVERSION POINT: NWNENE SEC. 03 TWP. 14N RGE. 23W MINERAL CO

USE: 120.00 GPM UP TO 161.00 AC-FT (JAN 01 - DEC 31)
FOR MUNICIPAL

PLACE OF USE: S2NENE SEC. 03 TWP. 14N RGE. 23W MINERAL CO
FOR MUNICIPAL

S2NWNW SEC. 02 TWP. 14N RGE. 23W MINERAL CO
FOR MUNICIPAL

N2SWNW SEC. 02 TWP. 14N RGE. 23W MINERAL CO
FOR MUNICIPAL

SENW SEC. 02 TWP. 14N RGE. 23W MINERAL CO
FOR MUNICIPAL

S2SWNE SEC. 02 TWP. 14N RGE. 23W MINERAL CO
FOR MUNICIPAL

N2NWSE SEC. 02 TWP. 14N RGE. 23W MINERAL CO
FOR MUNICIPAL

NWNESE SEC. 02 TWP. 14N RGE. 23W MINERAL CO
FOR MUNICIPAL

DIVERSION MEANS:

** PRIOR RIGHTS:
THIS CERTIFICATE IS SUBJECT TO ALL PRIOR EXISTING WATER RIGHTS IN THE SOURCE OF SUPPLY.

** ASSOCIATED RIGHTS:
THIS CERTIFICATE IS ASSOCIATED WITH WATER RIGHT NO. 76M-W045355.

** TRANSFER OF OWNERSHIP:
UPON A CHANGE IN OWNERSHIP OF ALL OR ANY PORTION OF THIS CERTIFICATE, THE PARTIES TO THE TRANSFER SHALL FILE WITH THE DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION A WATER RIGHT TRANSFER CERTIFICATE, FORM 608, PURSUANT TO SECTION 85-2-424. MCA.

WITNESS ______________________ ADMINISTRATIVE ASST: RONALD J GUSE

DATE: JANUARY 10,1994 WATER RIGHTS BUREAU, WATER RESOURCES DIVISION

Form No. 76-O N10/79

76M-Φ-212962

STATEMENT OF CLAIM FOR EXISTING WATER RIGHTS

OTHER USES

DEPT. NAT. RES. & CONS.

For the Water Courts of the State of Montana NOV 13 12 57 PM '82

HELENA MT 59601

1. Owner of Water Right [illegible] / [illegible] (Last / First / Middle Initial)

Co-Owner or Other Interest Owner ______ / ______ / ______ (Last / First / Middle Initial)

Address [illegible]

City [illegible] State [illegible] Zip Code [illegible]

Home Phone No. [illegible] Business Phone No. NONE

2. Person completing form [illegible] / [illegible] / [illegible] (Last / First / Middle Initial)

Address [illegible]

City [illegible] State [illegible] Zip Code [illegible]

Home Phone No. [illegible] Business Phone No. none

3. Use:
- ☐ Fish Raceways
- ☐ Fish & Wildlife
- ☐ Commercial
- ☐ Industrial
- ☒ Municipal
- ☐ Geothermal
- ☐ Navigation
- ☐ Fire Protection
- ☐ Agricultural Spraying
- ☐ Oil Well Flooding
- ☐ Mining
- ☐ Power Generation
- ☐ Recreation
- ☐ Other

Explain ______

TERMINATED

RECEIVED NOV 17 MONTANA D.N.R.C. MISSOULA FIELD OFFICE

4. Source of Water:
- ☐ Stream Name ______ Tributary of ______
- ☐ Spring
- ☒ Well
- ☐ Lake Name ______ Stream ______ Tributary of ______
- ☐ Reservoir Name ______ Stream ______ Tributary of ______

5. Point of Diversion: County(ies) MINERAL

NW ¼ NE ¼ NE ¼, Section 3, T 14N N/S, R 23W E/W

____ ¼ ____ ¼ ____ ¼, Section ____, T ____ N/S, R ____ E/W

Lot ______, Block ______, Subdivision ______

6. Means of Diversion:
- ☒ Well
- ☐ Pump Capacity 100 gpm
- Headgate with ditch or pipeline
- ☐ Instream use
- ☐ Other Explain ______

7. Means of Conveyance:
- ☐ Ditch
- ☒ Pipeline
- ☐ Instream
- ☐ Other: ______

8. Place of Use: County(ies). ___

☐ Instream ☐ City or Town ☐ Other: Explain ENTIRE TOWN

___ ¼ ___ ¼ ___ ¼, Section 213, T 14 N N/S, R 23 W E/W

___ ¼ ___ ¼ ___ ¼, Section ___, T ___ N/S, R ___ E/W

___ ¼ ___ ¼ ___ ¼, Section ___, T ___ N/S, R ___ E/W

___ ¼ ___ ¼ ___ ¼, Section ___, T ___ N/S, R ___ E/W

___ ¼ ___ ¼ ___ ¼, Section ___, T ___ N/S, R ___ E/W

Lot ___, Block ___, Subdivision ___

9. Flow rate claimed: 100 ☐ cubic feet per second ☒ gallons per minute ☐ miner's inches

10. Volume claimed: 161 acre-feet /annum

11. Period(s) of use: DURING SUMMER MONTHS WHEN DEMAND (IRRIGATION) INCREASES

TERMINATED

12. Check one: ☐ Decreed Water Right
☒ Filed Appropriation Right
☐ Use Water Right

13. Attach copies of the Decree, Record of Filing or Proof of Use Right.

14. Attach copies of aerial photographs, U.S. Geological Survey maps or such other documents necessary to show point of diversion, place of use, place of storage, and conveyance facilities.

15. Notarized Statement signed by claimant.

STATE OF MONTANA)
)ss.
County of Mineral)

I, REGINA MARVIN, having been first duly sworn, depose(s) and say(s) that (he) (she) (they), being of legal age and being the claimant(s) of the foregoing claim of Existing Water Right, and the person(s) whose name(s) is (are) subscribed thereto as the claimant(s), that (he) (she) (they) know(s) the contents of said foregoing claim and that the matters and things therein are true and correct.

R Marvin

Subscribed and sworn before me, this 11th day of November 1980.

T. P. DOOHAN
NOTARY PUBLIC for the State of Montana
Residing at Alberton, Montana 59820
My Commission Expires Sept. 17, 1982

TP Doohan
Notary Public for the State of Montana

Residing at Alberton, mt.

My Commission expires 9/17/82

W045355-76m

Form No. 76-O N10/79

45355 76 M

M1-C

07-019-01-01

$40.00

STATEMENT OF CLAIM FOR EXISTING WATER RIGHTS

OTHER USES

For the Water Courts of the State of Montana

DEPT. NAT RES. & CONS. Nov 13 12 57 PM '80 HELENA MT. 59601

1. Owner of Water Right ALBERTON / TOWN / (Last / First / Middle Initial)

Co-Owner or Other Interest Owner ______ / ______ / ______ (Last / First / Middle Initial)

Address BOX 115

City ALBERTON State MONTANA Zip Code 59820

Home Phone No. 722-4637 (CLERK) Business Phone No. NONE

2. Person completing form MARVIN / REGINA / H. (Last / First / Middle Initial)

Address BOX 246

City ALBERTON State MONTANA Zip Code 59820

Home Phone No. 722-4637 Business Phone No. NONE

3. Use:
- [ ] Fish Raceways
- [ ] Fish & Wildlife
- [ ] Commercial
- [ ] Industrial
- [X] Municipal
- [ ] Geothermal
- [ ] Navigation
- [ ] Fire Protection
- [ ] Agricultural Spraying
- [ ] Oil Well Flooding
- [ ] Mining
- [ ] Power Generation
- [ ] Recreation
- [ ] Other

Explain ______

RECEIVED NOV 17 1980 MONTANA D.N.R.C. MISSOULA FIELD OFFICE

4. Source of Water:
- [ ] Stream Name ______ Tributary of ______
- [X] Spring
- [ ] Well
- [ ] Lake Name ______ Stream ______ Tributary of ______
- [ ] Reservoir Name ______ Stream ______ Tributary of ______

5. Point of Diversion: County(ies) MINERAL

~~NW¼ NE¼ NE¼ Section ___ T ___ N/S, R ___ E/W~~

GOVT. LOT 1 ~~___ Section ___ T 14 N/S, R ___ E/W~~

Lot ___ Block ___ Subdivision ___

6. Means of Diversion:
- [ ] Well
- [ ] Pump Capacity ______ gpm
- [X] Headgate with ditch or pipeline
- [ ] Instream use
- [ ] Other Explain ______

7. Means of Conveyance:
- [ ] Ditch
- [X] Pipeline
- [ ] Instream
- [ ] Other: ______

8. Place of Use: County(ies) Mineral

☐ Instream ☒ City or Town ☐ Other: Explain ENTIRE TOWN

RGM 10-26-81

S ½ NE ¼ NE ¼, Section 2 : 3, T 14 N N/S, R 23 W E/W

S ½ NW ¼ NW ¼, Section 2, T 14 N N/S, R 23 W E/W

N ½ SW ¼ NW ¼, Section 2, T 14 N N/S, R 23 W E/W

— ¼ SE ¼ NW ¼, Section 2, T 14 N N/S, R 23 W E/W

S ½ SW ¼ NE ¼, Section 2, T 14 N N/S, R 23 W E/W

Lot ______, Block ______, Subdivision ______

RGM 10-26-81

9. Flow rate claimed: 50 ☐ cubic feet per second ☒ gallons per minute ☐ miner's inches

RGM 10-26-81

10. Volume claimed: 82 acre-feet

11. Period(s) of use: ALL THE TIME - Jan. 1 to Dec. 31

RGM 10-26-81

12. Check one: ~~☒ Decreed Water Right~~

☐ Filed Appropriation Right

☒ Use Water Right JAN. 30, 1923

RGM 10-26-81

13. Attach copies of the Decree, Record of Filing or Proof of Use Right.

14. Attach copies of aerial photographs, U.S. Geological Survey maps or such other documents necessary to show point of diversion, place of use, place of storage, and conveyance facilities.

15. Notarized Statement signed by claimant.

STATE OF MONTANA)
) ss
County of Mineral)

I, REGINA MARVIN, having been first duly sworn, depose(s) and say(s) that (he) (she) (they), being of legal age and being the claimant(s) of the foregoing claim of Existing Water Right, and the person(s) whose name(s) is (are) subscribed thereto as the claimant(s), that (he) (she) (they) know(s) the contents of said foregoing claim and that the matters and things therein are true and correct.

RM Marvin

Subscribed and sworn before me, this 11th day of November 1980

J.R. Hofman

Residing at Alberton, Montana

My Commission expires 3/17/82

DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
WATER RIGHT LISTING BY OWNER NAME

NOTE: * - VERIFIED WATER RIGHT; G - GALLONS/MIN C - CUBIC FEET/SEC, X - UNNAMED TRIBUTARY TO SOURCE, & - ONLY FIRST POD LISTED

WATER RIGHT		USE	RATE	VOLUME	. POINT OF DIVERSION . QTR	SCTN	SC	TWP	RGE	CN	UT	SOURCE NAME	OWNER NAME		
G76H	C017131-00	DM	30.00 G	4.50	NESENE	30		13N	19W	MS		WELL	AANENSON	JAMES	H
G76H	W045353-00	DM	25.00 G	4.00	NWNESW	19		18N	27W	MI		WELL	AARESTAD	EVERETT	A
S76H	W045354-00	IR	.11 C	11.40		19		18N	27W	MI		CLARK FORK RIVER	AARESTAD	EVERETT	A
G76H	W045353-00	DM	25.00 G	4.00	NWNESW	19		18N	27W	MI		WELL	AARESTAD	LORALEE	L
S76H	W045354-00	IR	.11 C	11.40		19		18N	27W	MI		CLARK FORK RIVER	AARESTAD	LORALEE	L
G76H	C022605-00	DM	3.00 G	1.50	N2NWNWNW	20		15N	21W	MS		WELL	AASENG	DAVID	R
G76H	C022605-00	DM	3.00 G	1.50	N2NWNWNW	20		15N	21W	MS		WELL	AASENG	JOAN	M
G76H	C004487-00	DM	45.00 G		SENWNE	16		13N	19W	MS		WELL (DEPTH - 92 FT)	AASHEIM	EINAR	T
G76H	C004014-00	DM	20.00 G		NESE	33		16N	25W	MI		WELL (DEPTH - 161 FT)	ABBEY	BONNIE	G
G76H	C004014-00	DM	20.00 G		NESE	33		16N	25W	MI		WELL (DEPTH - 161 FT)	ABBEY	DENNIS	R
G76H	C028401-00	DM	30.00 G	1.51	N2	14		15N	22W	MS		WELL (DEPTH - 100 FT)	ABBOTT	MARILYN	A
S76H	W211569-00	IR	48.69 G	33.20	SENE	14		15N	22W	MS		SIXMILE CREEK	ABBOTT	MARILYN	A
S76H	W211570-00	DM	7.41 G	3.00	SENE	14		15N	22W	MS		SIXMILE CREEK	ABBOTT	MARILYN	A
G76H	C068495-00	DM	20.00 G	1.50	NWNWNW	8		14N	22W	MS		WELL (DEPTH - 141 FT)	ABRAHAVAGE	JOSEPH	CV
G76H	C068495-00	DM	20.00 G	1.50	NWNWNW	8		14N	22W	MS		WELL (DEPTH - 141 FT)	ABRAHAVAGE	JUNE	
G76H	C030822-00	CM	15.00 G	1.50	SWNW	11		16N	26W	MI		WELL	ACHESON	ALVIN	R
G76H	C030823-00	DM	15.00 G	1.50	SENW	11		16N	26W	MI		WELL	ACHESON	ALVIN	R
G76H	C030822-00	CM	15.00 G	1.50	SWNW	11		16N	26W	MI		WELL	ACHESON	NANCY	L
G76H	C030823-00	DM	15.00 G	1.50	SENW	11		16N	26W	MI		WELL	ACHESON	NANCY	L
G76H	C003377-00	DM	12.00 G		NE	19		16N	25W	MI		WELL (DEPTH - 250 FT)	ADAMS	FRED	A
G76H	E043978-00	DM	15.00 G	1.50	SENENE	30		13N	19W	MS		WELL	ADAMS	GERALDINE	
G76H	E043978-00	DM	15.00 G	1.50	SENENE	30		13N	19W	MS		WELL	ADAMS	IVAN	C
G76H	E043656-00	DM	20.00 G	1.50	NESW	30		18N	30W	MI		WELL	ADAMS	JAMES	W
G76H	C095129-00	LG	12.00 G	2.25	SWNENE	36		14N	21W	MS		WELL (DEPTH - 119 FT)	ADAMS	MARY JO	
G76H	C095129-00	LG	12.00 G	2.25	SWNENE	36		14N	21W	MS		WELL (DEPTH - 119 FT)	ADAMS	MICHAEL	S
S76H	W133459-00	IR	.20 C	60.00	NENESW	16		19N	30W	MI		TIMBER CREEK	ADERMANN	BONNIE	
S76H	W133459-00	IR	.20 C	60.00	NENESW	16		19N	30W	MI		TIMBER CREEK	ADERMANN	RAYMOND	F
S76H	P038397-00	*IR	25.00 G	7.00	SWSWSE	14		13N	25W	MI		THOMPSON CREEK	ADKISON	GEORGE	B
S76H	P038397-00	*IR	25.00 G	7.00	SWSWSE	14		13N	25W	MI		THOMPSON CREEK	ADKISON	RONALD	B
G76H	C006433-00	DM	20.00 G		NWNE	21		14N	19W	MS		WELL (DEPTH - 72 FT)	ADLER	VIRGIL	D
S76H	P045875-00	DM	15.00 G	6.00	SWSESW	19		13N	22W	MS		BILL CREEK	AHEARN	JACQUELINE	
G76H	C093374-00	LG	15.00 G	3.50	N2NESE	16		14N	20W	MS		WELL (DEPTH - 110 FT)	AILPORT	BARBARA	J
G76H	C093374-00	LG	15.00 G	3.50	N2NESE	16		14N	20W	MS		WELL (DEPTH - 110 FT)	AILPORT	LARRY	G
G76H	C062550-00	IN	4.00 G	1.00	SESWNE	28		14N	20W	MS		WELL (DEPTH - 138 FT)	ALBERT	AUVERNE	V
G76H	C062550-00	IN	4.00 G	1.00	SESWNE	28		14N	20W	MS		WELL (DEPTH - 138 FT)	ALBERT	CHESTER	L
S76H	W105303-00	IR	30.00 G	2.00	NESWNE	32		15N	23W	MI		CLARK FORK RIVER	ALBERT	DENNIS	L
S76H	W105303-00	IR	30.00 G	2.00	NESWNE	32		15N	23W	MI		CLARK FORK RIVER	ALBERT	JODIE	J
S76H	W105303-00	IR	30.00 G	2.00	NESWNE	32		15N	23W	MI		CLARK FORK RIVER	ALBERT	MICHAEL	R
G76H	P013909-00	*MC	120.00 G	161.00	NWNENE	3		14N	23W	MI		WELL (DEPTH - 300 FT)	ALBERTON, TOWN OF		
G76H	W045355-00	MC	50.00 G	80.86	NWNENE	3		14N	23W	MI	X	CLARK FORK RIVER	ALBERTON, TOWN OF		
G76H	D212962-00	MC			NWNENE	3		14N	23W	MI		WELL	ALBERTON, TOWN OF		
G76H	E070417-00	DM	10.00 G	1.50	NESWNW	21		14N	19W	MS		WELL (DEPTH - 28 FT)	ALBINI	FRANK	A
G76H	E070417-00	DM	10.00 G	1.50	NESWNW	21		14N	19W	MS		WELL (DEPTH - 28 FT)	ALBINI	GINA	L
S76H	W104574-00	IR	22.00 G	11.28	SESWNW	11		13N	19W	MS		RATTLESNAKE CREEK	ALDERSON	RICHARD	L
G76H	C020579-00	DM	25.00 G	1.50	E2SE	24		18N	28W	MI		WELL (DEPTH - 51 FT)	ALEXANDER	IDA	M
G76H	C057742-00	DM	15.00 G	1.50	E2SE	24		18N	28W	MI		WELL (DEPTH - 60 FT)	ALEXANDER	IDA	M
G76H	C020579-00	DM	25.00 G	1.50	E2SE	24		18N	28W	MI		WELL (DEPTH - 51 FT)	ALEXANDER	J	L
G76H	C057742-00	DM	15.00 G	1.50	E2SE	24		18N	28W	MI		WELL (DEPTH - 60 FT)	ALEXANDER	JUNE	
S[illegible]	W012712-00	ST			NESENW	35		15N	21W	[illegible]		MILL CREEK	ALEXANDER	MALVIN	T
	W012713-00	IR	3.00 C	900.00	NESENW	35		15N	21W			MILL CREEK	ALEXANDER	MALVIN	T
S76H	W012714-00	ST			NWNWSE	25		15N	21W	[illegible]		MILL CREEK	ALEXANDER	MALVIN	T

Town of Alberton

Water Usage Rates

Usage	Flat Usage Rate
Below 3000 gallons	$ 3.47
3001-10,000 gallons	$13.47
10,001- 30,000 gallons	$18.47
30,001- 50,000 gallons	$28.47
50,001 - 55,000 gallons	$38.47
55,001 + gallons	$2.00 per 1,000 gallons

Example of New Rate (¾ inch)

Below 3000
Base rate 8.37 + 3.47 water = 11.84 + 47.41 = $59.25

3001-10,000
Base rate 8.37 + 13.47 water = 21.84 + 47.41 = $69.25

10,001- 30,000
Base rate 8.37 + 18.47 water = 26.84 + 47.41 = $74.25

30,001- 50,000
Base rate 8.37 + 28.47 water = 36.84 + 47.41 = $84.25

50,001 – 55,000
Base rate 8.37 + 38.47 water = 46.84 + 47.41 = $94.25

$2.00 per 1,000 gallons over 55,000

Vacant home rate
Base water rate 8.37 + 33.23 (sewer basic rate) = $41.60

For further information contact:
Alberton Town Office
722-3404

This is effective August 1, 2014

APPENDIX D

WATER TANK

Independent INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
406-465-3742 • jsn.fowler@gmail.com
1063 Sunny Vista Rd., Helena, MT 59602

SUPPLEMENTAL REPORT
ALBERTON 300KG
MAY 10, 2019

The Alberton 300kg Steel on grade appears to be in overall satisfactory condition. From the exterior working to inside the tank, I observed graffiti on the walls of the tank and the exterior roof top. I noticed cameras have been installed to combat the trespassing as well as a vandal guard and the exterior ladder has been cutoff higher to deter access to the top of the tank. The pump house was adequately locked along with the vandal guard and the access hatch. I am told a perimeter fence is in the works to help ensure security.

The tank itself shows signs of chalking with the exterior coating as well as growth occurring on the upper ring panels. The air vent has a large mesh screen in place but recommend the #10 mesh in addition to keep out insects and such. I notice the overflow had been modified and raised almost to the roof of the tank and was currently overflowing as it does every spring. The interior roof area shows an estimated 40% coverage of surface corrosion. All beams and the one column are in place with no deformations of any kind. The walls of the tank showed minor corrosion with only a pinhole or 2 detected.

The floor of the tank has ¾ of an inch of silt and pieces of debris, around the inlet is a 12 inch pile of sand. I recommend cleaning the tank to ensure top water quality and to be able to observe the floor and determine the condition. All parts and pieces are in place and in good working order.

RECOMMENDATIONS

- ADD ADDITIONAL #10 SCREEN ON AIR VENT
- CLEAN OUT SEDIMENT ON BOTTOM OF TANK
- INSPECT EVERY 3-5 YEARS

Independent INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
406-465-3742 • jsn.fowler@gmail.com
1063 Sunny Vista Rd., Helena, MT 59602

General Inspection Form

Date: May 10, 2019 Tank Name: ALBERTON Gallons: 300KG

Utility: TOWN OF ALBERTON City: ALBERTON State: Montana

Components	Number	Good/Fair/Poor	Discrepancies	Recommendation
Access Hatches	**1**	**GOOD**	**GOOD**	**NONE**
Ladder(s) Safety climb system	**0**	**NONE**	**NONE**	**NONE**
Man ways / cleanouts hatches	**1**	**GOOD**	**NONE**	**NONE**
Interior walls	**1**	**GOOD**	**CORROSION ABOVE WATERLIND**	**MONITOR**
Interior columns	**1**	**GOOD**	**NONE**	**NONE**
Interior roof	**1**	**FAIR**	**PANELS %40 SURFACE CORROSION**	**MONITOR**
Air vent	**1**	**GOOD**	**NONE**	**#10 SCREEN**
Overflow	**1**	**GOOD**	**NONE**	**NONE**
Inlet/Outlet	**1**	**GOOD**	**SAND PILE**	**RECOMMEND CLEANING**
Exterior roof	**1**	**FAIR**	**CHALKING**	**NONE**
Exterior walls	**1**	**FAIR**	**CHALKING**	**NONE**
Antennas	**0**	**N/A**	**N/A**	**NONE**
Aviation lights	**0**	**N/A**	**N/A**	**NONE**
Balconies/ Rail	**0**	**N/A**	**NONE**	**NONE**
Estimated amount of sediment and type	**1 INCH OF SILT AND DEBRIS**	**N/A**	**N/A**	**RECOMMEND CLEANING**
Interior floor if visible	**1**	**CANNOT EVALUATE**	**N/A**	**RECOMMEND CLEANING**
Pump house	**1**	**GOOD**	**N/A**	**N/A**
Other observations	**1**	**OVER FLOW MODIFIED**	**IN SPRING TIME IT OVERFLOWS CONSTANTLY**	
Foundation/ Ground Subsidence	**1**	**GOOD**	**NONE**	**NONE**

* Any areas marked as poor have a corresponding picture to that component to help monitor the rate of deterioration.

Notes: RECOMMEND CLEANING. WOULD BE GOOD TO CLEAN OUT ORGANICS AND OBSERVE CONDITION OF THE FLOOR

Independent INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
406-465-3742 • jsn.fowler@gmail.com
1063 Sunny Vista Rd., Helena, MT 59602

SANITATION SURVEY
MAY 10 2019

ALBERTON WATER DISTRICT 300KG WELDED STEEL ON-GRADE

Components	Number	Good/Fair/Poor	Sealed or Screen	Comments
Air Vents/Screen	**1**	**GOOD**	**LARGE MESH SCREEN IN PLACE**	**RECOMMEND # 10 SCREEN AS WELL**
Cathodic Covers	**0**	**N/A**	**N/A**	**NONE**
Over Flow/Screen	**0**	**N/A**	**PLUMBED UNDERGROUND**	**NONE**
Hatch & lid lip	**1**	**GOOD**	**GASKET INSTALLED**	**NONE**
Telemetry Penetrations	**0**	**N/A**	**N/A**	**NONE**
Man Ways	**1**	**GOOD**	**SEALED**	**DAVIT ARM**
Miscellaneous Penetrations	**0**	**N/A**	**N/A**	**NONE**
Waters hue	**CLEAR**			

SAFETY AND SECURITY

Components	Condition	Secure	Size / Dimension	Comments
Internal Ladder	**N/A**	**N/A**	**N/A**	**NONE**
External Ladder	**GOOD**	**YES**	**STANDARD**	**NONE**
Hatches	**GOOD**	**PADLOCKED**	**24X24**	**NONE**
Man Ways	**GOOD**	**YES**	**DOGGED**	**NONE**
Balcony / Railing	**NONE**	**N/A**	**N/A**	**NONE**
Vandal Guard	**GOOD**	**YES**	**N/A**	**NONE**
Perimeter Fence	**NONE**	**N/A**	**N/A**	**NONE**
Security Camera’s	**GOOD**	**YES**	**N/A**	**3 PLUS CAMERA’S**
Light fixtures	**NONE**	**N/A**	**N/A**	**NONE**
Safety Climb system	**NONE**	**N/A**	**N/A**	**NONE**
Pump house	**GOOD**	**YES**	**N/A**	**NONE**
Signs of Trespass	**YES**			**GRAFFITE ALL AROUND BASE AND ON TOP**


5/10/2019 10:50:11 AM
H: 006.3 °
D: 0.75 ft
Temp: 47.3 °F


5/10/2019 10:53:35 AM
H: 209.7 °
D: 0.42 ft
Temp: 48.5 °F


5/10/2019 10:55:05 AM
H: 097.3 °
D: 0.39 ft
Temp: 49.0 °F


5/10/2019 11:00:53 AM
H: 060.9 °
D: 26.80 ft
Temp: 50.5 °F


5/31/2019 11:06:07 AM
H: 233.3 °
D: 23.21 ft
Temp: 55.1 °F

APPENDIX E

ENVIRONMENTAL REVIEW

UNIFORM ENVIRONMENTAL CHECKLIST

For Town of Alberton, Montana

For PROPOSED WATER IMPROVEMENTS PROJECT

MONTANA
MARCUS J. GOLZ
10195PE
LICENSED PROFESSIONAL ENGINEER

As the engineer that prepared the preliminary engineering report, I, Marc Golz, P.E. Anderson-Montgomery Consulting Engineers, have reviewed the information presented below and believe that it accurately identifies the environmental resources in the area and the potential impacts that the project could have on those resources.

Key Letter: N – No Impact/Not Applicable **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

PHYSICAL ENVIRONMENT	
Key **N**	**1. Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil lump, steep slopes, subsidence, seismic activity)** *Comments and Source of Information*: **The distribution work and spring rehabilitation activities will take place in previously-disturbed areas within existing infrastructure footprints. It is not anticipated that the proposed activities will adversely impact or be adversely impacted by local soil characteristics.**
Key **M**	**2. Hazardous Facilities (e.g., power lines, hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks)** *Comments and Source of Information*: **Contaminated soils are not anticipated to be encountered in the excavation needed for the proposed project. However, limited sections of Transite pipe (asbestos cement) will need to be removed where new watermain intersects existing. AC pipe will be mitigated and removed where necessary but the vast majority of Transite will be abandoned in place. Specifications will require the general contractor to hire an asbestos handling firm when removing AC to avoid NESHAPS violations.**
Key **M**	**3. Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions)** *Comments and Source of Information*: **During construction there will likely be a limited generation of dust and heavy equipment exhaust. However, it is not expected that the project will result in any long-term adverse effects on surrounding air quality.**
Key **B**	**4. Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers)** *Comments and Source of Information*: **The proposed project will involve rehabilitating the spring and there may be short term impact to shallow groundwater. No long term adverse impacts will result. Installation of distribution mains may also impact shallow groundwater indirectly and temporarily. Again no long term adverse impacts are expected.**

Key **M**	**5. Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals)** *Comments and Source of Information*: **Short term surface water runoff may occur during construction and therefore appropriate storm water and sediment control measures, including recommended best management practices will be required of the contractor. A storm water pollution prevention plan will be required and a Construction General Permit may be required.**
Key **N**	**6. Floodplains & Floodplain Management (Identify any floodplains within one mile of the boundary of the project.)** *Comments and Source of Information*: **The Town of Alberton is on a high bench above the Clark Fork River and out of the floodplain. DNRC was contacted and verified this information. Correspondence from DNRC is included in Appendix E of the preliminary engineering report.**
Key **M**	**7. Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.)** *Comments and Source of Information*: **A review of the planning area and Montana Natural Heritage Data and Wetland Mapping shows a small area of Riparian Scrub-Shrub, Riparian Emergent and Riparian Forested east of Town and well outside the project boundary exists in the planning area. Also, the spring area is a Freshwater Forested/Shrub Wetland, but is already developed as the Town's water source. Contractor will be improving the spring source and required to protect the surrounding Forested/Shrub Wetland when rehabilitation work occurs.**
Key **N**	**8. Agricultural Lands, Production & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.)** *Comments and Source of Information*: **There are no significant agricultural lands in the project planning area.**
Key **N**	**9. Vegetation & Wildlife Species & Habitats, Including Fish (e.g., terrestrial, avian and aquatic life and habitats)** *Comments and Source of Information*: **The area is mountainous and surrounded by wildlands. Many species exist in the surrounding area, including species of concern. However, the proposed project will occur in the existing footprint of already developed areas. No adverse impacts are anticipated to flora or fauna in the planning area.**

Key	
N	**10. Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish or wildlife)** *Comments and Source of Information:* **No known unique, endangered, fragile or limited environmental resources exist in the project area. Many species exist in the surrounding area because that area is mountainous wildlands. These resources may include species of concern. However, the proposed project will occur within the existing developed footprint of the Town and the Town's spring. Therefore, no significant adverse impacts to these resources**
Key N	**11. Unique Natural Features (e.g., geologic features)** *Comments and Source of Information*: **No designated unique natural features exist in the project area, thus no long-term, adverse impacts are anticipated.**

Key	
N	**12. Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways, and Public Open Space** *Comments and Source of Information*: **The Town of Alberton exists within a surrounding recreational area. Short term disruption within the Town will occur but it will not be significant. No adverse impacts to the surrounding recreational, wildlands, public lands or waterways are anticipated.**

HUMAN POPULATION	
Key N	1. **Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics** *Comments and Source of Information*: **No long-term, adverse impacts anticipated. The project does not include new permanent surface structures.**
Key N	2. **Nuisances (e.g., glare, fumes)** *Comments and Source of Information*: **No long-term, adverse impacts anticipated.**
Key M	3. **Noise -- suitable separation between housing & other noise sensitive activities and major noise sources (aircraft, highways & railroads.)** *Comments and Source of Information*: **Some noise is expected during construction activities, which will be mitigated to the greatest extent possible. However, no long-term, adverse impacts are anticipated.**
Key N	4. **Historic Properties, Cultural, and Archaeological Resources** *Comments and Source of Information*: **The State Historical Preservation Office was contacted during project planning for input on potential impacts to cultural resources. If cultural materials are discovered or historical structures need to be altered during construction, state officials will be consulted.**
Key N	5. **Changes in Demographic (Population) Characteristics (e.g., quantity, distribution, density)** *Comments and Source of Information*: **The project area is, for the most part, fully developed and it is not expected that it will result in any significant changes to community demographics, distribution or densities.**
Key B	6. **General Housing Conditions - Quality, Quantity, Affordability** *Comments and Source of Information*: **Improving the distribution capacity of the Town's drinking water system and rehabilitating the spring as the main source of water is intended to be a general improvement in water quality and should be a benefit to the households in the community. Affordability of housing is likely to be unaffected by the project. It may enhance property values.**

Key N	7. **Displacement or Relocation of Businesses or Residents** *Comments and Source of Information*: **No long-term, adverse impacts anticipated.**
Key B	8. **Public Health and Safety** *Comments and Source of Information*: **The proposed improvements are intended to improve the public health and safety of the drinking water system by improving the primary water source and by improving the distribution pipeline capacities to improve water delivery for domestic use and firefighting demand.**
Key N	9. **Local Employment & Income Patterns - Quantity and Distribution of Employment, Economic Impact** *Comments and Source of Information*: **Employment and income are likely to be unaffected by the proposed project. Some temporary construction jobs may be available to residents during construction. No long-term, adverse impacts anticipated.**
Key N	10. **Local & State Tax Base & Revenues** *Comments and Source of Information*: **Unaffected by the project. No long-term, adverse impacts anticipated.**
Key N	11. **Educational Facilities - Schools, Colleges, Universities** *Comments and Source of Information*: **Fire protection in the school zones will be improved. Sprinklers should still be installed in the schools, but that is beyond the scope of the project. No long-term, adverse impacts anticipated.**
Key B	12. **Commercial and Industrial Facilities - Production & Activity, Growth or Decline** *Comments and Source of Information*: **Commercial facilities will benefit from an improved drinking water system as well as the residential areas. No long-term, adverse impacts are anticipated.**
Key N	13. **Health Care – Medical Services** *Comments and Source of Information*: **Health care will not be directly affected by the proposed project, but should also benefit from an improved drinking water system. No long-term, adverse impacts anticipated.**
Key N	14. **Social Services – Governmental Services (e.g., demand on)** *Comments and Source of Information*: **The proposed project should not affect social services. No long-term adverse impacts anticipated.**

Key **N**	**15. Social Structures & Mores (Standards of Social Conduct/Social Conventions)** *Comments and Source of Information*: **No long-term impacts anticipated.**
Key **N**	**16. Land Use Compatibility (e.g., growth, land use change, development activity)** *Comments and Source of Information*: **No long-term impacts anticipated.**
Key **B**	**17. Energy Resources - Consumption and Conservation** *Comments and Source of Information*: **Construction of the proposed project will utilize fuel and electrical energy during construction, but long term operation of the project will produce no-significant changes in energy consumption. A small amount of energy conservation may occur as a result of the distribution system improvements resulting in more efficient distribution of water and less leakage of water.**
Key **N**	**18. Solid Waste Management** *Comments and Source of Information*: **The proposed project may generate solid waste during removal and replacement of distribution pipes and associated appurtenances. These will have to be sold as salvage or disposed of by the contractor. No long-term, adverse impacts are anticipated.**
Key **N**	**19. Wastewater Treatment - Sewage System** *Comments and Source of Information*: **The proposed project should have no effect on the wastewater system. No adverse impact is anticipated.**
Key **M**	**20. Storm Water – Surface Drainage** *Comments and Source of Information*: **Short term surface water runoff may occur during construction and therefore appropriate storm water and sediment control measures, including recommended best management practices will be required of the contractor. A storm water pollution prevention plan will be required and a Construction General Permit may be required. This is not expected to be a significant impact.**
Key **B**	**21. Community Water Supply** *Comments and Source of Information*: **Rehabilitating the spring and replacing aging and undersized mains in the distribution system should be a large benefit to the community drinking water supply.**
Key **N**	**22. Public Safety – Police** *Comments and Source of Information*: **No long-term, adverse impacts are anticipated.**

Key **B**	**23. Fire Protection – Hazards** *Comments and Source of Information*: **The proposed project is intended to replace water supply pipes (mains) that are much too small to convey adequate fire protection in the community. Long-term this is meant to be a beneficial impact.**
Key **N**	**24. Emergency Medical Services** *Comments and Source of Information*: **No long-term, adverse impacts are anticipated.**
Key **B**	**25. Parks, Playgrounds, & Open Space** *Comments and Source of Information*: **Parks, playgrounds and open space that utilize water from the public water system should benefit from the improved water system.**
Key **N**	**26. Cultural Facilities, Cultural Uniqueness & Diversity** *Comments and Source of Information*: **No long-term, adverse impacts are anticipated.**
Key **M**	**27. Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones)** *Comments and Source of Information*: **During construction short term disruption to traffic flow in limited parts of town will occur. Contractor will be required to use appropriate signage to re-route traffic and protect excavations. No long-term, adverse impacts are anticipated.**
Key **N**	**28. Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)** *Comments and Source of Information*: **No long-term, adverse impacts are anticipated.**
Key **N**	**29. Is There a Regulatory Action on Private Property Rights as a Result of this Project? (consider options that reduce, minimize, or eliminate the regulation of private property rights.)** *Comments and Source of Information*: **None known. No adverse impacts related to private property rights are anticipated.**

March 12, 2020

Damon Murdo, Cultural Records Mgr.
Montana Historical Society
1301 East Lockey Avenue
P.O. Box 201202
Helena MT 59620

RE: Alberton Water System Improvements Project – Mineral County

Dear Mr. Murdo,

Town of Alberton, Montana, located 30 miles northwest of Missoula, is planning for improvements to its community drinking water system. Potential projects considered for implementation include improvements to the Town's drinking water distribution system and drinking water storage tank. Legal location of the proposed improvements is T14N R23W S02, S03 & S34.

The water system improvements will occur within the existing footprint of the existing system on lands owned by the Town of Alberton. Improvements being considered are upgrading the existing distribution system and upgrading the water storage tank. No new ground will be disturbed and no growth is being planned or will occur as a result of this project. **Figure 2.1**, attached, shows the planning area for this study and the general location of proposed improvements.

The success of this project is dependent upon receiving comments from applicable state and federal agencies. Therefore, we would greatly appreciate any comments you might have on this project regarding known or potential historical, archeological, cultural, or environmental resources.

Thank you for your help. Please call me at 449-3303 if you have any questions. Comments can be directed to me at 1064 N. Warren Street, Helena, MT 59601.

Sincerely,

Marc Golz, P.E.
Anderson-Montgomery Consulting Engineers

Attachment: Figure 2.1 Main Planning Area

Other Addresses:

Rebecca Harbage, MEPA Manager
Montana DEQ
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

Lauri Hanauska-Brown, Nongame/T&E Section Manager
Montana Department FWP
PO Box 200701
Helena, MT 59620

Steve Story, Bureau Chief, Water Operations Bureau
Montana DNRC
1424 9th Avenue
Helena, MT 59620-1601

Sage Joyce - MT Program Manager
U.S. Army Corps of Engineers
10 W. 15th St. Suite 2200
Helena, MT 59626

Jodi Bush, Field Supervisor
U.S. Fish and Wildlife Service
Montana Ecological Services Field Office
585 Shepard Way, Suite 1
Helena, MT 59601

A message from your site visitor Larry Schock, MT DNRC Inbox ×

noreply@a-mce.com

to me

Tue, Apr 7, 10:37 AM (13 days ago)

Visitor: Larry Schock, MT DNRC Email Address: lschock@mt.gov Phone Number: 406-360-1632 Message: TO: Marc Golz RE: Alberton Water System Improvement Project - Mineral County. The DNRC has no comments regarding this project concerning FEMA regulatory floodplains. The project area appears to be outside of the floodplain, The DNRC does have a reminder regarding water rights. Please insure that the current system has valid water rights. If there is no valid water right then one should be obtained prior to moving forward with this project. Please insure that a valid water right will be obtained prior to any additional usage above and beyond the current water right. Please contact me if you have any additional questions.

From: **Martin, Jacob** jacob_martin@fws.gov
Subject: Alberton Water System Improvements Project - Mineral County, MT
Date: April 14, 2020 at 8:31 AM
To: marc@a-mce.com

JM

Dear Mr. Golz:

Thank you for your March 12, 2020, letter requesting U.S. Fish and Wildlife Service comment on the proposed subject project.

This email represents our official response to your inquiry for your records.

The U.S. Fish and Wildlife Service reviewed the project description and has no comments regarding federally-listed or proposed threatened or endangered species or other trust species. Additional information on specific locations may be obtained using the IPaC project-planning tool at https://ecos.fws.gov/ipac/.

Thank you for the opportunity to comment. If you have any questions or comments about this correspondence please contact me via email or at the address below.

Sincerely,

Jacob M. (Jake) Martin
Assistant Field Supervisor
Montana Ecological Services Office
585 Shephard Way, Suite 1
Helena, Montana 59601
(406) 449-5225x215
jacob_martin@fws.gov

Big Sky. Big Land. Big History.
Montana
Historical Society

Historic Preservation
Museum
Outreach & Interpretation
Publications
Research Center

March 18, 2020

Marc Golz
Anderson-Montgomery
1064 N. Warren
Helena MT 59601

RE: ALBERTON WATER SYSTEM IMPROVEMENTS PROJECT. SHPO Project #:2020031805

Dear Mr. Golz:

I have conducted a cultural resource file search for the above-cited project located in Sections 2, 3, T14N R23W, and Section 34, T15N R23W. According to our records there have been a few previously recorded sites within the designated search locales. In addition to the sites there have been a few previously conducted cultural resource inventories done in the areas. I've attached a list of these sites and reports. If you would like any further information regarding these sites or reports, you may contact me at the number listed below.

It is SHPO's position that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are to be altered and are over fifty years old, we would recommend that they be recorded, and a determination of their eligibility be made prior to any disturbance taking place.

As long as the project will be occurring within previously disturbed ground and there will be no disturbance or alteration to structures over fifty years of age, we feel that there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should the projects need to occur within previously undisturbed ground, if structures need to be altered, or if cultural materials be inadvertently discovered during this project, we would ask that our office be contacted, and the site investigated.

If you have any further questions or comments, you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office

File: DEQ/AWWM/2020

225 North Roberts Street
P.O. Box 201201
Helena, MT 59620-1201
(406) 444-2694
(406) 444-2696 FAX
montanahistoricalsociety.org

Big Sky. Big Land. Big History.
Montana Historical Society

FILE SEARCH INVOICE

Montana State Historic Preservation Office
1301 E. Lockey Ave, PO Box 201202
Helena, MT 59620-1202
(406)444-7715
montanahistoricalsociety.org

DATE: 18-Mar-20

SHPO Invoice #: 2020031805

Bill To:

Contact Name:	Marc Golz
Organization:	Anderson-Montgomery
Address:	1064 N. Warren
City/State/Zip:	Helena MT 59601

Project Name:	ALBERTON WATER SYSTEM IMPROVEMENTS PROJECT

File Search Fee Structure
$25 / Section

For questions contact:
Damon Murdo
dmurdo@mt.gov
406-444-7767

Total Cost:	**$75.00**

Total sections searched for SHPO Project #: 2020031805	**3**

Please make all checks payable to:
Montana Historical Society
PO Box 201201
Helena, MT 59620

PAY ONLINE HERE

Due upon receipt. Please pay within 30 days.

STATE HISTORIC PRESERVATION OFFICE
Montana Cultural Resource Database
CRABS Township,Range,Section Results
Report Date:3/18/2020

Township:15 N Range:23 W Section: 34

MCLEOD C. MILO

9/9/1981 BESTWICK CREEK ROAD USE PERMIT

CRABS Document Number: MN 1 5932 Agency Document Number: 81-LL-4-23

Township:14 N Range:23 W Section: 2

WILLIAMS GARY D.

1/25/1980 CULTURAL RESOURCES SURVEY, MONTANA DEPT. OF HIGHWAYS PROJECT RS 507-1(1) ALBERTON-SOUTH

CRABS Document Number: MO 4 6160 Agency Document Number: RS507-1(1)

Township:14 N Range:23 W Section: 3

WHISENNAND KRISTIN L., ET AL.

2/25/1998 LOLO NATIONAL FOREST ANNUAL REPORT 1997 PROGRAMMATIC AGREEMENT REGARDING CULTURAL RESOURCE MANAGEMENT ON NATIONAL FORESTS IN THE STATE OF MONTANA

CRABS Document Number: ZZ 1 20165 Agency Document Number: 97-LC-01

Township:14 N Range:23 W Section: 2

WOOD GARVEY C.

6/1/1998 ALBERTON WASTEWATER IMPROVEMENTS

CRABS Document Number: MN 6 20285 Agency Document Number:

Township:14 N Range:23 W Section: 3

WOOD GARVEY C.

6/1/1998 ALBERTON WASTEWATER IMPROVEMENTS

CRABS Document Number: MN 6 20285 Agency Document Number:

Township:14 N Range:23 W Section: 2

GREISER T. WEBER, ET AL.

11/1/2000 RESULTS OF A CULTURAL RESOURCES INVENTORY FOR THE TOUCH AMERICA/AT & T FIBER OPTIC CABLE ROUTE BETWEEN BILLINGS AND LOOKOUT PASS IN MONTANA

CRABS Document Number: ZZ 6 23275 Agency Document Number:

Township:14 N Range:23 W Section: 3

GREISER T. WEBER, ET AL.

11/1/2000 RESULTS OF A CULTURAL RESOURCES INVENTORY FOR THE TOUCH AMERICA/AT & T FIBER OPTIC CABLE ROUTE BETWEEN BILLINGS AND LOOKOUT PASS IN MONTANA

CRABS Document Number: ZZ 6 23275 Agency Document Number:

Township:15 N Range:23 W Section: 34

GREISER T. WEBER, ET AL.

11/1/2000 RESULTS OF A CULTURAL RESOURCES INVENTORY FOR THE TOUCH AMERICA/AT & T FIBER OPTIC CABLE ROUTE BETWEEN BILLINGS AND LOOKOUT PASS IN MONTANA

CRABS Document Number: ZZ 6 23275 Agency Document Number:

Township:14 N Range:23 W Section: 2

STARK WILLIAM E.

5/1/2012 MT5 ALBERTON ARCHITECTURAL HISTORY EFFECTS INVESTIGATION, ADAMS STREET, ALBERTON, MINERAL COUNTY, MONTANA

CRABS Document Number: MN 6 33653 Agency Document Number:

Township:14 N Range:23 W Section: 3

STARK WILLIAM E.

5/1/2012 MT5 ALBERTON ARCHITECTURAL HISTORY EFFECTS INVESTIGATION, ADAMS STREET, ALBERTON, MINERAL COUNTY, MONTANA

CRABS Document Number: MN 6 33653 Agency Document Number:

Township:14 N Range:23 W Section: 2

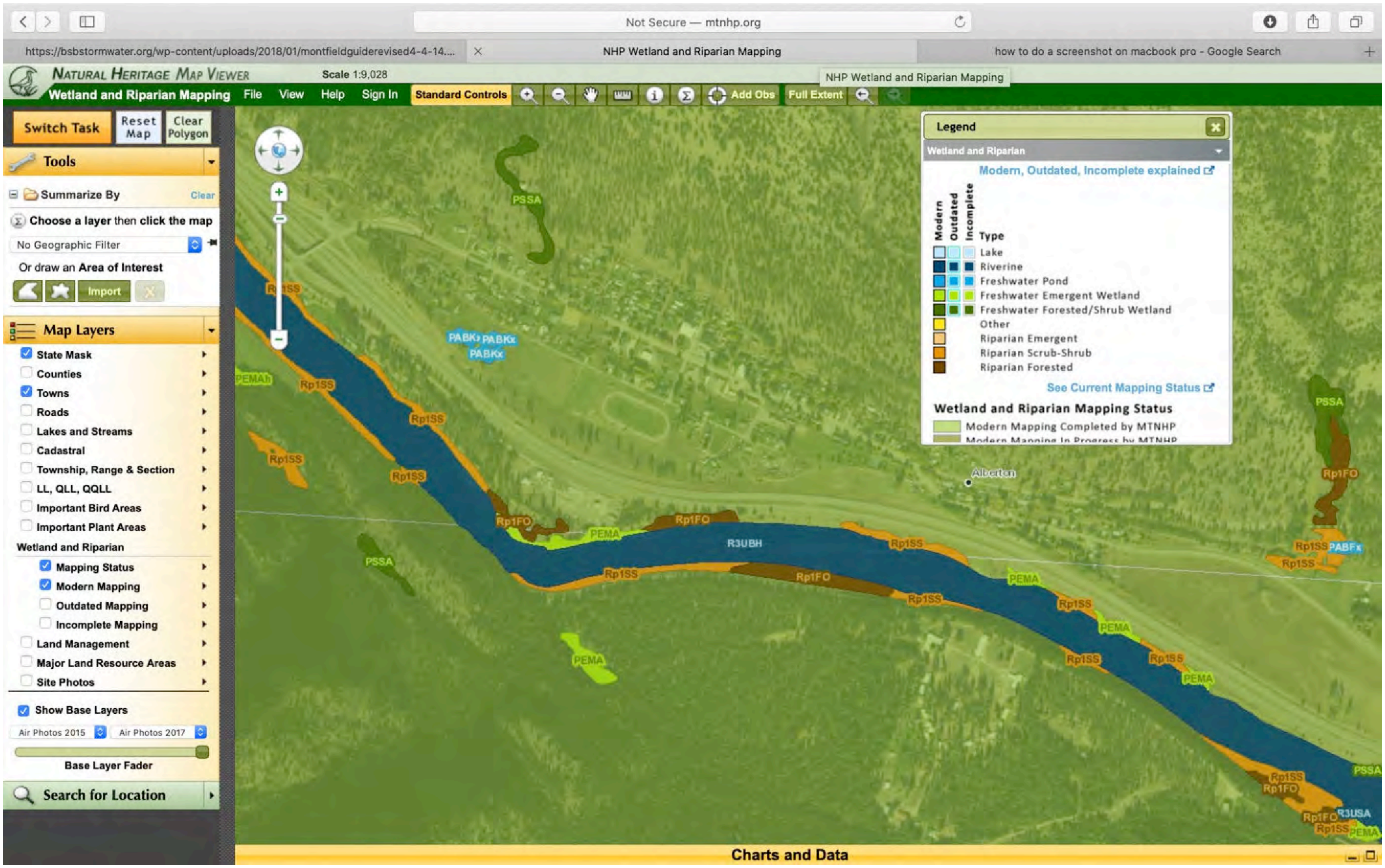
PAYETTE JACQUIE

9/24/2009 CULTURAL RESOURCES REPORT: MT-05 ALBERTON - DIV PROPOSED TELECOMMUNICATIONS TOWER, ALBERTON, MISSOULA COUNTY, MONTANA

CRABS Document Number: MO 6 34011 Agency Document Number:

STATE HISTORIC PRESERVATION OFFICE
Cultural Resource Information Systems
CRIS Township, Range, Section Report
Report Date:3/18/2020

Site #	Twp	Rng	Sec	Qs	Site Type 1	Site Type 2	Time Period	Owner	NR Status
24MN0357	14N	23W	2	NW	JJ		No Indication of Time		Undetermined*
24MN0164	14N	23W	3	Comb	Historic Railroad		Historic More Than One Decade	Private	Eligible
24MN0164	14N	23W	2	Comb	Historic Railroad		Historic More Than One Decade	Private	Eligible
24MN0164	15N	23W	34	Comb	Historic Railroad		Historic More Than One Decade	Private	Eligible
24MN0180	14N	23W	2	NW	Historic Architecture		1910-1919	Private	Undetermined*
24MN0269	14N	23W	2	NW	Historic School		Historic More Than One Decade	Other	NR Listed
24MN0270	14N	23W	2	NW	Historic Architecture		Historic More Than One Decade	Private	NR Listed
24MN0271	14N	23W	2	NW	Historic Architecture		Historic More Than One Decade	Private	NR Listed
24MN0272	14N	23W	2	NW	Historic Architecture		Historic More Than One Decade	Private	NR Listed
24MN0273	14N	23W	2	NW	Historic Architecture		Historic More Than One Decade	Private	NR Listed
24MN0274	14N	23W	2	NW	Historic Architecture		Historic More Than One Decade	State Owned	NR Listed
24MN0275	14N	23W	2	NW	Historic Architecture		Historic More Than One Decade	Private	NR Listed
24MN0276	14N	23W	2	NE	Historic Architecture		Historic More Than One Decade	Private	NR Listed
24MN1061	14N	23W	3	NE	Lithic Material Concentration		No Data	Private	Undetermined*
24MN1077	14N	23W	2		Lithic Material Concentration		No Data	MDOT	Undetermined*
24MN1082	15N	23W	34	SW	Lithic Material Concentration		No Data	Private	Undetermined*
24MO0450	15N	23W	34		Historic Railroad		Historic More Than One Decade	Private	Eligible
24MO0450	14N	23W	2		Historic Railroad		Historic More Than One Decade	Private	Eligible
24MO0450	14N	23W	3		Historic Railroad		Historic More Than One Decade	Private	Eligible
24MO0509	14N	23W	3	SW	Lithic Material Concentration		Prehistoric Late Period	Other	Undetermined*



Not Secure — mtnhp.org
NHP Wetland and Riparian Mapping
how to do a screenshot on macbook pro - Google Search
Natural Heritage Map Viewer
Scale 1:9,028
Wetland and Riparian Mapping
File
View
Help
Sign In
Standard Controls
Add Obs
Full Extent
Switch Task
Reset Map
Clear Polygon
Tools
Summarize By
Clear
Choose a layer then click the map
No Geographic Filter
Or draw an Area of Interest
Import
Map Layers
State Mask
Counties
Towns
Roads
Lakes and Streams
Cadastral
Township, Range & Section
LL, QLL, QQLL
Important Bird Areas
Important Plant Areas
Wetland and Riparian
Mapping Status
Modern Mapping
Outdated Mapping
Incomplete Mapping
Land Management
Major Land Resource Areas
Site Photos
Show Base Layers
Air Photos 2015
Air Photos 2017
Base Layer Fader
Search for Location
Legend
Wetland and Riparian
Modern, Outdated, Incomplete explained
Modern
Outdated
Incomplete
Type
Lake
Riverine
Freshwater Pond
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Other
Riparian Emergent
Riparian Scrub-Shrub
Riparian Forested
See Current Mapping Status
Wetland and Riparian Mapping Status
Modern Mapping Completed by MTNHP
PSSA
Rp1SS
PABKx
PEMA
Rp1FO
R3UBH
Alberton
PABFx
R3USA
Charts and Data

APPENDIX F

ALBERTON FINANCIALS

TOWN OF ALBERTON
Income Statement
For the Accounting Period: 4 / 20

5210 WATER UTILITY

Account	Object	Description	Current Month	Current YTD	Budget	Variance	%
			Current Year				
Revenue							
343020		Water Revenues	3,374.44	34,864.18	55,500.00	-20,635.82	63
343024		Sales of Water Materials & Supplies			500.00	-500.00	
343025		Water Permits			100.00	-100.00	
343026		Water Installation Charges			100.00	-100.00	
343027		Miscellaneous Water Revenue			100.00	-100.00	
							62
		Total Revenue	**3,374.44**	**34,864.18**	**56,300.00**	**-21,435.82**	**62**
Expenses							
411100		Legal Services					
	300	Purchased Services			500.00	500.00	
		Total Account			**500.00**	**500.00**	
430510		Water Administration					
	110	Salaries and Wages	974.93	13,032.23	18,500.00	5,467.77	70
	140	Employer Contributions	78.52	863.76	1,200.00	336.24	72
	210	Office Supplies and Materials		345.76	1,500.00	1,154.24	23
	220	Operating Supplies	40.95	830.36	7,500.00	6,669.64	11
	300	Purchased Services	547.53	10,698.80	12,000.00	1,301.20	89
		Total Account	**1,641.93**	**25,770.91**	**40,700.00**	**14,929.09**	**63**
430530		Water Source of Supply and Pumping					
	230	Repair and Maintenance Supplies			1,800.00	1,800.00	
	300	Purchased Services		328.62	7,800.00	7,471.38	4
	341	Electric Utility Services	319.65	2,930.68	5,500.00	2,569.32	53
		Total Account	**319.65**	**3,259.30**	**15,100.00**	**11,840.70**	**22**
430540		Water Purification and Treatment					
	300	Purchased Services	414.75	1,356.50	2,000.00	643.50	68
		Total Account	**414.75**	**1,356.50**	**2,000.00**	**643.50**	**68**
430610		Sewer Administration					
	300	Purchased Services		36.99		-36.99	
		Total Account		**36.99**		**-36.99**	
		Total Expenses	**2,376.33**	**30,423.70**	**58,300.00**	**27,876.30**	**52**
		Net Income from Operations	998.11	4,440.48			

5210 WATER UTILITY

Account Object	Description	Current Month	Current YTD	Budget	Variance	%
		Current Year				
Other Revenue						
371000	Interest Earnings		1,297.47	2,000.00	-702.53	65
						65
	Total Other Revenue	**0.00**	**1,297.47**	**2,000.00**	**-702.53**	**65**
	Net Income	998.11	5,737.95			

For the Accounting Period: 4 / 20

5210 WATER UTILITY

Assets

Current Assets		
Cash - Operating	(4,335.25)	
Cash - Repl/Depreciation	232,140.21	
Cash - STIP	106,130.20	
Accounts Receivable	14,768.84	
Total Current Assets		**348,704.00**
Fixed Assets		
Buildings	30,800.00	
Allowance for Depr - Buildings (Credit)	(27,720.00)	
Improvements Other Than Buildings	165,907.29	
Allowance for Depr - Imp Other Than Bldgs (Credit)	(153,714.00)	
Machinery and Equipment	6,000.00	
Deferred outflows for NPL	3,209.02	
Total Fixed Assets		**24,482.31**
Total Assets		**373,186.31**

5210 WATER UTILITY

Liabilities and Equity

Current Liabilities		
Refunds Payable	217.34	
Deferred inflows related to NPL	98.66	

Total Current Liabilities		**316.00**
Long-Term Liabilities		
Net pension liability	6,353.29	
Compensated Absences Payable	2,064.19	

Total Long-Term Liabilities		**8,417.48**

Total Liabilities		**8,733.48**
Equity		
Reserve for Replacement & Depreciation	96,709.55	
Unreserved Retained Earnings	261,931.02	
CURRENT YEAR INCOME/(LOSS)	5,812.26	

Total Equity		**364,452.83**

Total Liabilities & Equity		**373,186.31**

Town of Alberton

Water Usage Rates

Usage	Flat Usage Rate
Below 3000 gallons	$ 3.47
3001-10,000 gallons	$13.47
10,001- 30,000 gallons	$18.47
30,001- 50,000 gallons	$28.47
50,001 - 55,000 gallons	$38.47
55,001 + gallons	$2.00 per 1,000 gallons

Example of New Rate (¾ inch)

Below 3000
Base rate 8.37 + 3.47 water = 11.84 + 47.41 = $59.25

3001-10,000
Base rate 8.37 + 13.47 water = 21.84 + 47.41 = $69.25

10,001- 30,000
Base rate 8.37 + 18.47 water = 26.84 + 47.41 = $74.25

30,001- 50,000
Base rate 8.37 + 28.47 water = 36.84 + 47.41 = $84.25

50,001 – 55,000
Base rate 8.37 + 38.47 water = 46.84 + 47.41 = $94.25

$2.00 per 1,000 gallons over 55,000

Vacant home rate
Base water rate 8.37 + 33.23 (sewer basic rate) = $41.60

For further information contact:
Alberton Town Office
722-3404

This is effective August 1, 2014

Census and Target Rate 2015 Info
Past Programs
Fair Housing

CDD Target Rate Calculation Resource

The Community Development Division (CDD) has updated the U.S. Census Bureau's American Communities Survey (ACS) data set 2011-2015 for the calculation of local government target rates. The Treasure State Endowment Program (TSEP) and Community Development Block Grant (CDBG) programs use ACS information as the base data set to calculate applicant target rates for community infrastructure systems.

These calculated rates, along with other demographic information, are components of the review and analysis of applications submitted to the programs for funding requests. Applications to be submitted in 2018 or later for TSEP or CDBG programs must use the 2015 ACS data for the calculation of target rates for an applicant.

Search below for 2015 American Communities Survey data used to calculate target rates when applying to the **Treasure State Endowment Program** and **Community Development Block Group Grant Program.**

Select a Location:

City/Designated location Alberton town **or** County Choose County

City	Alberton town
County	*Mineral County*
Total Population	479
Total Households	151
Median Household Income	$24,539
Low & Moderate Income Percent	64.58%
Percent Poverty	19.8 %

Target Rates

Water & Waste Water	$47.03
Water Only	$28.63
WasteWater Only	$18.40
Solid Waste Only	$6.13

Amounts are computed using the 2015 census and target percentage rationale reviewed biennially by Commerce. The target percentages are:

2.3% combined (water and wastewater)
1.4% for water alone
0.9% for wastewater alone
0.3% for solid waste

CALCULATE ALBERTON WATER RATE

FROM ALBERTON INCOME STATEMENT: 5/4/2020

WATER REVENUES (FROM USER CHARGES) = \$55,000

BUDGETED FOR FY/20

178 RESIDENTIAL EDUs
217.79 TOTAL EDUs
} PER DIANE JODSAAS

$\frac{178}{217.79} \cong .80$ OR 80%

AVG. RESIDENTIAL RATE = 0.8 (\$55,500) ÷ 178 ÷ 12
= \$20.79/MO/EDU

SEWER IS A FLAT RATE @ \$47.41

RES. COMBINED W/S = \$20.79 + \$47.41 = \$68.20

RATE PER TOTAL EDU = $\frac{\$55,500}{217.79} \div 12$
= \$21.24

TOTAL COMBINED W/S = \$21.24 + \$47.41 = \$68.64

PROJECTED INCREASE = \$11.88

NEW TOTALS: RESIDENTIAL = \$20.79 + \$11.88 = \$32.67

WATER

JUST FOR O&M & DEBT DOES NOT INCLUDE RESERVES FOR SHORT LIVED ASSETS

COMBINED W/S = 32.67 + 47.41 = \$80.08

TOTAL EDU = \$21.24 + \$11.88 = \$33.12

WATER

COMBINED W/S = \$33.12 + \$47.41 = \$80.53

APPENDIX G

PUBLIC INVOLVEMENT

Town of Alberton

Water System Technical Study Project and Applications for DNRC Grant

PUBLIC HEARING

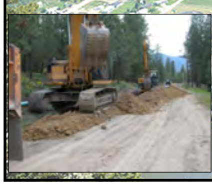
May 1, 2018
Anderson-Montgomery Engineers

AGENDA

- **Planning Process**
- **Alberton Project Specifics**
  - *Needs*
  - *Solutions*
- **Funding**
- **Environmental Impacts**
- **Importance of Public Involvement**
- **Q&A**

PROJECT SCHEDULE

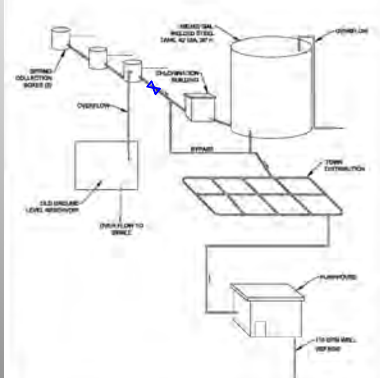
• DNRC Grant	May 2018
• Finalize Technical Study	May 2018
• DNRC Funding Available	July 2019
• Design and Construction of Priority 1 Improvements	Summer of 2019
• Future Projects??	May 2020 Cycle



Purpose of a Technical Study

- Identify System Deficiencies, Current and Future Regulatory Issues
- Incorporate Concerns of the Council, the Operator and the Public into Planning Process
- Evaluate Viable Options
- Prioritize Needs
- Identify the Most Cost-effective Solution
- Develop Financial Plan
- Pursue Grant and Loan Assistance
- Implement Recommendations

System Schematic



The *NEEDS*

SYSTEM NEEDS
- Lack of Control System
- Altitude Valve
- Disinfection, Operator Safety
- Limited Fire Protection
- Storage Needs
- Hydraulics, Looping, Stagnant Water
- No Metering of Sources or Usage

IMPLEMENTATION ISSUES
- Water Rights
- Limited Financial Resources
- Source Water Protection (Security)
- User Support for Improvements

ESTIMATED COSTS

TABLE 4.1
Upgrade Existing Control System and Disinfection (Priority 1)
Recommended Improvements

Capital Costs ITEM	Unit	Quantity	Unit Cost	Capital Cost
Mobilization & Bonds	%	10%	$75,700	$7,570
Control System				
New SCADA Control System	LS	1	$40,000	$40,000
Replace Existing Cla-Valve 210-01	EA	1	$16,000	$16,000
Flow Meters for the Sources	EA	2	$5,600	$11,200
Electrical Upgrade	LS	1	$8,500	$8,500
Chlorination				
New Liquid Hypo-Chlorination Equipment at both Sources (flow paced)	LS	2	$18,500	$37,000
Total Construction Cost				**$120,270**
Contingency	10%			**$12,027**
Engineering	22%			**$29,550**
Legal, Administration, DEQ Fee	6%			**$6,615**
TOTAL PROJECT COST				**$168,462**

ESTIMATED COSTS CONT.

TABLE 4.2
Upgrade Existing Distribution System (Priority 2)
Recommended Improvements

Capital Costs ITEM	Unit	Quantity	Unit Cost	Capital Cost
Mobilization & Bonds	LS	1	$75,000	$75,000
Upsize Mains				
10" C-900 PVC	LF	4475	$55	$246,125
12" C-900 PVC	LF	1000	$60	$60,000
Valves, Pipe Connections	EA	6	$2,500	$15,000
Hydrants	EA	4	$3,500	$14,000
Loop Mains				
6" C-900 PVC	LF	2500	$40	$100,000
8" C-900 PVC	LF	2950	$45	$132,750
Valves, Pipe Connections	EA	8	$2,500	$20,000
Hydrants	EA	6	$3,500	$21,000
Replace 2" Mains North of Railroad Avenue				
6" C-900 PVC	LF	4415	$40	$176,600
Valves, Pipe Connections	EA	6	$2,500	$15,000
Hydrants	EA	6	$3,500	$21,000
PRVs				
New Pressure Reducing Valve Station	LS	1	$12,500	$12,500
Water Meters				
New Residential Water Meters	EA	205	$300	$61,500
Total Construction Cost				**$895,475**
Contingency	15%			**$134,321**
Engineering	20%			**$179,095**
Legal, Administration, DEQ Fee	5%			**$44,774**
TOTAL PROJECT COST				**$1,253,665**

ESTIMATED COSTS CONT.

TABLE 4.3
Upgrade Existing Water Storage (Priority 3)
Recommended Improvements

Capital Costs ITEM	Unit	Quantity	Unit Cost	Capital Cost
Mobilization & Bonds	LS	1	$51,000	$51,000
Storage Tank				
New 200,000 Gallon Tank	LS	1	$400,000	$400,000
Site Work	LS	1	$50,000	$50,000
Piping, Appurtenances	LS	1	$75,000	$75,000
Total Construction Cost				**$576,000**
Contingency	15%			**$86,400**
Engineering	20%			**$115,200**
Legal, Administration, DEQ Fee	5%			**$28,800**
TOTAL PROJECT COST				**$806,400**

ESTIMATED COSTS CONT.

TABLE 4.4
Upgrade Existing Water Sources (Priority 4)
Recommended Improvements

Capital Costs ITEM	Unit	Quantity	Unit Cost	Capital Cost
Mobilization & Bonds	LS	1	$14,000	$14,000
Improve Water Sources				
Rehabilitate Spring and Well	LS	1	$9,500	$9,500
Drill Additional Well	LF	200	$125	$25,000
Pump, Motor, Drop Pipe	LS	1	$15,000	$15,000
Pump Testing, Documentation	LS	1	$10,000	$10,000
Pump Houses, Disinfection, Piping	LS	1	$95,000	$95,000
Total Construction Cost				**$168,500**
Contingency	15%			**$25,275**
Engineering	20%			**$33,700**
Legal, Administration, DEQ Fee	5%			**$8,425**
TOTAL PROJECT COST				**$235,900**

Priority 1 Project Budget:

Town of Alberton Water System - 2018
Project Budget - SCADA & NaClO Disinfection

Prepared by AMCE	SOURCE	SOURCE	SOURCE	SOURCE	SOURCE	*April-18*
ADMIN/FINANCIAL COSTS	**RRGL**	**SRF**	**SRF F. Prin**	**Local Res.**	**DNRC-TA**	**TOTAL**
Personnel Costs	$0	$0	$0	$0	$0	$0
Office Costs	$0	$0	$0	$0	$0	$0
Professional Services	$0	$0	$0	$6,615	$0	$6,615
Legal Costs	$0	$0	$0	$0	$0	$0
Loan Fees	$0	$0	$0	$0	$0	$0
Loan Reserves	$0	$0	$0	$0	$0	$0
TOTAL ADMIN/FIN. COSTS	$0	$0	$0	$6,615	$0	$6,615
						3.9%
ACTIVITY COSTS:	**RRGL**	**SRF**	**SRF F. Prin.**	**Local Res.**	**DNRC -TA**	**TOTAL**
Preliminary Engineering	$0	$0	$0	**$0**	**$0**	**$0**
Final Engineering Design	$3,250	$0	$0	$11,525	$0	$14,775
Construction Inspection	$3,250	$0	$0	$11,525	$0	$14,775
Construction	$118,500	$0	$0	$1,770	$0	$120,270
Contingency	$0	$0	$0	$12,027	$0	$12,027
TOTAL ACTIVITY COSTS	$125,000	$0	$0	$36,847	$0	$161,847
						96.1%
TOTAL PROJECT COSTS	**$125,000**	**$0**	**$0**	**$43,462**	**$0**	**$168,462**

Looking Forward

- Priority 2: Upgrade Distribution - $1.25M
  - Explore SRF Loan + Forgiven Principal (raise rates)
  - TSEP & DNRC in 2020 + SRF (raise rates & PER)
- Priority 3: Upgrade Storage - $806K
  - TSEP & DNRC in 2020 + SRF (raise rates & PER)
- Priority 4: Upgrade Sources - $236K
  - 2022 and beyond…………..

- Current combined W&S rate ≈ $71.75/mo.
- "Target" combined W&S rate = $81.12/mo.
- Increase to reach "Target" rate ≈ $9.37/mo.

Environmental Impacts

- Noise & Dust – minor & temporary
- Water Use Restrictions – minor & temporary
- Improved Safety & Lower Risk of chlorine leak
- Eliminate chlorinated water discharge
- Energy Savings

Public Involvement

- Necessary Part Of Planning Process
- Necessary For Successful Debt Election
- Necessary For Grant Program $$ (Letters Of Support)

Questions to Council?

- Agreement with Priorities?
- Project Scope?
- Other Needs?
- Other Funding Sources?

QUESTIONS?

Thank You

Anderson~Montgomery

Contact Information

Anderson~Montgomery

Paul Montgomery paul@a-mce.com
Phone: 406-449-3303

Letters of Support are encouraged before May 9, 2018 so they can be included in the DNRC/RRGL Application. Submit to Diane at the Town of Alberton.

Council Meeting
May 5, 2020
7:00 P.M.

The meeting was closed to the public and was available via zoom.

Council Present: Mayor John Bigart III, Cori Miranda, Brandon Prior, Jaime Odell. Joe Hanson was absent.

Minutes: The Clerk read the minutes. A motion was made by Jaime seconded by Brandon to approve the April 7, 2020 minutes as read. All were in favor. The motion carried.

Claims: The claims were discussed. A motion was made by Jaime seconded by Brandon to pay the claims from check number 15815 through 15833 in the amount of $16,567.30. All were in favor.

The Council received and reviewed the bank reconciliation and cash report. They have access at the Expenditure to Budget and Revenue to Budget financial reports.

Fire Department: Chief Joe Calnan was not at the meeting.

Sheriff Department: The Sheriff was not at the meeting.

County Planner: Andy Short was not at the meeting.

Water Sewer: James Claxton was not at the meeting. The Mayor stated that James had been working on a water issue up at the tank all day.

RC Askew updated on the town sprinklers. Eryn Odell has been mowing and assisting with the park which has been a great help.

Anderson-Montgomery: Paul Montgomery was at the meeting via zoom. He updated on the three resolutions that were on the agenda. One is for applying for a DNRC grant, one for applying for a TSEP grant and one for PER (preliminary engineering report). These are for the next phase of the water project. He will be holding a pre-bid conference tomorrow at 1:00 in Alberton for the current project. They plan to open bids on May 15, 2020 in Helena. He also had some tables for the pricing of the next phase of the water project. This phase will cost around $1,820,632.00. It includes upsizing main lines, looping main lines, replacing 2" mains north of Railroad Avenue, new pressure reducing valve, new meters. The first table showed a DNRC grant for $125,000.00, TSEP grant for $750,000.00, SRF loan $784,200.00 along with $150,000.00 local money this would have an increase of around $24.00 per customer. The second table shows the DNRC grant, TSEP grant, a SRF-A forgiven loan of $386,000.00, this takes the SRF loan down to $386,000.00, and the local money this would have an increase of about $12.00 per customer. The third table had the DNRC grant, TSEP grant, a CDBG grant for $450,000.00, the SRF loan would be $329,370, the local resident money would remain the same this would have an increase of approximately $10.00 per customer. Paul suggested that the town apply for all the grants available. He will put together a funding package including meters and without meters.

Marc Golz updated on this trip here yesterday with James Claxton. He is continuing to work on the PER with Paul.

<u>Resolutions 299, 300 and 301</u>: Resolution 299 is to apply for a DNRC grant. Grand made a motion seconded by Cori to approve resolution 299. All were in favor. Resolution 300 is to apply for a TSEP grant. Jaime made a motion seconded by Brandon to approve resolution 300. All were in favor. Resolution 301 is to approve the PER. This will be tabled until next month.

<u>Old Business:</u>

<u>Senior Project – Jordan Taapken</u>: Jordan was at the meeting via zoom. He wanted to know if anyone had looked at where the stakes were for the vet memorial. The Mayor stated that he thought people had seen it. He wanted to know if there were any questions. The size had been downsized from the original. Brandon wanted to know if he had posted anything at the town office, post office or Valley Grocery. He had given a piece of paper to TRAX, the Seniors and the River Edge to add to any takeout's that had been purchased. Brandon thought that it should have been posted so that all residents could have seen it. The Mayor read a letter from Karen at the Bookstore, Valley Grocery and Bob Bungarz they were all in favor of the project. Brandon wanted to know what the cost to the town would be to replace the sprinklers, RC stated around $1,000.00. Jordan had received enough to cover the maintenance for a while. The only real maintenance is to replace the flags when needed. Kari & Garth Riebe were on via zoom they stated that they are in complete favor of the project and think it is a wonderful idea. Brandon made a motion to table this until most posting could be done. There was not a second the motion died. Cori made a motion seconded by Jaime to approve the project. Cori and Jaime voted yes; Brandon voted no. The motion carried.

Brandon made a motion to adjourn the meeting. Discussion was held that you cannot adjourn a meeting when there are still items on the agenda. There was not a second. The motion died.

<u>Purchase the Feed Store building</u>: Because this was listed under old business and not new business this will be on next month's agenda.

<u>Public Comment</u>:

Jordan Taapken wanted to know where he goes from here. The Mayor stated that he can move forward with the project.

Anna Leduc from the Railroad Day Foundation wanted to know if the council thought that Railroad Day should be canceled. We will wait until next month and see what is going on with the virus.

Garth Riebe wanted to know if Jordan would need volunteers for his project so that it could still be completed by Memorial Day. He will check into that.

The Mayor read a letter form Donna Coburn.

Brandon made a motion seconded by Jaime to adjourn.

Being no further business, this meeting was adjourned.

____

Mayor

Attest:

______________________________ Seal

Clerk

APPENDIX H

WATER MODELING & STELLING DATA

CHAPTER 4

REGULATORY, PUBLIC HEALTH, ENVIRONMENT, AND SAFETY ISSUES

There are several public health, environmental and safety issues relative to Alberton's water system that need to be corrected. These include:

- Lack of fire protection (water mains, hydrants, and fire suppression sprinkler systems),
- Storage Capacity (fire pool and maximum day demand),
- Water Source Protection,
- System Configuration (water pressures and flows), and
- Lack of Consistent Disinfection.

4.1 FIRE PROTECTION

4.1.1 **Required Fire Flows** - Supplying the town with adequate fire protection is an essential function of the distribution system. The greatest safety issue facing the Town of Alberton is overall lack of fire protection. With only seventeen (17) hydrants combined with undersized pipe and inefficient looping, most citizens do not have adequate fire protection.

Lack of storage to accommodate fire fighting is another problem. According to the Public Works Director, during the summer irrigation season the tank will occasionally run dry. During these shortages, he must manually turn on the well to supplement the spring inflow to the tank. According to his pump records, the well had to be run continuously from 6 hours (8/20/96) to 86 hours (8/1/95) to help the spring fill the tank. During those periods when the tank is low, there is little or no water held in reserve for fire fighting purposes.

Fire Flow demands for the Town of Alberton were calculated using the *Uniform Fire Code* method. This method uses the total fire area, defined as the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof, and the type of building structure, as defined by the *Uniform Building Code*, to establish a required fire flow. The following assumptions were used to establish fire flows for the larger, more critical structures in Alberton. Those buildings include the North (Old) School, South School, Gym, Residential Dwellings, and the Business's along Railroad Avenue (Business District).

- The North School has 3 floors with an average area of 9,600 square feet per floor, and is of Type II-N Construction. The basement is sprinklered.
- The South School has 2 floors with an average area of 9,600 square feet per floor, and is of Type II-N Construction.
- The Gymnasium is single floor witn an approximate area of 7,854 square feet per floor, and is of Type II-N Construction.
- The buildings along Railroad Avenue (Business District) have 2 floors with an average area of 4,313 square feet per floor, and are of Type V-N Construction.
- The average residential dwelling in Alberton is a one floor structure with a fire area of 2,480 square feet.

Based on an informal inspection by the Fire Chief of the Frenchtown Rural Fire District, automatic sprinklers exist only in the basement of the North (Old) School building. Sprinklers are not extensive enough to allow any reduction in required fire flows. Basement sprinklers were apparently installed in 1998, following a State Fire Marshall inspection. Of concern were limited means of egress and shop class facilities located in the basement.

Sprinklers were installed by R.H. Grover of Missoula, and according to Jim Holloron of the company, installation included provisions to extend sprinkler lines throughout both school buildings in the future. A valved 4-inch feed line enters an underground utility tunnel between the two school buildings. The Town installed a new 6-inch water main up Third Street to this point to feed the sprinkler system(s).

For the critical structures/districts in Alberton, the Fire Flow Chart in the 1994 *Uniform Fire Code* yields recommended fire flows at 20 psi residual pressure and a minimum system pressure of 20 psi. A copy of the *Uniform Fire Code* and the *Uniform Building Code* regulations used in determining required fire flow are located in **Appendix C**, along with a letter from the Fire Chief. **Table 4.1** summarizes the recommended fire flows for Alberton.

TABLE 4.1
REQUIRED FIRE FLOWS; RESIDUAL PRESSURE 20 PSI;
MINIMUM SYSTEM PRESSURE 20 PSI

Building	Fire Flows w/o School Sprinklers		Fire Flows w/ N. & S. Schools Fully Sprinklered	
	Flow (gpm)	Duration (hrs)	Flow (gpm)	Duration (hrs)
North School	3,500 *	3 *	1,750	2
South School	3,000	3	1,500	2
Gym	1,750	2	1,750	2
Residential	1,000	2	1,000	2
Business	2,500	2	2,500 *	2 *
***Req'd. Fire Pool**	**630,000 gal**		**300,000 gal**	

In September 2000, Alberton came under the jurisdiction or the Frenchtown Rural Fire District. The Fire Chief, Scott Waldron, was asked to confirm fire flow requirements, and his response is included in **Appendix C**. Initial analysis suggested the presence of sprinklers in the North (Old) School would allow a reduction in required fire flows. According to the Fire Chief, this is not the case. Therefore this structure controls fire flow for Alberton, and requires 3,500 gpm for 3 hours.

Unless or until the North and South Schools are fully sprinklered, a storage tank fire pool of 630,000 gallons is necessary. This is more than twice the entire volume of the existing Alberton storage tank.

Completion of sprinkler installations throughout the North and South School buildings is essential to reduce fire flows. With sprinkler provisions throughout these two buildings, the fire pool requirements for the community are cut in half. Given the existing tank volume (300,000 gallons) and the recent installation of a sprinkler feed line and provisions to serve both schools, providing a complete fire suppression system in the schools is critical. Otherwise an additional 330,000 gallons of water storage for fire reserve will be necessary for the community. Because of the extreme economic impact of so much additional storage, **it is assumed for purposes of the subsequent analyses in this Master Plan that a sprinkler system will be completed for both schools.**

4.1.2 **<u>Hydrant Flows</u>** - A computer model, *WaterCad*, was used to predict how modifications to the system would effect available fire flows. The program is calibrated using measured flows and pressures from the 2½-inch nozzle. Then flows from the larger

4½-inch hydrant nozzles, flows into and out of storage tanks, and flows in the distribution network under various conditions can be modeled. Undersized mains, inefficient looping, and unanticipated water loss or restrictions were identified by systematically measuring and modeling hydrant flows.

Geographic locations of the fire flows in **Table 4.1** also is considered relative to water main capacity and fire hydrant availability. **Table 4-2** illustrates the location of the hydrants in Town (see also **Figure 5** in Chapter 3), and the static and predicted pressures measured from the 2½ inch outlet. These pressures, along with the flow tests shown in **Table 4-3,** were used to calibrate the model. **Table 4-4** shows the modeled results from the 4½ inch port from single fire hydrants for the existing conditions and for the improvements recommended in Chapter 7. This includes the proposed addition of three new fire hydrants (NFH-1, NFH-2, and NFH-3) around the schools, since it is a critical fire protection location. **Table 4-4** also shows the effect on fire flows with the existing well pump "on" versus "off".

There are some fire hydrants in the distribution system without a 4½ inch outlet. However, these hydrants have two 2½ inch outlets. With both outlets open, the flow from these hydrants will be slightly less than the values modeled for a 4½ inch outlet.

TABLE 4-2
EXISTING FIRE HYDRANTS
MEASURED AND PREDICTED STATIC PRESSURES
PUMP OFF; 2½-INCH PORT

Hydrant No.	Location	Static Pressure Measured (psi)	Static Pressure Predicted (psi)
1R	Railroad Ave & Meadow View Lane	80	82
2R	Railroad Ave & 2nd Street	82	83
3R	Railroad Ave & 4th Street	No Data	83
4R	Railroad Ave & 5th Street	No Data	82
5R	Railroad Ave & 6th Street	No Data	80
6R	Railroad Ave & 7th Street	No Data	80
7R	Railroad Ave & 8TH Street	76	77
8R	Railroad Ave East of Adams Street	74	75
1A	Adams & Riverview Ln	No Data	83
2A	Adams & Janet Street	No Data	95
3A	Adams & River Street	No Data	94
1P	West End Parkway Drive	No Data	94
2P	Parkway Drive by Lagoons	87-90	90
3P	Parkway Drive by Athletic Fields	No Data	83
4P	Parkway Drive by Wellhouse	81	82
1F	Parkway Drive & 5th Street	No Data	82
5P	Park by Tennis Courts	No Data	82

TABLE 4-3
HYDRANT FLOW TESTS; PUMP OFF; 2½-INCH PORT

Test	Fire Hydrant	Measured Flow (gpm)	Input Flow (gpm)	Fire Hydrant	Measured Pressure (psi)	Predicted Pressure (psi)
1	2R	500	500	1	76	79
2	2R	960	960	1	70	71
3	1P	730	650	13	25	29
4	1P	500	500	13	52	52
5	1F	730	650	15	47	44
6	1F	500	500	15	63	59
7	8R	690	690	7	30	34
8	8R	500	500	7	47	53
9	5P	520	520	7	47	54
10	3A	500	500	7	50	53
11	3A	730	730	7	27	24

TABLE 4-4 MODELED RESULTS FOR HYDRANT FLOWS; RESIDUAL PRESSURE 20 PSI; MINIMUM SYSTEM PRESSURE 20 PSI; 4½-INCH PORT

Hydrant No.	Location	Pump On/Off	Required Fire Flow	Existing Distribution System Flows (gpm)	Flows w/ Phase I & II Improvements (gpm)*
1R	Railroad Ave &	OFF	2,500	2,025	4,558
	Meadow View	ON		2,277	4,602
2R	Railroad Ave &	OFF	2,500	1,101	4,032
	2nd Street	ON		1,311	4,107
3R	Railroad Ave &	OFF	2,500	835	3,591
	4th Street	ON		1,030	3,660
4R	Railroad Ave &	OFF	2,500	766	3,111
	5th Street	ON		950	3,184
5R	Railroad Ave &	OFF	2,500	730	3,160
	6th Street	ON		890	3,238
6R	Railroad Ave &	OFF	2,500	701	3,022
	7th Street	ON		845	3,093
7R	Railroad Ave &	OFF	2,500	704	2,549
	8TH Street	ON		849	2,599
8R	Railroad Ave East	OFF	2,500	710	2,141
	of Adams Street	ON		828	2,174
1A	Adams &	OFF	1,000	712	1,719
	Riverview Ln	ON		834	1,736
2A	Adams &	OFF	1,000	712	1,443
	Janet Street	ON		916	1,453
3A	Adams &	OFF	1,000	705	1,332
	River Street	ON		780	1,341
1P	West End	OFF	1,000	661	2,541
	Parkway Drive	ON		761	2,553
2P	Parkway Drive	OFF	1,000	691	2,649
	by Lagoons	ON		812	2,668
3P	Parkway Drive	OFF	1,000	714	2.717
	by Athletic Fields	ON		867	2,749
4P	Parkway Drive by	OFF	1,000	771	2,360
	Wellhouse	ON		982	2,458
1F	Parkway Drive &	OFF	1,000	770	2,476
	5th Street	ON		978	2,555
5P	Park by	OFF	2,500	648	2,266
	Tennis Courts	ON		726	2,301
NFH - 1	South of	OFF	1,750	N/A	4,116
	Schools			N/A	4,212
NFH - 2	West of	OFF	1,750	N/A	4,574
	Schools			N/A	4,689
NFH - 3	East of	OFF	1,750	N/A	4,068
	Schools			N/A	4,159

* See Parts 6.7 and 7.3 for explanation of Phase I & II Distribution Improvements.

Table 4-5 shows the results of an analysis used to determine if multiple fire hydrants, used to simultaneously fight fires, would provide the required fire flows. This analysis was done by dividing the required fire flow equally between the hydrants being analyzed. The *WaterCAD* model was then run to determine the pressures throughout the distribution system. If the minimum system pressure and the residual pressure were greater than 20 psi, the required fire flow was met (true). If the minimum system pressure or the residual pressure was less than 20 psi, the required fire flows were not met (false).

This analysis indicates that pipe sizes are generally sufficient for domestic flows, but are not large enough to supply fire demands at 20 psi residual pressure for the Schools or the Business District. Adequate hydrant coverage is also lacking around the schools. Furthermore, hydrants number 1R and 2R are the only hydrants currently capable of providing at least 1,000 gpm at 20 psi residual for fire protection in the residential areas.

4.1.3 <u>Model Results for Proposed Distribution Improvements</u> - The *WaterCAD* model was also used to develop alternatives to correct deficiencies in the existing distribution system. (These alternatives are presented and developed in Chapters 6 and 7.) After construction of the recommended Phase I and Phase II distribution system improvements, the fire protection provided by the distribution system will meet fire flow criteria. The required flows will be provided at all of the indicated combinations of fire hydrants, whether the well pump is running or not. The controlling fire flow of 3,500 gpm at the schools will be provided with the recommended improvements.

Until the east and west ends of the system are looped (dead end main lines on the west end of Parkway Drive and the east end of Adams Street), fire hydrants 1P and 2P will not provide the required flows with the well pump off. Without this looping improvement (Alternative #5D in Chapters 6 and 7), model estimates show the remainder of system meeting hydrant flows with the well pump off, provided the other recommended improvements are constructed.

Looping and up-sizing the 2-inch mains north of Railroad Avenue will not significantly increase flows from existing fire hydrants, due partly to the current absence of hydrants in the north side area. In combination with new hydrant additions in this area, these improvements (Alternatives #5E and #5F in Chapters 6 and 7) will enhance fire protection and prevent water stagnation in this area.

TABLE 4-5 TRUE/FALSE ANALYSIS FOR COMBINED HYDRANTS; 4½" PORT; MIN. SYSTEM PRESSURE 20 PSI; MIN. RESIDUAL PRESSURE 20 PSI

Hydrant No.	Combined Required Fire Flows (gpm)	Pump On/Off	Existing System Combined Flows	Combined Flows w/ Phase I & II Improvements *
1R & 2R	2,500	OFF	False	True
		ON	False	True
2R & 3R	2,500	OFF	False	True
			False	True
3R & 4R	2,500	ON	False	True
		OFF	False	True
4R & 5R	2,500	OFF	False	True
		ON	False	True
5R & 6R	2,500	OFF	False	True
		ON	False	True
6R & 7R	2,500	OFF	False	True
		ON	False	True
7R & 5P	2,500	OFF	False	True
		ON	False	True
6R, 7R, & 5P	2,500	OFF	False	True
		ON	False	True
7R & 8R	2,500	OFF	False	True
		ON	False	True
1A & 2A	1,000	OFF	False	True
		ON	False	True
2A & 3A	1,000	OFF	False	True
		ON	False	True
1P & 2P	1,000	OFF	False	True
		ON	False	True
2P & 3P	1,000	OFF	False	True
		ON	False	True
3P & 4P	1,000	OFF	False	True
		ON	False	True
4P & 1F	1,000	OFF	False	True
		ON	False	True
NFH - 1 & 2	3,500	OFF	N/A	True
		ON	N/A	True
NFH - 2 & 3	3,500	OFF	N/A	True
		ON	N/A	True

* See Parts 6.7 and 7.3 for explanation of Phase I & II Distribution Improvements.

4.2 FIRE HYDRANT SPACING

Proper hydrant spacing is essential in providing adequate fire protection. The 1994 edition of the *Uniform Fire Code* (UFC) gives the following criteria for the number of fire hydrants and the average spacing between hydrants.

- For fire flows of 1,750 gpm or less, there must be one (1) fire hydrant available per building, spaced 500 feet apart.

- For fire flows of 2,500 gpm, there must be three (3) fire hydrants available per building, spaced 450 feet apart.

Most of the existing fire hydrants in Alberton do not meet these criteria. **Table 4-6** provides the current spacing of the existing fire hydrants. The UFC also states that the "average spacing between hydrants will be reduced by 100 feet for dead-end streets or roads."

TABLE 4-6 EXISTING FIRE HYDRANT SPACING

Hydrants	Location	Distance between hydrants (ft)
1R & 2R	Railroad Avenue	700
2R & 3R	Railroad Avenue	700
3R & 4R	Railroad Avenue	450
4R & 5R	Railroad Avenue	450
5R & 6R	Railroad Avenue	400
6R & 7R	Railroad Avenue	450
7R & 8R	Railroad Avenue	600
6R &5P	Railroad Avenue	500
7R & 5P	Railroad Avenue	150
8R & 1A	Adams Street	350
1A & 2A	Adams Street	700
2A & 3A	Adams Street	200
1P & 2P	Parkway Drive	900
2P & 3P	Parkway Drive	800
3P & 4P	Parkway Drive	1,000
4P & 1F	Parkway Drive	250
1F & 5R	Parkway Drive	400

Currently, hydrants along Railroad Avenue from Fourth Street to Eighth Street, hydrant pairs at the east and west ends of on Adams Street, and the area between Fifth and Sixth Streets south of Railroad Avenue are the only combinations that meet UFC spacing criteria. This leaves most of the western, eastern, and northern portions of Alberton with substandard fire hydrant density. The north side of town, including the area around the schools, is particularly deficient, as few hydrants are provided

4.3 WATER SUPPLY

Section 3.5.2 established that the current well and spring have adequate capacity to meet the <u>current</u> Maximum Daily Demand with the entire system in operation. Only approximately three percent excess supply exists for future growth.

4.3.1 **<u>Municipal Well</u>** - As was discussed in Section 3.3.3, the town recently had a Wellhead Protection Plan prepared by Bill O'Connell of Montana Rural Water Systems (MRWS) for its municipal well. A copy of the Wellhead Protection Plan is attached in **Appendix B.** In this report O'Connell states that, "...the depth of the water bearing formation, the distance to the nearest surface water, and the bacteriological history of the source indicates Alberton's well is not under the direct influence of surface water." This is supported by the Montana Bureau of Mines and Geology (Sept. 1999, Alan English) findings and the MDEQ directive (Nov. 1999) in **Appendix E.** The Town is not mandated to conduct Microscopic Particulate Analysis (MPA) testing for the well supply, and the supply has been designated as "not under the direct influence of surface water."

The pending federal *Groundwater Disinfection Rule* will likely encourage disinfection of all groundwater supplies. The final requirements of the Rule are pending, but are forecast to give precedence to wellhead protection over disinfection. As was discussed in Part 3.4.4, the current disinfection of the spring and absence thereof at the well nonetheless makes an undesirable situation of fluctuating chlorine residuals, depending on which sources are being used.

4.3.2 **<u>Spring Collection Structure</u>** - The spring supply was designated "at risk for influence by surface water" by Alan English of the Montana Bureau of Mines and Geology. This resulted in an MDEQ directive (Nov. 1999) to conduct two MPA tests in the spring of 2000 (**Appendix E**).

The first of these samples was taken May 16th and 17th, and analytical results by CHD Diagnostic determined the spring supply to be "low risk"(see **Appendix E**). The analytical techniques resulted in a score of "1". Scoring less than "9" qualifies for the "low risk" designation.

A second MPA test will need to be conducted. At MDEQ's discretion that test has been rescheduled until spring, 2001, given that the 2000 season was unseasonably dry with minimal runoff. If the second test collaborates the "low risk" designation, periodic continued MPA testing may still be required by MDEQ.

Physical conditions around the springs and collection site warrant attention to minimize future chances for surface water contamination. The fencing site is broken and deteriorated, allowing wildlife and people to enter the area and possibly contaminate the drinking water supply. The Town has recently disposed of timber downfall and debris located in the area, and has re-sealed pipe penetrations into the lower collection manhole.

Another possible source of contamination is the abandoned piping from the lower collection manhole to the abandoned concrete reservoir. The two facilities are isolated by a closed valve, but piping should be permanently severed to remove the potential health risk. The concrete reservoir had a wood roof, that has been demolished. The concrete basin holds stagnant water, and a continuous trickle of flow is visible from a pipe entering from the direction of the lower spring collection manhole. A closed (exposed) gate valve isolates reservoir discharge from the active transmission main system.

Piping leaving the abandoned concrete reservoir branches to an even older reservoir site adjacent the steel tank, again presumably isolated by a closed valve. Some uncertainty exists if piping from this older abandoned reservoir remains connected (although isolated) from the current system.

Water samples from the spring were analyzed by Inter-Mountain Laboratories, Inc. Quality is good. A copy of the results from this analysis is located in **Appendix E**.

4.3.3 <u>**Water Quality and Compliance**</u> - The compliance forecast for Alberton's continues to use its two existing water supplies is good. Water quality from the spring and well supplies is excellent (see Part 3.4.1 and **Appendix E**). Some tightening of water quality standards is anticipated nationally under the *Safe Drinking Water Act*. However little likelihood appears to exist for future water quality standards to render Alberton's water supplies in noncompliance.

- Corrosive water and *Lead and Copper Rule* compliance has not been a problem, with yearly test results at half or less the prescribed action levels (0.015 mg/l lead and 1.3 mg/l copper).

- Nitrate levels have been historically low from both supplies, indicating pristine groundwater sources. Increased protection for the spring supply watershed will further deter the likelihood of future contamination.

- Trihalomethanes are not a problem with the current chlorinated spring supply. Adding chlorination at the well is not expected to increase trihalomethane levels, given the typical lack of organic precursors in well supplies.

- The proposed federal *Arsenic Rule* is slated for promulgation in 2001. It may reduce the maximum contaminant level (MCL) for arsenic to 0.005 mg/l, although there is some controversy as to whether this low a limit is practical. The current MCL is 0.050 mg/l. Sampling since 1993 generally show only two detects on arsenic: a distribution sample in 1979 at 0.002 mg/l and a well supply sample in 1996 at 0.004 mg/l. The final MCL adopted for the *Arsenic Rule* bears watching by the Town. Continued water source testing for arsenic is required, and will be important, given that some evidence of arsenic occurs in the Town's well supply. Any new groundwater source(s) developed should be screened thoroughly for arsenic.

- Other trace inorganics, notably barium and fluoride, are observed sporadically in tests of existing supplies, although concentrations are well below current MCL's. Statutory limits for these elements are not forecast to change in the foreseeable future. Existing supplies therefore appear unthreatened. Additional area groundwater sources that may be developed in the future could be expected to have similar inorganic characteristics, and should meet MCL's. Nonetheless during any new groundwater development, inorganics must necessarily be closely screened.

4.3.4 **Source Water Protection** - MDEQ's *Circular PWS-6 – Source Water Protection Delineation (1999)* requires delineation, inventory, and hazard susceptibility for existing and new groundwater sources. Two recent reports for the Town of Alberton, contain most of the information required for the delineation. These documents are:

- *Alberton, Montana, Wellhead Protection Plan (1996)* prepared by Montana Rural Water Systems at the request of the Town of Alberton. This report contains delineation, inventory, and management guidelines for both of Alberton's groundwater supplies. The report led to a Resolution Relating to Wellhead Protection (resolution no. 138) adopted in March, 1996 by the Alberton Town Council.

- *Hydrogeologic Assessment of the Alberton Public Water Supply for GWUDISW (1999)* prepared by the Montana Bureau of Mines and Geology. This assessment covered both Alberton's spring and well, and included geology, aquifer characterization and hydrology, and water quality for the sources. The report was used by MDEQ as the basis for characterizing the well as groundwater "not under the direct influence of surface water," and requiring MPA testing on the spring source (see **Appendix E**).

At the conclusion of the 2001 MPA testing on the spring source, the Town should consider proceeding with preparing a formal Source Water Protection Delineation report in accordance with *Circular PWS-6*. This could largely be a consolidation of information already contained in the above reports, supplemented with final MPA test results and any subsequent MDEQ determinations relative to the spring supply.

Any future water source development by the Town of Alberton, such as adding another well, would likewise fall under the requirements of *Circular PWS-6*. For a new source development, a Source Water Protection Delineation report would need to be prepared. This should logically be accomplished before developing a new well, and must include delineation and hazard susceptibility information for the new source.

4.4 STORAGE CAPACITY

Storage facilities should have sufficient capacity to meet both domestic and fire-flow demands. *Circular DEQ-1* guidelines recommend that enough storage be available to meet the Average Daily Demand plus the recommended fire pool, less the amount of gravity flow available from the spring.

As established in Section 3.6.1, this amounts to 441,000 gallons of storage for Alberton, <u>provided full fire sprinkler coverage is installed at the schools</u>. (Without school sprinklers, 771,000 gallons of storage would be needed.) The current 300,000-gallon tank falls far short of this capacity. This poses a health and safety hazard from two standpoints:

- The storage tank serves the important function of maintaining positive pressure on the distribution system. If storage is depleted, there becomes a risk of negative pressures in the system. This could compromise public health through infiltration of groundwater through leaking pipe joints, or backflow from unprotected domestic sources.

- Public safety in a fire event is compromised by an insufficient fire pool. The situation would be most dire during periods of peak (summer) domestic demand.

4.5 LOW AND HIGH PRESSURES

Circular DEQ-1 requires that the minimum working pressure in the distribution system should be 35 psi and recommends normal working pressure of approximately 60 psi. The working pressures within the current distribution system vary between 60 and 105 psi. When static pressures exceed 100 psi, *DEQ-1* recommends pressure reducing devices on mains in the distribution system.

Static pressures are comparatively less on the hillside areas north of Railroad Ave. South of Railroad Avenue, pressures are generally greater due to lower ground surface elevation.

The static pressure at the southern end of River Street is in excess of 105 psi. This affects approximately six residences who lie at the lowest elevation in the distribution system. Such pressures aggravate system leakage, and wear and tear on domestic plumbing. Wasted water is also more acute with higher static pressures, since the volume of water use increases.

4.6 DISTRIBUTION PIPING

4.6.1 **Asbestos Cement Pipe** - Roughly 2,500 lineal feet of asbestos cement (AC) pipe was installed in 1978. Since asbestos fibers are considered a hazard to respiratory organs, this pipe is no longer accepted for domestic use. One hazard of AC pipe is the exposure of air borne particles to construction workers during demolition. Sawcutting AC pipe is currently prohibited by OSHA regulations. Another hazard is the potential that residents could ingest asbestos fibers. Fibers typically do not release from the interior pipe walls and such occurrences nationally have be infrequent. One occurrence is on record in East Helena, Montana in 1998 that resulted in replacement of an AC transmission main.

The AC pipe used at Alberton was first used as water pipe in the United States in the 1930's. In the ensuing years this type of pipe gained popularity. Since that time the AWWA has approved and reactivated standards several times with the latest being January 16, 1975. There are virtually millions of feet of AC pipe in use in the United States. MDEQ has taken the stance that AC pipe can remain in use in Montana's public water systems. If and when it is replaced, it can be abandoned in place, avoiding the cost of removal and disposal as a hazardous material.

With asbestos cement pipe, flexural strength is a concern. The smaller diameter asbestos cement pipe does not have the flexural strength of ductile iron or PVC pipe. Therefore, when improperly bedded, this type of pipe can easily break. To date, this has not been a problem for the Town of Alberton.

4.6.2 **Other Pipe Materials** - Cast iron pipe in use for Alberton's transmission and some distribution mains is a proven pipe material. The age of the iron pipe in portions of the system is such that "leaded" (poured molten lead) joints were used. This is not causing any lead exceedances, likely because the lead at the joints is only minimally exposed to the water and Alberton's water is not chemically aggressive. This type of pipe jointing is vulnerable to disruption and leakage if disturbed, and is difficult to repair. Repair of leaking joints typically requires removal of the joint, and installation of a splice or repair clamp.

Galvanized steel pipe is in use for Alberton's smaller mains. This material is suitable, provided soils are not particularly corrosive. Fortunately soils in the area have not proven aggressive, and corrosion-induced leakage of steel mains has not been a reported problem.

Recent water main installations in the Town have used modern PVC pipe materials. With proper bedding, this is a durable and inert pipe material.

4.6.3 **<u>Flow Capacity</u>** - The existing 6-inch diameter watermain along Railroad Avenue through the business district cannot carry the minimum 2,500 gpm fire flows for the Business District. This poses a direct public safety hazard. Larger mains will be required to provide the required fire flow at the minimum residual pressure of 20 psi.

Capacity of mains north of Railroad Avenue is restricted by a predominance of 2-inch lines. *DEQ-1* requires that the minimum size of watermains for providing fire protection and serving fire hydrants shall be 6-inch diameter. Lack of looping further impairs flow distribution in this area, as well as at the east end of Adams Street and west end of Parkway Drive. Mains in the latter locations are 6-inch, but dead ends restrict efficient flow delivery. This reduces fire protection at the expense of public safety.

4.6.4 **<u>System Configuration</u>** - The entire portion of Town, north of Railroad Avenue is served by dead end lines. In addition, residents along Adams Street and Parkway Drive are served by 6-inch asbestos cement and 6-inch PVC unlooped lines. Dead end lines tend to collect sediment and allow water to stagnate which leads to water quality problems. *DEQ-1* requires that dead end mains be provided with a flushing hydrant. Alberton has none. Flushing hydrants provide a means for maintaining such lines, but require a regular flushing program to provide any control of stagnant water. *DEQ-1* recommends that dead end lines be looped whenever practical.

4.7 STORAGE TANK AND LEVEL CONTROLS

The existing storage tank lacks adequate capacity for peak demands and fire flows. The structure and interior coating are in good condition, based on an inspection Liquid Engineering in August of 1997. The lack of capacity compromises fire protection, and unprotected ladders and absence of roof railings pose additional safety hazards.

The lack of positive isolation between the tank (and springs) and abandoned water storage reservoirs create other potential health hazards. Abandoned piping and old valves do not provide reliable isolation for the active water supply and storage system.

The existing tank is not equipped with automatic level controls. This leads to periodic overflows down the hillside toward residential homes, particularly with the gravity flow spring source. This creates an environmental problem with wasted water, and could lead to other liability or damage exposure for the Town.

Another problem with the system is that the well has no control link to the storage tank. When the tank is low, the well must be manually turned on. This reduces reliability, particularly during a fire event. Telemetry should be provided to ensure that the storage tank remains near full for fire protection.

4.8 DISINFECTION

With disinfection provided only on the spring supply, chlorine residual in the distribution system inevitably fluctuates when the well is in use. Coupled with the stagnation problems associated with dead end mains, this poses a potential health hazard.

Chlorination facilities at the storage tank (for the spring supply) pose other health hazards. Ventilation and leak detection alarm provisions are substandard. No emergency scrubber is provided. Residual monitoring is not automated, although with a relatively constant water flow, this is not critical.

4.9 METERS

Alberton currently doesn't have continuous metering of its water supplies. No metering provisions are provided on the spring supply. No operable flow-rate meter exists at the well; only a totalizer is present.

Customer meters were installed in May-June, 2000. Without additional metering at the sources, no way exists to measure "unaccounted for water". Comparing supply and consumption meter readings is a good tool for quantifying leaking in the system. Without this ability, waste of water can go undetected.

Customer meters should nonetheless encourage water conservation. A reduction in per capita water use will be likely with conversion to a metered rate system. Metered water rates are tentatively scheduled to go into effect near year-end, 2000, following a rate hearing.

4.10 EMERGENCY POWER

Circular DEQ-1 requires auxiliary power when power failure would result in cessation of minimum essential service. Auxiliary power is not required when:

1. Documentation is provided which shows power outages are infrequent and of short duration, and

2. Fire protection is not diminished by power failure.

The current system configuration does not require emergency power because the spring supply provides a constant gravity-flow source. However, if the system were reconfigured to make the well the primary source, consistent with the Town's water rights, emergency power may be required. This would depend in part on the availability of adequate water storage for fire protection.

APPENDIX I

FIRE FLOW REQUIREMENTS

Division III
FIRE PROTECTION
APPENDIX III-A
FIRE-FLOW REQUIREMENTS FOR BUILDINGS
(See U.F.C. Section 903.3)

SECTION 1 — SCOPE

The procedure determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with Appendix III-A. Appendix III-A does not apply to structures other than buildings.

SECTION 2 — DEFINITIONS

For the purpose of Appendix III-A, certain terms are defined as follows:

FIRE AREA is the floor area, in square feet, used to determine the required fire flow.

FIRE FLOW is the flow rate of a water supply, measured at 20 psi (137.9 kPa) residual pressure, that is available for firefighting.

SECTION 3 — MODIFICATIONS

3.1 Decreases. Fire-flow requirements may be modified downward by the chief for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

3.2 Increases. Fire flow may be modified upward by the chief where conditions indicate an unusual susceptibility to group fires or conflagrations. An upward modification shall not be more than twice that required for the building under consideration.

SECTION 4 — FIRE AREA

4.1 General. The fire area shall be the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building, except as modified in Section 4.

4.2 Area Separation. Portions of buildings which are separated by one or more four-hour area separation walls constructed in accordance with the Building Code, without openings and provided with a 30-inch (762 mm) parapet, are allowed to be considered as separate fire areas.

4.3 Type I and Type II-F.R. Construction. The fire area of buildings constructed of Type I and Type II-F.R. construction shall be the area of the three largest successive floors.

SECTION 5 — FIRE-FLOW REQUIREMENTS FOR BUILDINGS

5.1 One- and Two-Family Dwellings. The minimum fire flow and flow duration requirements for one- and two-family dwellings having a fire area which does not exceed 3,600 square feet (344.5 m^2) shall be 1,000 gallons per minute (3785.4 L/min.). Fire flow and flow duration for dwellings having a fire area in excess of 3,600 square feet (344.5 m^2) shall not be less than that specified in Table A-III-A-1.

> EXCEPTION: A reduction in required fire flow of 50 percent, as approved by the chief, is allowed when the building is provided with an approved automatic sprinkler system.

5.2 Buildings other than One- and Two-Family Dwellings. The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table A-III-A-1.

EXCEPTION: A reduction in required fire flow of up to 75 percent, as approved by the chief, is allowed when the building is provided with an approved automatic sprinkler system. The resulting fire flow shall not be less than 1,500 gallons per minute (5677.5 L/min.).

TABLE A-III-A-1—MINIMUM REQUIRED FIRE FLOW AND FLOW DURATION FOR BUILDINGS

FIRE AREA (square feet) × 0.0929 for m²					FIRE FLOW (gallons per minute)[2] × 3.785 for L/min.	FLOW DURATION (hours)
Type I-F.R. II-F.R.[1]	Type II One-HR. III One-HR.[1]	Type IV-H.T. V-One-HR.[1]	Type II-N III-N[1]	Type V-N[1]		
Up to 22,700	Up to 12,700	Up to 8,200	Up to 5,900	Up to 3,600	1,500	2
30,200	17,000	10,900	7,900	4,800	1,750	
38,700	21,800	12,900	9,800	6,200	2,000	
48,300	24,200	17,400	12,600	7,700	2,250	
59,000	33,200	21,300	15,400	9,400	2,500	
70,900	39,700	25,500	18,400	11,300	2,750	
83,700	47,100	30,100	21,800	13,400	3,000	3
97,700	54,900	35,200	25,900	15,600	3,250	
112,700	63,400	40,600	29,300	18,000	3,500	
128,700	72,400	46,400	33,500	20,600	3,750	
145,900	82,100	52,500	37,900	23,300	4,000	4
164,200	92,400	59,100	42,700	26,300	4,250	
183,400	103,100	66,000	47,700	29,300	4,500	
203,700	114,600	73,300	53,000	32,600	4,750	
225,200	126,700	81,100	58,600	36,000	5,000	
247,700	139,400	89,200	65,400	39,600	5,250	
271,200	152,600	97,700	70,600	43,400	5,500	
295,900	166,500	106,500	77,000	47,400	5,750	
Greater	Greater	115,800	83,700	51,500	6,000	
"	"	125,500	90,600	55,700	6,250	
"	"	135,500	97,900	60,200	6,500	
"	"	145,800	106,800	64,800	6,750	
"	"	156,700	113,200	69,600	7,000	
"	"	167,900	121,300	74,600	7,250	
"	"	179,400	129,600	79,800	7,500	
"	"	191,400	138,300	85,100	7,750	
"	"	Greater	Greater	Greater	8,000	

[1]Types of construction are based upon the Building Code.

[2]Measured at 20 psi (137.9 kPa). See Appendix III-A, Section 2.

APPENDIX III-B
FIRE HYDRANT LOCATIONS AND DISTRIBUTION
(See U.F.C. Section 903.4.2)

SECTION 1 — SCOPE

Fire hydrants shall be provided in accordance with Appendix III-B for the protection of buildings, or portions of buildings, hereafter constructed.

SECTION 2 — LOCATION

Fire hydrants shall be provided along required fire apparatus access roads and adjacent public streets.

SECTION 3 — NUMBER OF FIRE HYDRANTS

The minimum number of fire hydrants available to a building shall not be less than that listed in Table A-III-B-1. The number of fire hydrants available to a complex or subdivision shall not be less than that determined by spacing requirements listed in Table A-III-B-1 when applied to fire apparatus access roads and perimeter public streets from which fire operations could be conducted.

SECTION 4 — CONSIDERATION OF EXISTING FIRE HYDRANTS

Existing fire hydrants on public streets are allowed to be considered as available. Existing fire hydrants on adjacent properties shall not be considered available unless fire apparatus access roads extend between properties and easements are established to prevent obstruction of such roads.

SECTION 5 — DISTRIBUTION OF FIRE HYDRANTS

The average spacing between fire hydrants shall not exceed that listed in Table A-III-B-1.

EXCEPTION: The chief may accept a deficiency of up to 10 percent where existing fire hydrants provide all or a portion of the required fire hydrant service.

Regardless of the average spacing, fire hydrants shall be located such that all points on streets and access roads adjacent to a building are within the distances listed in Table A-III-B-1.

TABLE A-III-B-1—NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NO. OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[1,2,3] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[4]
× 3.785 for L/min.		× 304.8 for mm	
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more[5]	200	120

[1]Reduce by 100 feet (30 480 mm) for dead-end streets or roads.

[2]Where streets are provided with median dividers which can be crossed by firefighters pulling hose lines, or arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet (152.4 m) on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute (26 495 L/min.) and 400 feet (122 m) for higher fire-flow requirements.

[3]Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at not less than 1,000-foot (305 m) spacing to provide for transportation hazards.

[4]Reduce by 50 feet (15 240 mm) for dead-end streets or roads.

[5]One hydrant for each 1,000 gallons per minute (3785 L/min.) or fraction thereof.

rooms or suites are separated from each other and from corridors by not less than one-hour fire-resistive construction may be constructed of:

1. Noncombustible materials or fire-retardant-treated wood in buildings of any type of construction; or

2. Combustible framing with noncombustible materials applied to the framing in buildings of Type III or V construction.

Openings to such corridors shall be equipped with doors conforming to Section 1005.8 regardless of the occupant load served.

For use of plastics in partitions, see Section 2603.10.

601.5.3 Folding, portable or movable partitions. Approved folding, portable or movable partitions need not have a fire-resistive rating, provided:

1. They do not block required exits (without providing alternative conforming exits) and they do not establish an exit corridor.

2. Their location is restricted by means of permanent tracks, guides or other approved methods.

3. Flammability shall be limited to materials having a flame-spread classification as set forth in Table 8-B for rooms or areas.

601.5.4 Walls fronting on streets or yards. Regardless of fire-resistive requirements for exterior walls, certain elements of the walls fronting on streets or yards having a width of 40 feet (12 192 mm) may be constructed as follows:

1. Bulkheads below show windows, show-window frames, aprons and showcases may be of combustible materials, provided the height of such construction does not exceed 15 feet (4572 mm) above grade.

2. Wood veneer of boards not less than 1-inch (25 mm) nominal thickness or exterior-type panels not less than $^3/_8$-inch (9.5 mm) nominal thickness may be applied to walls, provided the veneer does not exceed 15 feet (4572 mm) above grade, and further provided such veneer shall be placed either directly against noncombustible surfaces or furred out from such surfaces not to exceed $1^5/_8$ inches (41 mm) with all concealed spaces fire-blocked as provided in Section 708. Where boards, panels and furring as described above comply with Section 207 as fire-retardant-treated wood suitable for exterior exposure, the height above grade may be increased to 35 feet (10 668 mm).

601.5.5 Trim. Trim, picture molds, chair rails, baseboards, handrails and show-window backing may be of wood. Unprotected wood doors and windows may be used except where openings are required to be fire protected.

Foam plastic trim covering not more than 10 percent of the wall or ceiling area may be used, provided such trim (1) has a density of no less than 20 pounds per cubic foot (320.4 kg/m^3), (2) has a maximum thickness of $^1/_2$ inch (12.7 mm) and a maximum width of 4 inches (102 mm) and (3) has a flame-spread rating no greater than 75.

Materials used for interior finish of walls and ceilings, including wainscoting, shall be as specified in Chapter 8.

601.5.6 Loading platforms. Exterior loading platforms may be of noncombustible construction or heavy-timber construction with wood floors not less than 2-inch (51 mm) nominal thickness. Such wood construction shall not be carried through the exterior walls.

601.5.7 Insulating boards. Combustible insulating boards may be used under finished flooring.

SECTION 602 — TYPE I FIRE-RESISTIVE BUILDINGS

602.1 Definition. The structural elements in Type I fire-resistive (F.R.) buildings shall be of steel, iron, concrete or masonry.

Walls and permanent partitions shall be of noncombustible fire-resistive construction except that permanent nonbearing partitions of one-hour or two-hour fire-resistive construction, which are not part of a shaft enclosure, may have fire-retardant-treated wood (see Section 207) within the assembly.

Materials of construction and fire-resistive requirements shall be as specified in Section 601 and Chapter 7.

602.2 Structural Framework. Structural framework shall be of structural steel or iron as specified in Chapter 22, reinforced concrete as in Chapter 19, or reinforced masonry as in Chapter 21.

For additional requirements for Group H Occupancies, see Section 307.2.

602.3 Exterior Walls and Openings.

602.3.1 Exterior walls. Exterior walls and all structural members shall comply with the requirements specified in Section 503 and Table 5-A and the fire-resistive provisions set forth in Table 6-A.

602.3.2 Openings in walls. All openings in exterior walls shall conform to the requirements of Section 503.2 and Table 5-A.

602.4 Stairway Construction. Stairways shall be constructed of reinforced concrete, iron or steel with treads and risers of concrete, iron or steel. Brick, marble, tile or other hard noncombustible materials may be used for the finish of such treads and risers.

Stairways shall comply with the requirements of Chapter 10.

602.5 Roofs. Except in retail sales and storage areas classified as Groups M and S, Division 1 Occupancies and in Group H Occupancies, roofs and their members, other than the structural frame, may be of unprotected noncombustible materials when every part of the roof framing, including the structural frame, is 25 feet (7620 mm) or more above the floor, balcony or gallery immediately below. Heavy-timber members in accordance with Section 605.6 may be used for such unprotected members in one-story buildings.

When every part of the structural framework of the roof of a Group A or E Occupancy or of an atrium is not less than 25 feet (7620 mm) above any floor, balcony or gallery, fire protection of all members of the roof construction, including those of the structural frame, may be omitted. Heavy-timber members in accordance with Section 605.6 may be used for such unprotected members in one-story buildings.

Roofs of unprotected noncombustible or heavy-timber construction conforming to Section 605.6.4 may be less than 25 feet (7620 mm) above any floor, balcony or gallery of a Group A, Division 2.1 Occupancy having an occupant load of 10,000 or more when all of the following conditions are met:

1. The building is not more than one story in height, except for multilevel areas located under the roof and used for locker rooms, exiting, concession stands, mechanical rooms and others accessory to the assembly room.

2. The area in which the roof clearance is less than 25 feet (7620 mm) does not exceed 35 percent of the area encompassed by the exterior walls.

3. An approved supervised automatic sprinkler system shall be installed throughout.

Where every part of the structural steel framework of the roof of a Group A or E Occupancy is more than 18 feet (5486 mm) and less than 25 feet (7620 mm) above any floor, balcony or gallery, the roof construction shall be protected by a ceiling of not less than one-hour fire-resistive construction.

Roof coverings shall be as specified in Chapter 32.

SECTION 603 — TYPE II BUILDINGS

603.1 Definition. The structural elements in Type II-F.R. buildings shall be of steel, iron, concrete or masonry.

The structural elements of Type II One-hour or II-N buildings shall be of noncombustible materials.

Floor construction of Type II One-hour and Type II-N buildings shall be of noncombustible material, provided, however, that a wood surface or finish may be applied over such noncombustible material.

Walls and permanent partitions of Type II-F.R. buildings shall be of noncombustible fire-resistive construction, except that permanent nonbearing partitions of one-hour or two-hour fire-resistive construction, which are not part of a shaft enclosure, may have fire-retardant-treated wood (see Section 207) within the assembly.

Type II One-hour buildings shall be of noncombustible construction and one-hour fire resistive throughout except that permanent nonbearing partitions may use fire-retardant-treated wood (see Section 207) within the assembly, provided fire-resistive requirements are maintained.

Walls and permanent partitions of Type II-N buildings shall be of noncombustible materials.

Materials of construction and fire-resistive requirements shall be as specified in Section 601.

For requirements due to occupancy, see Chapter 3.

603.2 Structural Framework. Structural framework shall be as specified in Chapter 22 for iron and steel, Chapter 19 for concrete and Chapter 21 for masonry.

603.3 Exterior Walls and Openings.

603.3.1 Exterior walls. Exterior walls and all structural members shall comply with the requirements specified in Section 503 and Table 5-A and the fire-resistive provisions set forth in Table 6-A.

603.3.2 Openings in walls. All openings in exterior walls of Type II-F.R. buildings shall conform to the requirements of Section 503.2 and Table 5-A.

603.4 Stairway Construction. Stairways of Type II-F.R. buildings shall be constructed of reinforced concrete, iron or steel with treads and risers of concrete, iron or steel. Brick, marble, tile or other hard noncombustible materials may be used for the finish of such treads and risers. Stairways of Type II One-hour and Type II-N buildings shall be of noncombustible construction.

Stairways shall comply with the requirements of Chapter 10.

603.5 Roofs. Roofs shall be of noncombustible construction, except that in Type II-F.R. and Type II One-hour buildings, roofs may be as specified in Section 602.5.

Roof coverings shall be as specified in Chapter 15.

SECTION 604 — TYPE III BUILDINGS

604.1 Definition. Structural elements in Type III buildings may be of any materials permitted by this code.

Type III One-hour buildings shall be of one-hour fire-resistive construction throughout.

604.2 Structural Framework. Structural framework shall be of steel or iron as specified in Chapter 22, concrete as in Chapter 19, masonry as in Chapter 21, or wood as in Chapter 23 and this chapter.

604.3 Exterior Walls, Openings and Partitions.

604.3.1 Exterior walls. Exterior walls shall be constructed of noncombustible materials and shall comply with the fire-resistive requirements set forth in Section 503 and Tables 5-A and 6-A.

604.3.2 Openings in walls. Openings in exterior walls shall conform to the requirements of Section 503.2 and Table 5-A.

604.3.3 Partitions. Bearing partitions, when constructed of wood, shall comply with Section 2318.

604.4 Stairway Construction.

604.4.1 General. Stairways shall comply with the requirements of Chapter 10.

604.4.2 Interior. Interior stairways serving buildings not exceeding three stories in height may be constructed of any material permitted by this code.

In buildings more than three stories in height, interior stairways shall be constructed as required for Type I buildings.

604.4.3 Exterior. Exterior stairways shall be of noncombustible material except that on buildings not exceeding two stories in height, they may be of wood not less than 2 inches (51 mm) in nominal thickness.

604.5 Roofs. Roof coverings shall be as specified in Chapter 15.

Except in retail sales and storage areas classified as Group M or S, Division 1 Occupancies and in Group H Occupancies, roofs and their members other than the structural frame may be of unprotected noncombustible materials when every part of the roof framing, including the structural frame, is 25 feet (7620 mm) or more above the floor, balcony or gallery immediately below. Heavy-timber members in accordance with Section 605.6 may be used for such unprotected members in one-story buildings.

SECTION 605 — TYPE IV BUILDINGS

605.1 Definition. Structural elements of Type IV buildings may be of any materials permitted by this code.

Type IV construction shall conform to Section 605.6 except that permanent partitions and members of the structural frame may be of other materials, provided they have a fire resistance of not less than one hour.

605.2 Structural Framework. Structural framework shall be of steel or iron as specified in Chapter 22, concrete as in Chapter 19, masonry as in Chapter 21, or wood as in Chapter 23 and this chapter.

605.3 Exterior Walls, Openings and Partitions.

605.3.1 Exterior walls. Exterior walls shall be constructed of noncombustible materials and shall comply with the fire-resistive requirements set forth in Section 503 and Tables 5-A and 6-A.

605.3.2 Openings in walls. Openings in exterior walls shall conform to the requirements of Section 503.2 and Table 5-A.

605.3.3 Partitions. Bearing partitions, when constructed of wood, shall comply with Section 2318.

605.4 Stairway Construction.

605.4.1 General. Stairways shall comply with the requirements of Chapter 10.

605.4.2 Interior. Interior stairways serving buildings not exceeding three stories in height may be constructed of wood or as required for Type I buildings. If constructed of wood, treads and risers shall not be less than 2 inches (51 mm) in thickness, except where built on laminated or plank inclines as required for floors, where they may be of 1-inch (25 mm) thickness. Wood stair stringers shall be a minimum of 3 inches (76 mm) in thickness and not less than 10 inches (254 mm) in depth.

In buildings more than three stories in height, interior stairways shall be constructed as required for Type I buildings.

605.4.3 Exterior. Exterior stairways shall be of noncombustible material except that on buildings not exceeding two stories in height they may be of wood not less than 2 inches (51 mm) in nominal thickness.

605.5 Roofs. Roof coverings shall be as specified in Chapter 15.

605.6 Heavy-timber Construction.

605.6.1 General. Details of heavy-timber construction shall be in accordance with the provisions of this section. Unless otherwise specified, all dimensions are nominal as defined in Section 2302.

605.6.2 Columns. Wood columns may be of sawn timber or structural glued-laminated timber not less than 8 inches (203 mm) in any dimension when supporting roof or floor loads except as specified in Section 605.6.4.

Columns shall be continuous or superimposed and connected in an approved manner.

605.6.3 Floor framing. Beams and girders may be of sawn timber or structural glued-laminated timber and shall not be less than 6 inches (152 mm) in width and not less than 10 inches (254 mm) in depth.

Framed sawn timber or structural glued-laminated timber arches, which spring from the floor line and support floor loads, shall not be less than 8 inches (203 mm) in any dimension.

Framed lumber or structural glued-laminated timber trusses supporting floor loads shall have members of not less than 8 inches (203 mm) in any dimension.

605.6.4 Roof framing. Framed sawn timber arches or structural glued-laminated timber arches for roof construction, which spring from the floor line and do not support floor loads, shall have members not less than 6 inches (152 mm) in width and not less than 8 inches (203 mm) in depth for the lower half of the height and not less than 6 inches (152 mm) in depth for the upper half.

Framed sawn timber or structural glued-laminated timber arches for roof construction, which spring from the top of walls or wall abutments, framed lumber or structural glued-laminated timber trusses, and other roof framing which does not support floor loads, shall have members not less than 4 inches (102 mm) in width and not less than 6 inches (152 mm) in depth. Spaced members may be composed of two or more pieces not less than 3 inches (76 mm) in thickness, when blocked solidly throughout their intervening spaces, or when such spaces are tightly closed by a continuous wood cover plate of not less than 2 inches (51 mm) in thickness, secured to the underside of the members. Splice plates shall not be less than 3 inches (76 mm) in thickness. When protected by an approved automatic sprinkler system under the roof deck, framing members shall not be less than 3 inches (76 mm) in thickness.

605.6.5 Floors. Floors shall be without concealed spaces. Floors shall be of planks, splined or tongue and groove, of not less than 3 inches (76 mm) in thickness covered with 1-inch (25 mm) tongue-and-groove flooring laid crosswise or diagonally, or $^{15}/_{32}$-inch (12 mm) wood structural panels, or of plank not less than 4 inches (102 mm) in width set on edge close together and well spiked, and covered with 1-inch (25 mm) flooring or $^{15}/_{32}$-inch (12 mm) wood structural panels. The lumber shall be laid so that no continuous line of joints will occur except at points of support. Floors shall not extend closer than $^{1}/_{2}$ inch (13 mm) to walls. Such $^{1}/_{2}$-inch (13 mm) space shall be covered by a molding fastened to the wall and so arranged that it will not obstruct the swelling or shrinkage movements of the floor. Corbeling of masonry walls under floors may be used in place of such molding.

605.6.6 Roof decks. Roofs shall be without concealed spaces and roof decks shall be of planks, splined or tongue and groove, of not less than 2-inch (51 mm) thickness, or $1^{1}/_{8}$-inch (29 mm) tongue-and-groove wood structural panels with exterior glue, or of a double thickness of 1-inch (25 mm) boards with tongue-and-groove joints, or with staggered joints, of lumber not less than 3 inches (76 mm) nominal in width, set on edge close together and laid as required for floors.

605.6.7 Construction details. Approved wall plate boxes or hangers shall be provided where wood beams, girders or trusses rest on masonry or concrete walls.

Girders and beams shall be closely fitted around columns, and adjoining ends shall be cross tied to each other, or intertied by caps or ties, to transfer horizontal loads across the joints. Wood bolsters may be placed on top of columns which support roof loads only.

Where intermediate beams are used to support a floor, they shall rest on top of the girders, or shall be supported by ledgers or blocks securely fastened to the sides of the girders, or they may be supported by approved metal hangers into which the ends of the beams shall be closely fitted.

In heavy-timber roof construction, every roof girder and at least every alternate roof beam shall be anchored to its supporting member; roof decks, where supported by a wall, shall be anchored to such wall at intervals not exceeding 20 feet (6096 mm); every monitor and every sawtooth construction shall be anchored to the main roof construction. Such anchors shall consist of steel or iron bolts of sufficient strength to resist vertical uplift of the roof.

605.6.8 Mechanically laminated floors and roof decks. Mechanically laminated floors and roof decks conforming to Section 2323 may be used as heavy-timber floors or roof decks, provided the minimum thickness and other applicable requirements of the section are followed.

605.6.9 Partitions. Partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction of 4-inch (102 mm) thickness, or of one-hour fire-resistive construction.

SECTION 606 — TYPE V BUILDINGS

606.1 Definition. Type V buildings may be of any materials allowed by this code.

Type V One-hour buildings shall be of one-hour fire-resistive construction throughout.

Materials of construction and fire-resistive requirements shall be as specified in Section 601.

For requirements due to occupancy, see Chapter 3.

606.2 Structural Framework. Structural framework shall be of steel or iron as specified in Chapter 22, concrete as in Chapter 19, masonry as in Chapter 21, or wood as in Chapter 23 and this chapter.

606.3 Exterior Walls and Openings. Exterior walls shall comply with fire-resistive requirements set forth in Section 503 and Tables 5-A and 6-A. Openings in exterior walls shall conform to requirements of Section 503.2 and Table 5-A.

606.4 Stairway Construction.

606.4.1 General. Stairways shall comply with the requirements of Chapter 10.

606.4.2 Interior. Interior stairways may be constructed of any materials permitted by this code.

606.4.3 Exterior. Exterior stairways shall be constructed of wood not less than 2 inches (51 mm) in nominal thickness, or may be of noncombustible materials.

606.5 Roofs. Roof coverings shall be as specified in Chapter 15.

Except in retail sales and storage areas classified as Group M or S, Division 1 Occupancies and in Group H Occupancies, roofs and their members other than the structural frame may be of unprotected noncombustible materials when every part of the roof framing, including the structural frame, is 25 feet (7620 mm) or more above the floor, balcony or gallery immediately below. Heavy-timber members in accordance with Section 605.6 may be used for such unprotected members in one-story buildings.

TABLE 6-A—TYPES OF CONSTRUCTION—FIRE-RESISTIVE REQUIREMENTS (In Hours)
For details, see occupancy section in Chapter 3, type of construction sections in this chapter and sections referenced in this table.

	TYPE I	TYPE II			TYPE III		TYPE IV	TYPE V	
	Noncombustible				Combustible				
BUILDING ELEMENT	Fire-resistive	Fire-resistive	1-Hr.	N	1-Hr.	N	H.T.	1-Hr.	N
1. Bearing walls—exterior	4 Sec. 602.3.1	4 Sec. 603.3.1	1	N	4 Sec. 604.3.1	4 Sec. 604.3.1	4 Sec. 605.3.1	1	N
2. Bearing walls—interior	3	2	1	N	1	N	1	1	N
3. Nonbearing walls—exterior	4 Sec. 602.3.1	4 Sec. 603.3.1	1 Sec. 603.3.1	N	4 Sec. 604.3.1	4 Sec. 604.3.1	4 Sec. 605.3.1	1	N
4. Structural frame[1]	3	2	1	N	1	N	1 or H.T.	1	N
5. Partitions—permanent	1[2]	1[2]	1[2]	N	1	N	1 or H.T.	1	N
6. Shaft enclosures[3]	2	2	1	1	1	1	1	1	1
7. Floors and floor-ceilings	2	2	1	N	1	N	H.T.	1	N
8. Roofs and roof-ceilings	2 Sec. 602.5	1 Sec. 603.5	1 Sec. 603.5	N	1	N	H.T.	1	N
9. Exterior doors and windows	Sec. 602.3.2	Sec. 603.3.2	Sec. 603.3.2	Sec. 603.3.2	Sec. 604.3.2	Sec. 604.3.2	Sec. 605.3.2	Sec. 606.3	Sec. 606.3
10. Stairway construction	Sec. 602.4	Sec. 603.4	Sec. 603.4	Sec. 603.4	Sec. 604.4	Sec. 604.4	Sec. 605.4	Sec. 606.4	Sec. 606.4

N—No general requirements for fire resistance. H.T.—Heavy timber.

[1]Structural frame elements in an exterior wall that is located where openings are not permitted or where protection of openings is required, shall be protected against external fire exposure as required for exterior bearing walls or the structural frame, whichever is greater.

[2]Fire-retardant-treated wood (see Section 207) may be used in the assembly, provided fire-resistance requirements are maintained. See Sections 602 and 603.

[3]For special provisions, see Sections 304.6, 306.6 and 711.

APPENDIX J

SPRINKLING REGULATIONS

TOWN OF ALBERTON
SPRINKLING REGULATIONS
Effective Jan. 1 to Dec. 31

REGULATIONS

1. SPRINKLING HOURS:

   7:00 A.M. to 10:00 A.M.
   6:00 P.M. to 10:00 P.M.
   School District 7:00 A.M. to 1:00 P.M. M-W-F

2. SPRINKLING DAYS:

   Even days: All property fronting on the North side of Railroad Ave. to 1028 Rairroad Ave.
   All property fronting on Adams Street.
   Odd days: All property fronting other streets.
   All property fronting on South side of Railroad Ave.

3. AUTOMATIC SPRINKLING SYSTEMS:
   Anyone who has an automatic underground sprinkling system will be allowed to sprinkle during the night from 6 P.M. till 10 A.M. Not to exceed normal length of sprinkling hours (7 hours and must be done on designated day).

4. SWIMMING POOLS:
   Swimming pools must be filld during regular hours, and regular sprinkling days.

5. No open tap, permitting continuous flow of water will be allowed under any circumstances.

6. All hose lines used in sprinkling shall be equipped with suitable nozzles, and no larger than 3/4 inch.

7. Consumers must, at their own expense, keep their fixtures and service pipes in good condition, and all waterways closed when not in use.

8. For violation of these rules for domestic, commercial or sprinkling uses, the Town Council reserves the right to refuse water for further use, after proper notification, and/or impose a suitable fine, whichever the case may warrant, of the party or parties involved.

9. The Town Council reserves the right to impose further restrictions and regulations as may be required.

FIRE ALARM NOTICE: All hoses must be SHUT OFF IMMEDIATELY when the Fire Siren sounds, and sprinkling resumed ONLY after the fire truck has returned to the Fire Hall.

REVISED 1999

ALBERTON TOWN COUNCIL