

# **SPRINGHILL PARK SUBDIVISION**

## **PUBLIC WATER SYSTEM**

**PWS ID No. MT0000796**

### **SOURCE WATER DELINEATION & ASSESSMENT REPORT**

**PREPARED BY:**

**MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY  
SOURCE WATER PROTECTION PROGRAM**

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## EXECUTIVE SUMMARY

This Source Water Delineation and Assessment Report (SWDAR) was prepared as required by the Federal Safe Drinking Water Act, according to a detailed Source Water Assessment Plan developed by a statewide Montana citizens' advisory committee, and approved by the US Environmental Protection Agency. The Department of Environmental Quality (DEQ) is completing assessment and delineation reports for all public water systems in Montana. These reports are intended to provide information so that the public water system staff/operator, consumers, and community citizens can develop strategies to protect drinking water sources. The information provided includes the delineation of the area most critical to maintaining safe drinking water (the inventory region), an inventory of significant potential sources of contamination within this area, and an assessment of the relative threat that these sources pose to the water system.

The Springhill Park Subdivision's drinking water is supplied by three wells. The water source is groundwater. According to the Source Water Protection Program (DEQ, 1999) the source aquifer for the wells is considered to have **moderate sensitivity** to potential contamination, since the aquifer is most likely to be semiconfined Tertiary alluvial fan deposits.

As part of this assessment, three types of source water protection management areas were mapped for the Springhill Park subdivision public water system. They are: the control zone, the inventory region, and the recharge region. Control zones (sometimes called exclusion zones) are 100-foot radius circles around the wellheads. The goal of management in the control zone is to avoid introducing contaminants directly into the water supply's well or immediate surrounding areas. The inventory region was delineated as the portion of the alluvial aquifer extending one mile upgradient. The recharge region represents the area that will contribute water to the wells over long periods of time. This is essentially the East Gallatin River drainage upgradient of the PWS. Potential sources of contamination were inventoried within the control zone and inventory region and the results are as follows:

- No potential sources of contamination were identified within the control zones. The control zones are delineated as circles of 100-foot radius around the wellheads. All sources of potential contaminants should be excluded from the control zones.
- One UST/LUST facility was identified in the inventory region. The DEQ database reports this to be an inactive (and removed) residential tank. The Springhill Park subdivision includes areas of high septic system density and community sewer lines. The sewage treatment plant and drainfield is located within the inventory region. The Riverside Manor subdivision is sewered, and sanitary sewer lines are present within the inventory region. Cropped agricultural land and a golf course were identified within the inventory region.

Of the identified potential contaminant sources, the Source Water Protection Program has determined that significant potential contaminant sources are limited to the sewage treatment plant drainfield, sewer lines, and areas of high septic system density.

Contaminant sources are not inventoried within the recharge region. Land use patterns are identified and evaluated. The recharge region includes the city of Bozeman, with accompanying industrial, commercial and residential land uses. With the exception of the Bozeman urban area, much of the rest of the recharge area is generally sparsely developed and populated.

Coliform bacteria have not been detected in the Springhill Park subdivision PWS water within the past five years. Nitrate levels are generally below 1 mg/L, with the maximum reported concentration in the period reviewed of 0.69 mg/L from Well 1. Dissolved solids are low, with low levels of fluoride (0.7

mg/L) and sulfate (11 mg/L) reported. In general, the water quality appears to be high. The analytical results do not provide any evidence of impact from the inventoried potential contaminant sources.

Low risk potential sources and potential sources located outside the inventory region, but within the recharge region, may still pose a threat over time. These are not considered in this assessment, however. The susceptibility analysis is intended to provide the operator with information on where the greatest risk occurs. To this end, the assessment is focused on potential contaminant sources that the Source Water Protection Section has determined to be significant. These are detailed in Chapter 4.

Mitigating and managing potential sources of contamination identified within the inventory region are often beyond the scope of what an operator of a relatively small PWS may accomplish. The SWP section recommends that whenever possible, the operator should illustrate to residents the potential hazards associated with the onsite septic systems, and the need for regular maintenance.

The costs associated with contaminated drinking water are high, and prevention is vastly preferable to treatment. Public awareness is a powerful tool for protecting drinking water. The information in this report is intended to help increase public awareness about the relationship between land use activities and drinking water quality.

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## 1.0 INTRODUCTION

The primary purpose of this source water delineation and assessment report (SWDAR) is to provide information that helps the Springhill Park subdivision public water supply (PWS) protect its drinking water sources. The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to protect public drinking water supplies. The Springhill Park subdivision PWS is classified as a community PWS, as it serves more than 25 year-round residents.

This Source Water Delineation and Assessment Report is intended to meet the technical requirements for delineation and assessment of the Springhill Park Subdivision Public Water System as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 [U.S. Code Title 42, Chapter 6A, Subchapter XII, Part E, § 300j-13-(a) Source Water Assessment].

Eric Sivers, a hydrogeologist with the Montana Department of Environmental Quality (DEQ) Source Water Protection Section, completed the Springhill Park subdivision (PWS ID No. MT0000796) Source Water Delineation and Assessment Report. Information on the PWS was obtained from the most recent sanitary survey (June 2004) and from the operator, Charles Vanderpas. Additional references are detailed at the end of this report.

## 2.0 BACKGROUND

The Springhill Park subdivision is located in Gallatin County in southwestern Montana, approximately three miles north of Bozeman ([Figure 1](#)). According to the Census Bureau, the population of Gallatin County in 2000 was 67,831. Approximately 100 persons reside in the Springhill Park subdivision.

### 2.1 PHYSICAL SETTING

#### 2.1.1 Geography and Geology

The PWS lies at the northeastern edge of the Gallatin Valley, just north of the interstate. The PWS is located in the East Gallatin River valley. The elevation is approximately 4,600 feet above mean sea level.

The Gallatin Valley extends over roughly 520 square miles of southwestern Montana. The valley is bounded by the Horseshoe Hills to the north, the Gallatin and Madison ranges to the south, the Bridge range to the east, and the Western Three Forks Valley to the west (Kendy and Tresch, 1996). The valley is drained by the Gallatin River and its tributaries.

The valley is an east-tilted graben (a downdropped fault block). Precambrian rocks probably floor the valley, but the majority of the basin is filled with Tertiary sedimentary rocks, over which Quaternary alluvium was deposited. The mountains surrounding the basin are composed of metamorphic, sedimentary and igneous bedrock. The bedrock is generally less permeable than the unconsolidated basin sediments, although fractures or carbonate dissolution features create significant local flow conduits.

More detailed information on the hydrogeology of the study area is provided in Section 2.1.3.

#### 2.1.2 Climate

Climate in the area is typical of intermontane valleys in southwestern Montana. The climate summary is based upon data from the MSU Bozeman climate station, which is located at a lower elevation than the PWS. Annual total precipitation is 16.3 inches, and occurs year

round. The area receives an annual average of 56.2 inches of snow, mainly from October to May. Climate data is provided by the Western Regional Climate Center, operated by the Desert Research Institute of Reno, Nevada. See Table 1 for additional climate information.

**Table 1. Monthly Climate Summary: Bozeman MSU Climate Station (241044)**

Period of Record: 04/08/1892 to 09/30/2004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Ave. Max. Temp (F)	31.3	35.3	42.3	53.7	63.1	71.5	81.1	80.2	69.1	57.5	42.0	33.6	55.1
Ave. Min. Temp. (F)	11.8	15.2	21.2	30.5	38.5	45.2	51.0	49.5	41.1	32.8	22.1	14.6	31.1
Ave Tot. Precip. (in.)	0.88	0.74	1.33	1.81	2.87	2.88	1.36	1.24	1.74	1.48	1.08	0.86	18.27
Ave. Tot. Snowfall (in.)	12.7	10.2	16.1	12.2	4.2	0.5	0.0	0.1	0.8	5.3	11.0	11.6	84.7
Ave Snow Depth (in.)	5	5	3	1	0	0	0	0	0	0	2	3	2

### 2.1.3 Source Water

The hydrogeology of the Gallatin Valley is best described in Hackett *et al.*, (1960), and is summarized in this discussion. Within the Gallatin Valley are two primary aquifer systems: a shallow Quaternary alluvial system, and underlying Tertiary deposits. The Quaternary alluvial system fills a valley eroded into the Tertiary beds during pre-modern times. The Quaternary alluvial aquifer includes relatively coarse sand and gravel deposited in the floodplain of the Gallatin River and its tributaries, including the East Gallatin River. This aquifer is unconfined and in direct communication with the surface waters in the Gallatin River drainage system.

The surface drainage system and related alluvial deposits are superimposed on a sequence of Tertiary sediments. These deposits form a deeper aquifer system in consolidated to semi-consolidated lenses of coarse-grained material deposited in both alluvial and lacustrine environments. The Tertiary units fill the Gallatin and Madison River Valleys as a single system in a structurally defined geologic basin. These Tertiary sediments are exposed in the Camp Creek Hills that separate the Madison and Gallatin drainages. The total thickness of the Tertiary strata in the Gallatin Valley may exceed 4,000 feet, based on exploratory drilling for oil (Hackett *et al.*, 1960). The aquifer system within the Tertiary strata is considered semi-confined due to the thick clay sequences present in some areas.

The well logs did not include detailed descriptions of the lithologies encountered. Based on their depth and the limited descriptions, it is likely that the PWS supply wells are completed in sediments of a Tertiary alluvial fan deposited at the front of the Bridger Range.

## 2.2 THE PUBLIC WATER SUPPLY

### 2.2.1 Water Supply System

Three wells provide groundwater to the system. The locations of these sources are indicated on [Figure 1](#). The wells transmit water to the distribution system without treatment. The PWS distributes water through 43 service connections. No storage is presently available; the system maintains pressure via captive air tanks. The Springhill Park Subdivision PWS is classified as a community public water system since it serves more than 25 year-round residents.

### 2.2.2 Supply Well Information

No construction details are available for Well 1. According to the sanitary survey, it is approximately 200 feet deep and used as a standby source. Wells 2 and 3 were drilled in 1996 and serve as the primary supplies. Well 2 is five inches in diameter, 145 feet deep and yields 35 gallons per minute; Well 3 is six inches in diameter, 222 feet deep and yields 30 gallons per minute. Lithologic descriptions on the logs are poor. Based on comparisons with available geologic references for the Gallatin Valley, the wells are likely screened in gravel bodies of a Tertiary alluvial fan complex. Construction details for Wells 2 and 3 are provided in the well logs, which are attached as Appendix A.

## 2.3 WATER QUALITY

Each PWS performs regular sampling of its water supply to detect contamination. The analytical parameters for a community PWS include: coliform bacteria, nitrates, metals, petroleum hydrocarbons, synthetic organic chemicals, and radionuclides. The monitoring schedule depends on factors such as the type of PWS, type of source water (surface water or groundwater), the number of supplies (e.g. wells, springs or intakes), and the population served. Monitoring programs are tailored to each system, following the general protocols defined by DEQ and the US EPA. Monitoring schedules are available online at: <http://nris.state.mt.us/wis/swap/swapquery.asp>. The Springhill Park subdivision PWS monitoring data from DEQ's database for the past five years was reviewed and is summarized in this section. Analytical results are reported in units of milligrams per liter (mg/L, equivalent to one part per million) or micrograms per liter ( $\mu\text{g/L}$ , equivalent to one part per billion). The results are compared to quality standards established by the US EPA. Maximum Contaminant Levels (MCLs) are enforceable standards limiting the amount of a contaminant in drinking water. National Secondary Drinking Water Standards (known as SMCLs) are non-enforceable guidelines regarding contaminants that may cause aesthetic (color, odor, taste) or cosmetic (staining, skin/tooth discoloration) issues.

### 2.3.1 Public Water Supply Monitoring Results

Coliform bacteria have not been detected in the Springhill Park Subdivision PWS water within the past five years. Nitrate levels are below 1 mg/L, with the maximum reported concentration in the period reviewed of 0.69 mg/L from Well 1. Dissolved solids are low, with low levels of fluoride (0.7 mg/L) and sulfate (11 mg/L) reported. In general, the water quality appears to be high.

The water quality analysis summary reports are attached as Appendix B.

### 2.3.2 Background Water Quality Monitoring Results

Background water quality data was not identified for the subject PWS. Background water quality typically includes general water quality parameters: major dissolved ions (calcium, magnesium, sodium, potassium, iron, manganese, silica, bicarbonate, carbonate, chloride, sulfate, nitrate, fluoride and orthophosphate), trace elements, and metals.

## 3.0 MANAGEMENT AREA DELINEATION

This report delineates three source water management areas. The goal of source water management is protection of the source water by 1) controlling activities in the control zone(s), 2) managing significant potential contaminant sources in the inventory region, and 3) ensuring that major land use activities or other significant activities in the recharge region pose minimal threat to the source water. Methods and

criteria for delineating source water protection areas for public water supplies are specified in the Montana Source Water Protection Program (DEQ, 1999).

### 3.1 DELINEATION

*Control Zone* – A 100-foot radius control zone is delineated around each of the wellheads.

*Inventory Region* – The inventory region is generally the area that is expected to contribute water to the water supply over three years; this is sometimes referred to as a three-year capture zone. All potentially significant contaminant sources are inventoried in these regions. Lithologic descriptions in the logs for Wells 2 and 3 were inadequate for performing time-of-travel calculations. Therefore, an inventory region was conservatively delineated to extend a default distance of one mile upgradient in the source aquifer (the East Gallatin River bottom). This generally agrees with the three-year time of travel (4,000 feet) estimated for the Riverside Water & Sewer District, located slightly south of the PWS.

*Recharge Region* – Since the aquifer system is semiconfined and is potentially in communication with surface water, the recharge area is delineated as the East Gallatin River valley upstream of the PWS ([Figure 3](#)).

## 4.0 INVENTORY

Significant potential contaminant sources in the source water management areas were inventoried to assess the susceptibility of the Springhill Park Subdivision PWS source water to contamination, and to provide a foundation for source water protection planning. The inventory for the PWS focuses on facilities or features that generate, use, store, or transport potential contaminants, as well as certain land uses in the inventory and recharge regions. It is important to remember that the sources identified in this section are only potential sources of contamination to the drinking water. Contamination of drinking water sources is less likely when potential contaminants are properly managed.

### 4.1 INVENTORY METHOD

Information on facilities and land uses that are potential sources of regulated contaminants was obtained from a number of databases. The process for completing the inventory includes the following:

- Step 1: The Montana State Library Natural Resources Information System (NRIS) GIS database was queried to identify septic land application sites, wastewater treatment plants, animal feeding operations, septic system density, sewer systems, and agricultural land uses.
- Step 2: The DEQ PWS files were reviewed to identify agricultural activities or wastewater treatment in the vicinity of the PWS.
- Step 3: The US Environmental Protection Agency's (EPA) Envirofacts System <<http://www.epa.gov/enviro/>> was queried to identify EPA-regulated facilities located in the management areas. This system accesses facilities listed in the following databases: Resource Conservation and Recovery Information System (RCRIS), Biennial Reporting System (BRS), Toxic Release Inventory System (TRIS), and Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) and the Permit Compliance System (PCS - for Concentrated Animal Feeding Operations with MPDES permits). The available reports were browsed for facility information including the Handler/Facility Classification to be used in assessing whether a facility should be classified as a significant potential contaminant source.

- Step 4: Montana DEQ databases were queried to identify any of the following in the management areas:

Underground storage tanks (USTs) <<http://www.deq.state.mt.us/UST/USTDownloads.asp>>

Hazardous waste contaminated sites, above ground storage tanks (ASTs), landfills, and abandoned and active mines, including gravel pits <<http://nr.is.state.mt.us/gis/bundler/>>

Any information on past releases and present compliance status was noted.

Potential contaminant sources are considered significant if they fall into one or more of the following categories:

1. Large quantity hazardous waste generators.
2. Landfills.
3. Underground storage tanks.
4. Known groundwater contamination (including open or closed hazardous waste sites, state or federal Superfund sites, and leaking UST sites).
5. Underground injection well.
6. Major roads or rail transportation routes.
7. Cultivated cropland exceeding 20% of the inventory region.
8. Animal feeding operations.
9. Wastewater treatment facilities, sludge handling sites, or land application areas.
10. Septic systems.
11. Sewer mains.
12. Storm sewer outflows.
13. Abandoned or active mines

## 4.2 INVENTORY RESULTS

### 4.2.1 Control Zone Inventory Results

No significant potential sources of contamination were identified within the 100-foot radius control zones. As a blanket statement, the control zone should be isolated from traffic and passers-by, and drainage away from the wellheads should be maintained.

### 4.2.2 Inventory Region Results

*Point Sources:* The Springhill Park drainfield is located within the inventory region. Due to the population served, this is a large capacity drainfield, and is considered to be a point source. One UST facility was identified in the inventory region. The UST is reported to be an inactive residential tank, and has been removed from the ground, according to the DEQ database.

*Nonpoint Sources:* The first phase (constructed 1972-1973) of the Springhill Park subdivision is mapped as high septic system density. The second phase (1996) included construction of a sanitary sewer and sewage treatment system. The operator estimated that as of July 2005 approximately 60-70% of the homes were connected to the sewer system. The Springhill Park sewer lines are present within the inventory region. The nearby Riverside Manor subdivision includes a water and sewer district (WSD) with a centralized sewer system. While the sewer lines are within the inventory region, the WSD's wastewater treatment is located outside the inventory region. Cropped agricultural land occupies a small percentage of the inventory region. A golf course is present in the inventory region.

Of the identified potential contaminant sources, the Source Water Protection Program has determined that significant potential contaminant sources are limited to the drainfield, the

septic system density, and the sewer lines. The PWS' susceptibility to these potential contaminants will be assessed in Section 5, and presented in Table 2.

#### 4.2.3 Recharge Region Results

Contaminant sources are not inventoried within the recharge region. However, land use patterns are identified and evaluated. Land use varies widely, from urban commercial, industrial and residential uses in the city of Bozeman, to relatively isolated forest in the upper reaches of the recharge region. A major transportation corridor, Interstate 90, traverses the recharge region, as does a rail line. With the exception of the Bozeman urban area, the majority of land uses in the recharge region are generally protective of source water.

### 5.0 SUSCEPTIBILITY ASSESSMENT

*Susceptibility* is the degree of likelihood for a public water supply to be impacted by inventoried contaminant sources. Susceptibility is determined in accordance with the DEQ Source Water Protection Program (DEQ, 1999). This guidance document is available on the DEQ Source Water Protection website (see the Reference section), or by request.

Susceptibility is determined by considering the *hazard* that significant potential contaminant source presents to the PWS source water, relative to any *barriers* to the contaminant. Hazard is determined by the proximity or density of significant potential contaminant sources, according to a formula laid out in the Source Water Protection Program (DEQ, 1999). Barriers to contamination are anything that decreases the likelihood of contaminants reaching a water source. No barriers were identified for the Springhill Park subdivision PWS.

Inventory results and management recommendations for the Springhill Park Subdivision PWS are provided in Table 2. In some cases the management recommendations are fairly site-specific and can be implemented by the public water supply. However, other management options can only be implemented by federal, state, county or local governmental entities. When the latter options are mentioned, it is not implied or suggested that this public water supply should lead or spearhead the effort to implement the management option. It is assumed that representatives from this public water supply would participate in the public process sponsored by various governmental entities to develop and implement any of these management options.

**Table 2. Susceptibility Assessment of Significant Potential Contaminant Sources**

Potential Contaminant Source	Potential Contaminants	Hazard	Hazard	Barriers	Susceptibility	Management Recommendations
<i>Inventory Region</i>						
Septic Systems and community drainfield	Pathogens, nitrate (NO <sub>3</sub> )	System failure could result in discharge of untreated effluent	Moderate	Depth to intake	Low	Encourage septic system owners in PWS community to properly maintain their septic systems, and connect to sewer when possible.
Sewer System	Pathogens, nitrate (NO <sub>3</sub> )	System failure could result in discharge of untreated effluent	Moderate	Depth to intake	Low	BMPs: maintain sewer lines in good working order, periodically inspect for leakage.
<i>Other Potential Contaminant Sources, not rated significant</i>						
Golf Course	NO <sub>3</sub> and SOCs from fertilizer, pesticides and herbicides.	Spills, over application	Low	Depth to intake	Very low	Encourage BMPs. Increase awareness of source water issues by participating in local water quality district.
Cropped Agricultural Land	NO <sub>3</sub> and SOCs from fertilizer, pesticides and herbicides.	Spills, over application	Low	Depth to intake	Very low	Encourage BMPs. Increase awareness of source water issues by participating in local water quality district.
UST/LUST	VOCs	Release of petroleum hydrocarbons to soil and groundwater	Low	Depth to intake	Very low	Diligently maintain PWS monitoring schedule.

## 6.0 LIMITATIONS

This Source Water Delineation and Assessment Report is intended to meet the technical requirements for delineation and assessment of the Springhill Park subdivision Public Water System (PWS) as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 [U.S. Code Title 42, Chapter 6A, Subchapter XII, Part E, § 300j-13-(a) Source Water Assessment]. The following limitations should be noted:

- Not every potential or existing source contamination in the Springhill Park Subdivision area has been identified. Consideration was limited to potential sources of contamination that are within the inventory region and of a type determined by the DEQ to be significant.
- Potential sources of contamination were identified using online databases and available overhead and map imagery. Field surveys and inspections of the inventory region were not conducted. It is highly recommended that the operator or other persons knowledgeable about the community review the inventory, and revise it as necessary.
- The inventory region was delineated on the basis of rudimentary hydrogeologic mapping. The inventory region was limited to a one-mile upgradient extent of the East Gallatin River alluvium. A truly accurate delineation of a three-year time of travel distance would require detailed field investigations, which would be beyond the scope of this report. A time-of-travel calculation could not be performed due to inadequate descriptions of aquifer materials in the well logs.
- The potential contaminant sources described in the inventory are identified from readily available information, as described in Chapter 4. Consequently, unregulated activities or unreported contaminant releases may have been overlooked. Multiple data sources are used to increase the likelihood that major threats to the source water are identified. The inventory is not exhaustive. Absence of a potential contaminant in the inventory or susceptibility assessment of this report does not mean that the potential for contamination does not exist, or that there is no threat.

## 7.0 CONCLUSIONS

The Springhill Park Subdivision's drinking water is supplied by three wells. The water source is groundwater. According to the Source Water Protection Program (DEQ, 1999) the source aquifer for the wells is considered to have **moderate sensitivity** to potential contamination, since the aquifer is most likely to be semiconfined Tertiary alluvial fan deposits.

As part of this assessment, three types of source water protection management areas were mapped for the Springhill Park subdivision public water system. They are: the control zone, the inventory region, and the recharge region. Control zones (sometimes called exclusion zones) are 100-foot radius circles around the wellheads. The goal of management in the control zone is to avoid introducing contaminants directly into the water supply's well or immediate surrounding areas. The inventory region was delineated as the portion of the alluvial aquifer extending one mile upgradient. The recharge region represents the area that will contribute water to the wells over long periods of time. This is essentially the East Gallatin River drainage upgradient of the PWS. Potential sources of contamination were inventoried within the control zone and inventory region and the results are as follows:

- No potential sources of contamination were identified within the control zones. The control zones are delineated as circles of 100-foot radius around the wellheads. All sources of potential contaminants should be excluded from the control zones.
- One UST/LUST facility was identified in the inventory region. The UST is reported to be an inactive (and removed) residential tank, according to the DEQ database. The Springhill Park subdivision is mapped as having a high septic system density, and sewer lines and wastewater treatment plant are present in the subdivision. The Riverside Manor subdivision is sewer, and sanitary sewer lines are present within the inventory region. Cropped agricultural land and a golf course were identified within the inventory region.

Of the identified potential contaminant sources, the Source Water Protection Program has determined that significant potential contaminant sources are limited to the areas of high septic system density.

- Contaminant sources are not inventoried within the recharge region. Land use patterns are identified and evaluated. The recharge region includes the city of Bozeman, with accompanying industrial, commercial and residential land uses. With the exception of the Bozeman urban area, much of the rest of the recharge area is generally sparsely developed and populated.

Coliform bacteria have not been detected in the Springhill Park subdivision PWS water within the past five years. Nitrate levels are generally below 1 mg/L, with the maximum reported concentration in the period reviewed of 0.69 mg/L from Well 1. Dissolved solids are low, with low levels of fluoride (0.7 mg/L) and sulfate (11 mg/L) reported. In general, the water quality appears to be high.

Mitigating and managing potential sources of contamination identified within the inventory region are often beyond the scope of what an operator of a relatively small PWS may accomplish. The SWP section recommends that whenever possible, the operator should illustrate to residents the potential hazards associated with the onsite septic systems, and the need for regular maintenance.

## 8.0 REFERENCES

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## 9.0 GLOSSARY

Aquifer. A water-bearing layer of rock or sediment that will yield water in usable quantity to a well or spring.

Barrier. A physical feature or management plan that reduces the likelihood of contamination of a water source from a potential contaminant source

Best Management Practices (BMPs). Methods for various activities that have been determined to be the most effective, practical means of preventing or reducing non-point source pollution.

Coliform Bacteria. A general type of bacteria found in the intestinal tracts of animals and humans, and also in soils, vegetation and water. Their presence in water is used as an indicator of pollution and possible contamination by pathogens.

Confined Animal Feeding Operation (CAFO). Any agricultural operation that feeds animals within specific areas, not on rangeland. Certain CAFOs require permits for operation.

Confined Aquifer. A fully saturated aquifer overlain by a confining unit such as a clay layer. The static water level in a well in a confined aquifer is at an elevation that is equal to or higher than the base of the overlying confining unit.

Confining Unit. A geologic formation present above a confined aquifer that inhibits the flow of water and maintains the pressure of the groundwater in the aquifer. The physical properties of a confining unit may range from a five-foot thick clay layer to shale that is hundreds of feet thick.

Delineation. The process of determining and mapping source water protection areas.

Geographic Information Systems (GIS). A computerized database management and mapping system that allows for analysis and presentation of geographic data.

Hardness. Characteristic of water caused by presence of various calcium and magnesium salts. Hard water may interfere with some industrial processes and prevent soap from lathering.

Hazard. A relative measure of the potential of a contaminant from a facility or associated with a land use to reach the water source for a public water supply. The location, quantity and toxicity of significant potential contaminant sources determine hazard.

Hydraulic Conductivity. A constant number or coefficient of proportionality that describes the rate water can move through an aquifer material.

Inventory Region. A source water management area for groundwater systems that encompasses the area expected to contribute water to a public water supply within a fixed distance or a specified three year groundwater travel time.

Large Capacity Septic System. Defined by Underground Injection Control regulations as an on-site septic system serving 20 or more persons.

Maximum Contaminant Level (MCL). Maximum concentration of a substance in water that is permitted to be delivered to the users of a public water supply. Set by EPA under authority of the Safe Drinking Water Act to establish concentrations of contaminants in drinking water that are protective of human health.

Montana Bureau of Mines and Geology – Groundwater Information Center (MBMG/GWIC). The database of information on all wells drilled in Montana, including stratigraphic data and well construction data, when available.

Nitrate. An important plant nutrient and type of inorganic fertilizer that can be a potential contaminant in water at high concentrations. In water the major sources of nitrates are wastewater treatment effluent, septic tanks, feed lots and fertilizers.

Nonpoint Source Pollution. Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet. Examples of nonpoint- source pollution include agriculture, forestry, and run-off from city streets. Nonpoint sources of pollution, such as the use of herbicides, can

concentrate low levels of these chemicals into surface and/or groundwaters at increased levels that may exceed MCLs.

Pathogens. A microorganism typically found in the intestinal tracts of mammals, capable of producing disease.

Point Source. A stationary location or a fixed facility from which pollutants are discharged. This includes any single identifiable source of pollution, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fracture, container, rolling stock (tanker truck), or vessel or other floating craft, from which pollutants are or may be discharged.

Pollutant. Generally, any substance introduced into the environment that adversely affects the usefulness of a resource (e.g. groundwater used for drinking water).

Public Water System (PWS). A system that provides water for human consumption through at least 15 service connections or regularly serves 25 individuals.

Pumping Water Level. Water level in a well when the pump is operating.

Sensitivity. The relative ease with which contaminants can migrate to source water through the natural materials

Source Water. Any surface water, spring, or groundwater source that provides water to a public water supply.

Source Water Delineation and Assessment Report (SWDAR). A report for a public water supply that delineates source water protection areas, provides an inventory of potential contaminant sources within the delineated areas, and evaluates the relative susceptibility of the source water to contamination from the potential contaminant sources under “worst-case” conditions.

Source Water Protection Areas. For surface water sources, the land and surface drainage network that contributes water to a stream or reservoir used by a public water supply. For groundwater sources, the area within a fixed radius or three-year travel time from a well, and the land area where the aquifer is recharged.

Static Water Level (SWL). Water level in a well when the pump is not operating.

Susceptibility (of a PWS). The relative potential for a PWS to draw water contaminated at concentrations that would pose concern. Susceptibility is evaluated at the point immediately preceding treatment or, if no treatment is provided, at the entry point to the distribution system.

Transmissivity. A number that describes the ability of an aquifer to transmit water. The transmissivity is determined by multiplying the hydraulic conductivity time the aquifer thickness.

Turbidity. The cloudy appearance of water caused by the presence of suspended matter.

Unconfined Aquifer. An aquifer containing water that is not under pressure. The water table is the top surface of an unconfined aquifer.

Watershed. The region drained by, or contributing water to, a stream, lake, or other water body of water.

## **FIGURES**







**APPENDIX A**

**WELL LOG & PWS SANITARY SURVEY**

Montana Bureau of Mines and Geology  
 Ground-Water Information Center Site Report  
 SPRINGHILL PARK SUBDIVISION - WELL 2

[Plot this site on a topographic map](#)

**Location Information**

GWIC Id: 159581	Source of Data: LOG
Location (TRS): 01S 05E 24 CBCA	Latitude (dd): 45.7344
County (MT): GALLATIN	Longitude (dd): -111.0581
DNRC Water Right: P099453-00	Geomethod: MAP
PWS Id: 00796003	Datum: NAD27
Block: 1	Altitude (feet):
Lot:	Certificate of Survey:
Addition: SPRINGHILL PARK	Type of Site: WELL

**Well Construction and Performance Data**

Total Depth (ft): 145.00	How Drilled: ROTARY
Static Water Level (ft): 10.00	Driller's Name: HAGGERTY
Pumping Water Level (ft): 115.00	Driller License: WWC353
Yield (gpm): 35.00	Completion Date (m/d/y): 6/7/1996
Test Type: AIR	Special Conditions:
Test Duration: 8.00	Is Well Flowing?:
Drill Stem Setting (ft):	Shut-In Pressure:
Recovery Water Level (ft):	Geology/Aquifer: Not Reported
Recovery Time (hrs):	Well/Water Use: PUBLIC WATER SUPPLY
Well Notes: HAGGERTY FILE NO: 96067	

**Hole Diameter Information**

From	To	Diameter
0.0	25.0	10.0
25.0	145.0	6.0

**Annular Seal Information**

From	To	Description
0.0	25.0	BENTONITE

**Lithology Information**

From	To	Description
------	----	-------------

**Casing Information<sup>1</sup>**

From	To	Dia	Wall Thickness	Pressure Rating	Joint Type
-2.0	133.0	6.0			STEEL

**Completion Information<sup>1</sup>**

From	To	Dia	# of Openings	Size of Openings	Description
123.0	143.0	4.0		0.020	SCREEN

0.0	1.0	TOPSOIL
1.0	35.0	GRAVEL
35.0	100.0	CLAY
100.0	140.0	CLAY GRAVEL MIX
140.0	145.0	CLAY

<sup>1</sup> - 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.

Montana Bureau of Mines and Geology  
 Ground-Water Information Center Site Report  
 SPRINGHILL PARK SUBDIVISION - WELL 3

[Plot this site on a topographic map](#)

**Location Information**

GWIC Id: 159582	Source of Data: LOG
Location (TRS): 01S 05E 24 CBCA	Latitude (dd): 45.7344
County (MT): GALLATIN	Longitude (dd): -111.0581
DNRC Water Right:	Geomethod: MAP
PWS Id: 00796004	Datum: NAD27
Block:	Altitude (feet):
Lot: 1	Certificate of Survey:
Addition: SPRINGHILL PARK	Type of Site: WELL

**Well Construction and Performance Data**

Total Depth (ft): 222.00	How Drilled: ROTARY
Static Water Level (ft): 0.00	Driller's Name: HAGGERTY
Pumping Water Level (ft): 135.00	Driller License: WWC353
Yield (gpm): 30.00	Completion Date (m/d/y): 6/11/1996
Test Type: AIR	Special Conditions:
Test Duration: 8.00	Is Well Flowing?:
Drill Stem Setting (ft):	Shut-In Pressure:
Recovery Water Level (ft):	Geology/Aquifer: Not Reported
Recovery Time (hrs):	Well/Water Use: PUBLIC WATER SUPPLY

Well Notes: HAGGERTY FILE NO: 96071

**Hole Diameter Information**

From	To	Diameter
0.0	25.0	10.0
25.0	222.0	6.0

**Annular Seal Information**

From	To	Description
0.0	25.0	BENTONITE

**Lithology Information**

**Casing Information<sup>1</sup>**

From	To	Dia	Wall Thickness	Pressure Rating	Joint Type
-2.0	193.0	6.0			STEEL

**Completion Information<sup>1</sup>**

From	To	Dia	# of Openings	Size of Openings	Description
182.0	222.0	4.0		0.020	SCREEN

From	To	Description
0.0	10.0	TOPSOIL
10.0	36.0	GRAVEL
36.0	200.0	CLAY GRAVEL MIX
200.0	222.0	GRAVEL

<sup>1</sup> - 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.

The Cadmus Group, Inc  
2620 Colonial Drive, Suite B  
Helena, MT 59601  
Telephone: 406-443-9194  
Fax: 406-443-9197

FILES  
X N P  
PWSID # M10006796  
SANT. Survey  
sect  
Correspondence  
Chlorine/Turbidity  
Lead & Copper  
Phase II & V  
MUDISW  
Initials *du*  
SDWIS/PWS  
8-4-01

July 1, 2001

Mr. Charles Vanderpas  
P.O.Box 4818  
Bozeman, MT 59772

GALLATIN COUNTY

**RE: PWSID # 00796 – SPRINGHILL PARK SUBDIVISION SANITARY SURVEY INSPECTION**

Dear Mr Vanderpas:

On January 23, 2001, I conducted a sanitary survey of the Spring Hill Park Subdivision Public Water Supply (PWS) system. I would like to thank you for your assistance with this inspection. The PWS serves the Springhill Park Subdivision (previously Springhill Park Mobile Home Subdivision). This system is classified as a community public water supply due to the permanent nature of the population served. This was a routine sanitary survey conducted under contract with the State DEQ Water Quality Division. The State completes sanitary surveys on all Montana public water supply systems at about 3-year intervals.

The following report contains descriptions of each of the sections of the water system; any recommendations for the system are numbered at the end of the report.

Well #1

Well 1 is located in the pump house in the middle of the cul-de-sac off Springhill Lane. I was unable to find a well log however an old report in the file indicates the well is approximately 200 feet deep.

Well #2

Well # 2 is located at the north end of Cape Avenue. The well was drilled in 1996 to a depth of 145 feet. The 5-inch well yields approximately 35 gpm.

Well #3

Well # 3 is located at the south end of Cape Avenue. The well was drilled in 1996 to a depth of 222 feet. The 6-inch well yields approximately 30 gpm.

Distribution System

The distribution system is PVC piping and is not a looped system. Two pressure control facilities are on the system:

*Plate  
attached  
JD*

one in the pump house with Well 1 and the other in the Well 2 pump house. No treatment is practiced.

**Recommendations for Springhill Park Subdivision**

1. **Well 1:** I was unable to obtain a well log for the well. It would be beneficial for you to locate a log for the well documenting the construction of the well. If you obtain one, please forward a copy to this office to complete the PWS file.
2. **Well 1:** There were some paints stored in the well house. Chemicals and other potential contaminants should not be stored near the well. The potential is minor but it would be best if other storage locations could be found.
3. **Monitoring:** The monitoring history for this system is adequate. We discussed the sampling requirements for your system and I left you a copy of the DEQ circular *Summary of Drinking Water Regulations for Community Water Supplies*. If you have any further questions regarding monitoring, please feel free to call me or the State DEQ for assistance.

Please contact me if you have questions about this report or any other concerns. Note that there are items not mentioned in this letter that are covered in the report. I am providing copies of this letter, the report, and the chemical results (if applicable) to the DEQ Drinking Water Program. You may also call DEQ at (406) 444-4400 with any questions you may have. Thank you very much for your time and cooperation during my visit.

Sincerely,



Joe Steiner  
The Cadmus Group, Inc.

cc: County Sanitarians  
Sanitary Survey file

**SANITARY SURVEY FORM - INVENTORY** Page 1 of \_\_\_\_\_

1/11/2001

DATE OF SURVEY <b>1-23-01</b>	COUNTY <b>GALLATIN</b>	SURVEYOR NAME - <b>JOE STEINER</b>
PWSID <b>MT00796</b>	SYSTEM NAME <b>SPRINGHILL PARK SUBDIVISION</b>	

(SYSTEM REPRESENTATIVE) <b>CHARLES VANDERPAS</b>	(OTHER REPRESENTATIVE)
---	------------------------

<p style="text-align: center;"><b>SYSTEM ADDRESS</b></p> <p>Addressee <b>CHARLES VANDERPAS</b> <small>Primary Address</small></p> <p>Street <b>P.O. BOX 4818</b></p> <p>City <b>BOZEMAN</b> State <b>MT</b> Zip <b>59712</b></p> <p>System Phone <b>(406) 585-8477</b> Fax ( )</p>	<p style="text-align: center;"><b>SYSTEM OWNER</b></p> <p>Addressee <small>Owners Address</small></p> <p>Street <b>SAME</b></p> <p>City _____ State _____ Zip _____</p> <p>Owner Phone ( ) Fax ( )</p>
--	--

<p style="text-align: center;"><b>LOCATION OF SYSTEM</b></p> <p>Nearest City <b>BOZEMAN</b> Description or Physical Address <b>SPRING HILL LANE OFF SPRINGHILL ROAD</b></p>
---

<p style="text-align: center;"><b>OPERATOR OF SYSTEM</b></p> <p>Name <b>CHARLES VANDERPAS</b></p> <p>Certified Operator <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes If, yes</p> <p>Certification # <b>5290</b> Phone <b>(406) 585-8477</b></p>	<p style="text-align: center;"><b>ALTERNATE OPERATOR OF SYSTEM</b></p> <p>Name _____</p> <p>Certified Operator <input type="checkbox"/> No <input type="checkbox"/> Yes If, yes</p> <p>Certification # _____ Phone # ( )</p>
--	--

<p style="text-align: center;"><b>SYSTEM STATUS</b></p> <p><input checked="" type="checkbox"/> <b>A = Active</b>    <input type="checkbox"/> <b>P = Pending (Add New System)</b></p> <p><input type="checkbox"/> <b>I = Inactive</b></p>	<p style="text-align: center;"><b>SYSTEM CLASS</b></p> <p><input checked="" type="checkbox"/> <b>C = Community</b>    <input type="checkbox"/> <b>NTNC = Non-Transient Non-Community</b></p> <p><input type="checkbox"/> <b>NC = Transient Non-Community</b></p>
--	--

<p>Total Service Connections: Residential / Non-Transient: <b>44</b></p> <p style="padding-left: 100px;">Transient:</p> <p>Total Active Connections: Residential / Non-Transient: <b>44</b></p> <p style="padding-left: 100px;">Transient:</p> <p>Service Connections Metered? <input type="checkbox"/> Yes <input type="checkbox"/> No % <small>Metered</small></p>	<table style="width:100%;"> <tr> <td>Resident Population</td> <td>Summer: <b>100</b></td> </tr> <tr> <td>Number of permanent residents utilizing PWS daily</td> <td>Winter: <b>100</b></td> </tr> <tr> <td>Non-Transient Population</td> <td>Summer: _____</td> </tr> <tr> <td>Number of non-transient persons utilizing PWS daily</td> <td>Winter: _____</td> </tr> <tr> <td>Transient Population</td> <td>Summer: _____</td> </tr> <tr> <td>Number of transient persons served by PWS daily</td> <td>Winter: _____</td> </tr> </table>	Resident Population	Summer: <b>100</b>	Number of permanent residents utilizing PWS daily	Winter: <b>100</b>	Non-Transient Population	Summer: _____	Number of non-transient persons utilizing PWS daily	Winter: _____	Transient Population	Summer: _____	Number of transient persons served by PWS daily	Winter: _____
Resident Population	Summer: <b>100</b>												
Number of permanent residents utilizing PWS daily	Winter: <b>100</b>												
Non-Transient Population	Summer: _____												
Number of non-transient persons utilizing PWS daily	Winter: _____												
Transient Population	Summer: _____												
Number of transient persons served by PWS daily	Winter: _____												

<p style="text-align: center;"><b>OWNER TYPE</b></p> <p><input type="checkbox"/> 1 Federal Government</p> <p><input checked="" type="checkbox"/> 2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc.</p> <p><input type="checkbox"/> 3 State Government</p>	<p><input type="checkbox"/> 4 Local Government Authority, Commission, District, Municipality, City, etc.</p> <p><input type="checkbox"/> 5 Mixed Public/Private</p> <p><input type="checkbox"/> 6 Native American Indian Tribes &amp; Reservations</p>
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<p style="text-align: center;"><b>SERVICE AREA CHARACTERISTICS LIST</b></p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> DC Day Care Center</td> <td><input type="checkbox"/> RS Restaurant</td> </tr> <tr> <td><input type="checkbox"/> DI Dispenser</td> <td><input type="checkbox"/> SC School</td> </tr> <tr> <td><input checked="" type="checkbox"/> HA Homeowners Assoc.</td> <td><input type="checkbox"/> SI Sanitary Improvement District</td> </tr> <tr> <td><input type="checkbox"/> HM Hotel/Motel</td> <td><input type="checkbox"/> SK Summer Camp</td> </tr> <tr> <td><input type="checkbox"/> HR Highway Rest Area</td> <td><input type="checkbox"/> SR Secondary Residences</td> </tr> <tr> <td><input type="checkbox"/> IA Industrial/Agricultural</td> <td><input type="checkbox"/> SS Service Station</td> </tr> <tr> <td><input type="checkbox"/> IC Interstate Carrier</td> <td><input type="checkbox"/> SU Subdivision</td> </tr> <tr> <td><input type="checkbox"/> IN Institution</td> <td><input type="checkbox"/> WB Water Bottler</td> </tr> <tr> <td><input type="checkbox"/> MF Medical Facility</td> <td><input type="checkbox"/> WH Wholesaler (Sells Water)</td> </tr> <tr> <td><input type="checkbox"/> MH Mobile Home Park</td> <td></td> </tr> <tr> <td><input type="checkbox"/> MP Mobile Home Park, Principle Residence</td> <td></td> </tr> <tr> <td><input type="checkbox"/> MU Municipality</td> <td></td> </tr> <tr> <td><input type="checkbox"/> OA Other Area</td> <td></td> </tr> <tr> <td><input type="checkbox"/> ON Other Non-Transient Area</td> <td></td> </tr> <tr> <td><input type="checkbox"/> OR Other Residential Area</td> <td></td> </tr> <tr> <td><input type="checkbox"/> OT Other Transient Area</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PA Recreation Areas</td> <td></td> </tr> <tr> <td><input type="checkbox"/> RA Residential Area</td> <td></td> </tr> <tr> <td><input type="checkbox"/> RE Retail Employees</td> <td></td> </tr> </table> <p>Service Category Description</p>	<input type="checkbox"/> DC Day Care Center	<input type="checkbox"/> RS Restaurant	<input type="checkbox"/> DI Dispenser	<input type="checkbox"/> SC School	<input checked="" type="checkbox"/> HA Homeowners Assoc.	<input type="checkbox"/> SI Sanitary Improvement District	<input type="checkbox"/> HM Hotel/Motel	<input type="checkbox"/> SK Summer Camp	<input type="checkbox"/> HR Highway Rest Area	<input type="checkbox"/> SR Secondary Residences	<input type="checkbox"/> IA Industrial/Agricultural	<input type="checkbox"/> SS Service Station	<input type="checkbox"/> IC Interstate Carrier	<input type="checkbox"/> SU Subdivision	<input type="checkbox"/> IN Institution	<input type="checkbox"/> WB Water Bottler	<input type="checkbox"/> MF Medical Facility	<input type="checkbox"/> WH Wholesaler (Sells Water)	<input type="checkbox"/> MH Mobile Home Park		<input type="checkbox"/> MP Mobile Home Park, Principle Residence		<input type="checkbox"/> MU Municipality		<input type="checkbox"/> OA Other Area		<input type="checkbox"/> ON Other Non-Transient Area		<input type="checkbox"/> OR Other Residential Area		<input type="checkbox"/> OT Other Transient Area		<input type="checkbox"/> PA Recreation Areas		<input type="checkbox"/> RA Residential Area		<input type="checkbox"/> RE Retail Employees		<p>Comments:</p>
<input type="checkbox"/> DC Day Care Center	<input type="checkbox"/> RS Restaurant																																						
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<input type="checkbox"/> RA Residential Area																																							
<input type="checkbox"/> RE Retail Employees																																							

**SANITARY SURVEY FORM - WATER SYSTEM FACILITIES** Page 2 of \_\_\_\_

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 Active, this includes systems that are seasonal. Inactive sources are those which are shut down but can return to active status, such as a system out of business. Proposed 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 \_\_\_\_

**WATER SYSTEM FACILITIES SUMMARY (WSF)**

WSF ID	Facility Name	Water Type Code	Purchased	Seller PWSID
DS 001	Distribution System			
WL002	WELL #1	GW	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
WL003	WELL #2	GW	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
WL004	WELL #3	GW	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
PC001	WELL #1 - PRESSURE TANKS		<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
PC002	WELL #2 - " "		<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
			<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
			<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
			<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
			<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
			<input type="checkbox"/> Yes <input type="checkbox"/> No	_____

Description of Water System Facility flow: \_\_\_\_\_

WELLS 1, 2 AND 3 PUMP INTO DISTRIBUTION SYSTEM WITH NO TREATMENT -  
PRESSURE CONTROL SYSTEMS ON WELLS 1 AND 2.

Example: Well 1 (WL002) is pumped into pumphouse where chlorine is applied (TP001) and from there to the storage tank (ST001). The treated water flows by gravity to the Distribution System (DS001)

**EMERGENCY POWER**

Does the system have emergency power?  Yes  No

If yes, what type:

Frequency of testing: \_\_\_\_\_ ON WELL # 2

Record of primary power failures: \_\_\_\_\_ in last year.

Switchover:  Automatic  Manual

Comments:

**SANITARY SURVEY FORM - WELLS & PUMPS** Page \_\_\_\_ of \_\_\_\_

(Please copy this sheet for additional wells & pumps)

**COMPLETE ONE SECTION FOR EACH SOURCE**

**STATUS OF SOURCE**  (A)ctive  (I)nactive  (P)roposed

WSF ID WL002 Entry Point ID 502  
 These are state assigned identification numbers  
 Source Name WELL #1  
 Name of Source - Example: Well 1 or South well, etc.  
 Location of Water Source (TRS or street address) PUMP HOUSE IN CUL DE SAC -  
 Entry Point Name EP FOR WELL #1  
 Name of EP - Example: Entry point for North Well 1 & South Well 2  
 Location of Entry Point W/ PUMP HOUSE  
 Available  Perm  Emerg  Interim  Seasonal  Other  
 If seasonal: \_\_\_\_\_ to \_\_\_\_\_  
 GWUDISW PA Completed  Yes  No **\* FILE REPORT 3/11/1986**

Log Available?  Yes  No \*  
 Average Production \_\_\_\_\_ indicate units  
 Maximum Production \_\_\_\_\_ indicate units  
 Date Drilled \_\_\_\_\_ if well, date drilled  
 Casing Size \_\_\_\_\_ size of casing installed in well  
 Case Depth \_\_\_\_\_ depth of casing installed in well  
 Well Depth ~200FT depth of well expressed in feet  
 Grout Depth \_\_\_\_\_ depth of grout used to seal well walls

Log SWL \_\_\_\_\_ (static) expressed in feet below ground elevation  
 Log PWL \_\_\_\_\_ (pumping) expressed in feet below ground elevation  
 Pump Capacity ~1000GPM capacity of pump installed expressed in gallons per min  
 Intake Type \_\_\_\_\_ type of intake mechanism  
 Screened Interval \_\_\_\_\_ expressed in feet below ground elevation  
 Well Yield \_\_\_\_\_ pump tested in gallons per minute  
 Latitude 45.44.01 latitude of source  
 Longitude 111.03.76 longitude of source

**WELLS - COMPLETE ONE SECTION FOR EACH SOURCE**

**PUMPS - COMPLETE ONE SECTION FOR EACH SOURCE**

WSF ID WL002  
 Example: WL002  
 Is well site subject to flooding?  Yes  No  
 Is well located in proximity of a potential source of pollution (includes surface water, known chemical spills, agricultural use, etc.)?  Yes  No  
 If yes... explain \_\_\_\_\_  
 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)  Yes  No  
 Is top of the well casing properly sealed? (sanitary seal)  Yes  No  
 Is the well vent properly screened and terminated in a downward position?  Yes  No  
 Does well have suitable sampling tap?  Yes  No  
 Are check valves, blow-off valves and water meters maintained and operating properly? NA  Yes  No  
 Is upper termination of well protected (housed or fenced)?  Yes  No  
 Is intake located below the maximum drawdown?  Yes  No

WSF ID \_\_\_\_\_  
 Type 7.5 HP SUBM.  
 (example: 30 hp line shaft turbine)  
 Rated Capacity \_\_\_\_\_  
 Are pumps operable?  Yes  No  
 How frequently has pumps(s) been replaced? AS NECESSARY  
 Are backup pumps/motors provided? OTHER WELLS  Yes  No  
 Are controls functioning properly and adequately protected?  Yes  No  
 Do underground compartments have a drain? NA  Yes  No  
 Is facility properly protected against trespassing and vandalism?  Yes  No  
 Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?  Yes  No  
 Is the plumbing adequately painted to prevent excessive corrosion?  Yes  No  
 Is adequate heating, lighting, and ventilation provided?  Yes  No  
 Is a preventive maintenance program in operation?  Yes  No  
 Are recommended spare parts on hand? OTHER WELLS  Yes  No

Comments: (Such as, detailed information on any items with identified deficiencies)  
- USED AS STANDBY -

Comments: (Such as, detailed information on any items with identified deficiencies)

**SANITARY SURVEY FORM - WELLS & PUMPS** Page \_\_\_\_ of \_\_\_\_

(Please copy this sheet for additional wells & pumps)

**COMPLETE ONE SECTION FOR EACH SOURCE**

**STATUS OF SOURCE**  (A)ctive  (I)inactive  (P)roposed

WSF ID WL003 Entry Point ID SO3  
 These are state assigned identification numbers  
 Source Name Well 2  
 Name of Source - Example: Well 1 or South well, etc.  
 Location of Water Source (TRS or street address) No. END OF CAPE AVE  
 Entry Point Name EP FOR WELL 1 & 2  
 Name of EP - Example: Entry point for North Well 1 & South Well 2  
 Location of Entry Point W/ PUMPHOUSE  
 Available  Perm  Emerg  Interim  Seasonal  Other  
 If seasonal: \_\_\_\_\_ to \_\_\_\_\_  
 GWUDISW PA Completed  Yes  No

Log Available?  Yes  No  
 Average Production UNK  
indicate units  
 Maximum Production \_\_\_\_\_  
indicate units  
 Date Drilled 6/7/96  
if well, date drilled  
 Casing Size 4.5"  
size of casing installed in well  
 Case Depth 143  
depth of casing installed in well  
 Well Depth 145  
depth of well expressed in feet  
 Grout Depth 25  
depth of grout used to seal well walls

Log SWL 10  
(static) expressed in feet below ground elevation  
 Log PWL 115  
(pumping) expressed in feet below ground elevation  
 Pump Capacity 35  
capacity of pump installed expressed in gallons per min  
 Intake Type SUBM.  
type of intake mechanism  
 Screened Interval 123-143  
expressed in feet below ground elevation  
 Well Yield 35  
pump tested in gallons per minute  
 Latitude 45.44.09  
latitude of source  
 Longitude 111.03.60  
longitude of source

**WELLS - COMPLETE ONE SECTION FOR EACH SOURCE**

**PUMPS - COMPLETE ONE SECTION FOR EACH SOURCE**

WSF ID WL003  
Example: WL002  
 Is well site subject to flooding?  Yes  No  
 Is well located in proximity of a potential source of pollution (includes surface water, known chemical spills, agricultural use, etc.)?  Yes  No  
 If yes . . explain \_\_\_\_\_  
 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)  Yes  No  
 Is top of the well casing properly sealed? (sanitary seal)  Yes  No  
 Is the well vent properly screened and terminated in a downward position?  Yes  No  
 Does well have suitable sampling tap?  Yes  No  
 Are check valves, blow-off valves and water meters maintained and operating properly? NA  Yes  No  
 Is upper termination of well protected (housed or fenced)?  Yes  No  
 Is intake located below the maximum drawdown? NA  Yes  No

WSF ID WL003  
 Type UNK-  
(example: 30 hp line shaft turbine)  
 Rated Capacity UNK-  
 Are pumps operable?  Yes  No  
 How frequently has pumps(s) been replaced?  
 Are backup pumps/motors provided? OTHER WELLS  Yes  No  
 Are controls functioning properly and adequately protected?  Yes  No  
 Do underground compartments have a drain? NA  Yes  No  
 Is facility properly protected against trespassing and vandalism?  Yes  No  
 Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?  Yes  No  
 Is the plumbing adequately painted to prevent excessive corrosion?  Yes  No  
 Is adequate heating, lighting, and ventilation provided?  Yes  No  
 Is a preventive maintenance program in operation?  Yes  No  
 Are recommended spare parts on hand?  Yes  No

Comments: (Such as, detailed information on any items with identified deficiencies)

Comments: (Such as, detailed information on any items with identified deficiencies)

**SANITARY SURVEY FORM - WELLS & PUMPS** Page \_\_\_\_ of \_\_\_\_

(Please copy this sheet for additional wells & pumps)

**COMPLETE ONE SECTION FOR EACH SOURCE**

**STATUS OF SOURCE**  (A) Active  (I) Inactive  (P) Proposed

WSF ID WL004 Entry Point ID 503  
 These are state assigned identification numbers  
 Source Name Well #3  
 Name of Source - Example: Well 1 or South well, etc.  
 Location of Water Source (TRS or street address) ON SO END OF  
 Entry Point Name EP FOR WELLS 2 & 3 CAPE AVE  
 Name of EP - Example: Entry point for North Well 1 & South Well 2  
 Location of Entry Point w/i system  
 Available  Perm  Emerg  Interim  Seasonal  Other  
 If seasonal: \_\_\_\_\_ to \_\_\_\_\_  
 GWUDISW PA Completed  Yes  No

Log Available?  Yes  No  
 Average Production unk  
indicate units  
 Maximum Production \_\_\_\_\_  
indicate units  
 Date Drilled 6/11/96  
if well - date drilled  
 Casing Size 6"  
size of casing installed in well  
 Case Depth 193  
depth of casing installed in well  
 Well Depth 222  
depth of well expressed in feet  
 Grout Depth 25  
depth of grout used to seal well walls

Log SWL 0  
(static) expressed in feet below ground elevation  
 Log PWL 135  
(pumping) expressed in feet below ground elevation:  
 Pump Capacity 30 GPM  
capacity of pump installed expressed in gallons per min  
 Intake Type SUBM  
type of intake mechanism  
 Screened Interval 182 - 222  
expressed in feet below ground elevation  
 Well Yield 30 GPM  
pump tested in gallons per minute  
 Latitude 45.44.00  
latitude of source  
 Longitude 111.03.54  
longitude of source

**WELLS - COMPLETE ONE SECTION FOR EACH SOURCE**

**PUMPS - COMPLETE ONE SECTION FOR EACH SOURCE**

WSF ID WL004  
Example: WL002  
 Is well site subject to flooding?  Yes  No  
 Is well located in proximity of a potential source of pollution (includes surface water, known chemical spills, agricultural use, etc.)?  Yes  No  
 If yes... explain \_\_\_\_\_  
 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? 12"  
(Check for appropriate distance)  Yes  No  
 Is top of the well casing properly sealed? (sanitary seal)  Yes  No  
 Is the well vent properly screened and terminated in a downward position?  Yes  No  
 Does well have suitable sampling tap? w/i syst  Yes  No  
 Are check valves, blow-off valves and water meters maintained and operating properly? NA  Yes  No  
 Is upper termination of well protected (housed or fenced)?  Yes  No  
 Is intake located below the maximum drawdown? NA  Yes  No

WSF ID WL004  
 Type SUBM  
(example: 30 hp line shaft turbine)  
 Rated Capacity ?  
 Are pumps operable?  Yes  No  
 How frequently has pumps(s) been replaced? AS NEC.  
 Are backup pumps/motors provided? OTHERWELLS  Yes  No  
 Are controls functioning properly and adequately protected?  Yes  No  
 Do underground compartments have a drain?  Yes  No  
 Is facility properly protected against trespassing and vandalism?  Yes  No  
 Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?  Yes  No  
 Is the plumbing adequately painted to prevent excessive corrosion?  Yes  No  
 Is adequate heating, lighting, and ventilation provided? NA  Yes  No  
 Is a preventive maintenance program in operation?  Yes  No  
 Are recommended spare parts on hand?  Yes  No

Comments: (Such as, detailed information on any items with identified deficiencies)

Comments: (Such as, detailed information on any items with identified deficiencies)

**SANITARY SURVEY FORM - PRESSURE CONTROL ASSEMBLIES** Page \_\_\_\_ of \_\_\_\_

**COMPLETE ONE SECTION FOR EACH PRESSURE CONTROL ASSEMBLY**

CAPTIVE AIR TANK(S)	PRESSURE TANK(S)
<p>WSF ID <u>PC001</u> Location, Description <u>WELL #1 -</u></p> <p>Is there a pressure relief valve? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Is there an operable pressure gauge? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Does low pressure level provide adequate pressure? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Are there water-logged tanks? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Is the exterior surface of the tanks in good physical condition? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Can tank(s) be by-passed for repair? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump run time _____</p> <p>Time of Day _____ Cut-In <u>38</u> psi</p> <p>Pump Type: <u>SUBM 7.5HP</u> Cut-Out <u>60</u> psi</p> <p>Comments: _____</p> <p align="center"><u>1 - WELLXTROL 302</u> <u>(8/1970)</u></p>	<p>WSF ID _____ Location, Description _____</p> <p>Is there an operable pressure gauge? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Does low pressure level provide adequate pressure? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump recharge rate _____ Cut-In _____ psi</p> <p>Time of day _____ Cut-Out _____ psi</p> <p>Is the tank water logged? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is air charge system adequate? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is the exterior surface of the pressure tank in good physical condition? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there a water level sight glass? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there a bottom drain valve? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there a pressure relief valve? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Can tank(s) be by-passed for repair? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump type: _____</p> <p>Comments: _____</p>

CAPTIVE AIR TANK(S)	PRESSURE TANK(S)
<p>WSF ID <u>PC002</u> Location, Description <u>WELL #2</u></p> <p>Is there a pressure relief valve? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there an operable pressure gauge? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Does low pressure level provide adequate pressure? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Are there water-logged tanks? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Is the exterior surface of the tanks in good physical condition? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Can tank(s) be by-passed for repair? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump run time _____</p> <p>Time of Day _____ Cut-In <u>44</u> psi</p> <p>Pump Type: _____ Cut-Out <u>55</u> psi</p> <p>Comments: _____</p>	<p>WSF ID _____ Location, Description _____</p> <p>Is there an operable pressure gauge? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Does low pressure level provide adequate pressure? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump recharge rate _____ Cut-In _____ psi</p> <p>Time of day _____ Cut-Out _____ psi</p> <p>Is the tank water logged? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is air charge system adequate? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is the exterior surface of the pressure tank in good physical condition? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there a water level sight glass? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there a bottom drain valve? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there a pressure relief valve? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Can tank(s) be by-passed for repair? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump type: _____</p> <p>Comments: _____</p>

**SANITARY SURVEY FORM - MISCELLANEOUS** Page \_\_\_\_ of \_\_\_\_

**DISTRIBUTION SYSTEM EVALUATION**

- System description **TIP system - w/services**
- System drawings available?  Yes  No
- Lines adequately sized?  Yes  No
- Adequate pressure maintained?  Yes  No
- Mains subject to freezing?  Yes  No
- Distribution system leaks?  Yes  No
- Cross-connections noted?  Yes  No

Comments:

**SAFETY**

Note any safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.)

\_\_\_\_\_

**MONITORING EVALUATION**

- Bacti monitoring satisfactory?  Yes  No
- Familiar with repeat sampling?  Yes  No
- Chemical monitoring satisfactory?  Yes  No
- Monitoring records maintained?  Yes  No
- Bacti Sample Site Plan submitted to state?  
(Community Systems Only)  Yes  No
- Did Surveyor take a bacteriological sample?  Yes  No

If Yes,

Date of Sample(s): \_\_\_\_\_ Time of Sample(s): \_\_\_\_\_

Sample Result(s)

Comments:

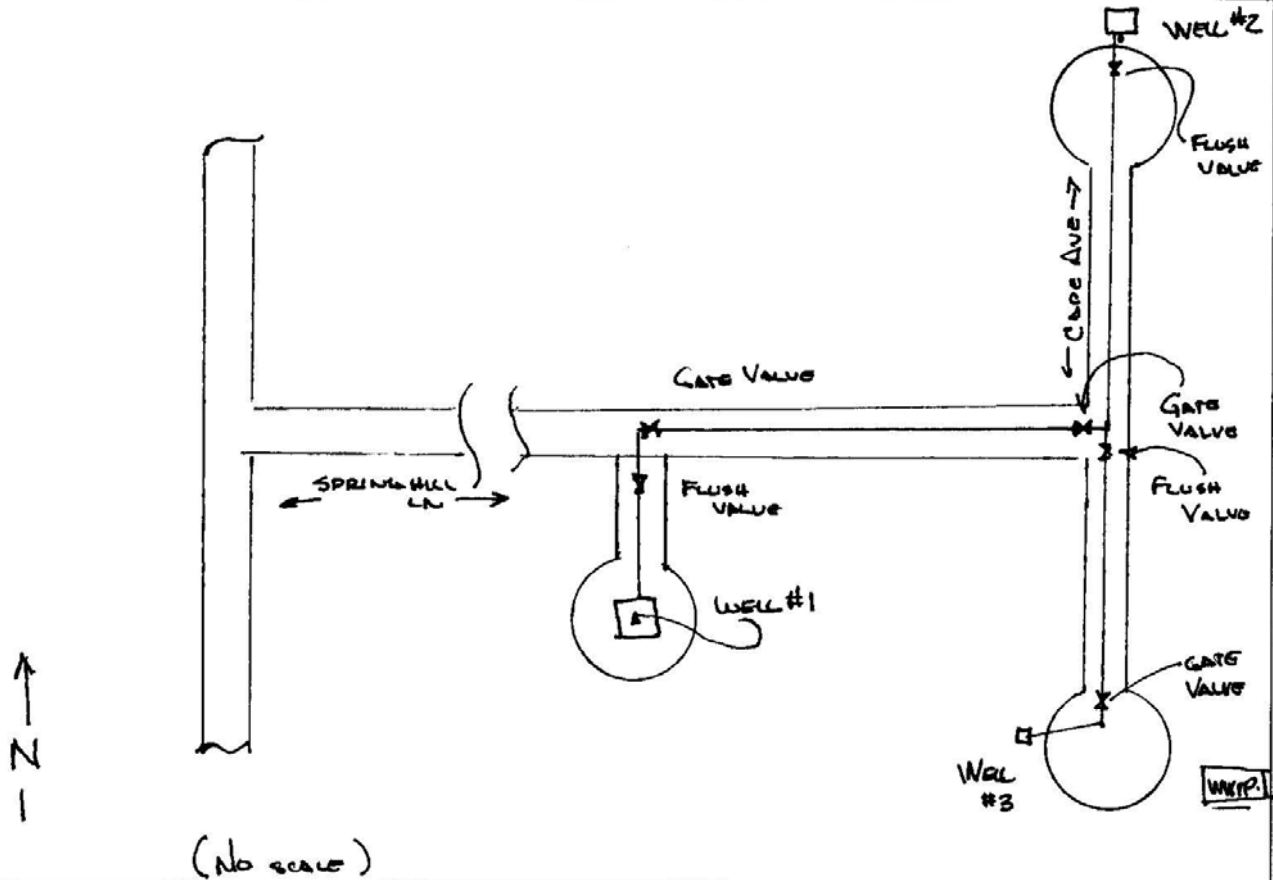
**MANAGEMENT**

- Are personnel adequately trained?  Yes  No
- Are operators properly certified?  Yes  No
- Are there sufficient personnel? **NEED BACK UP**  Yes  No
- Is an emergency plan available and workable?  Yes  No
- Are abandoned wells present?  Yes  No
- Do abandoned wells appear to be properly abandoned?  Yes  No
- Is operator aware of rules regarding well abandonment?  Yes  No
- Does the system have a current DEQ Monitoring Schedule?  Yes  No

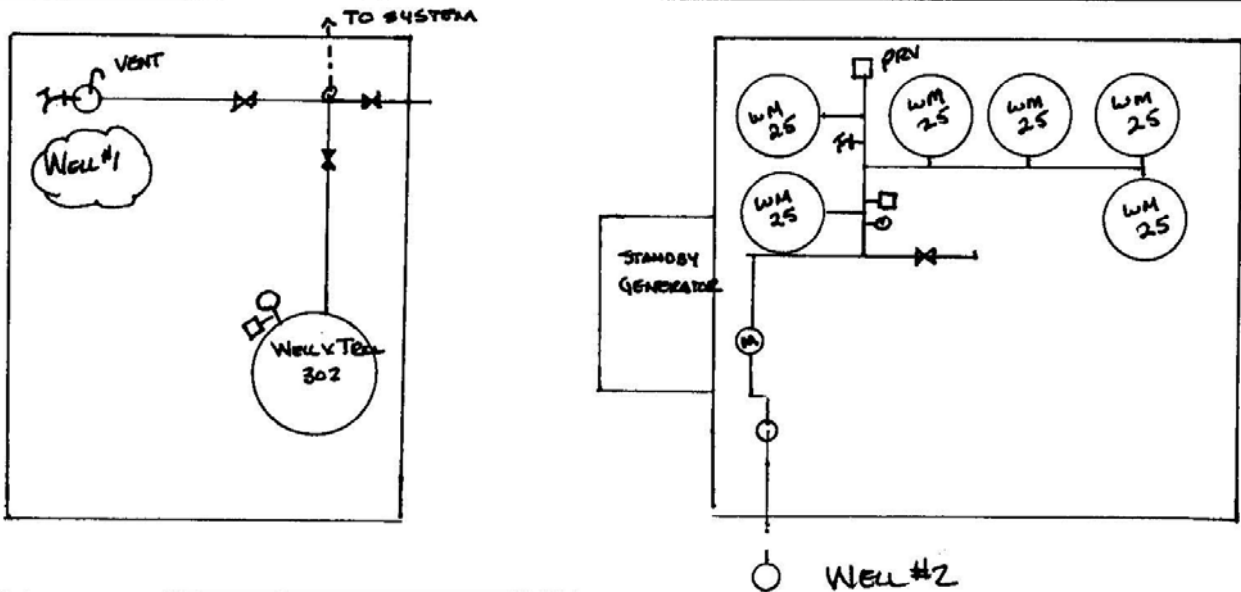
Comments:

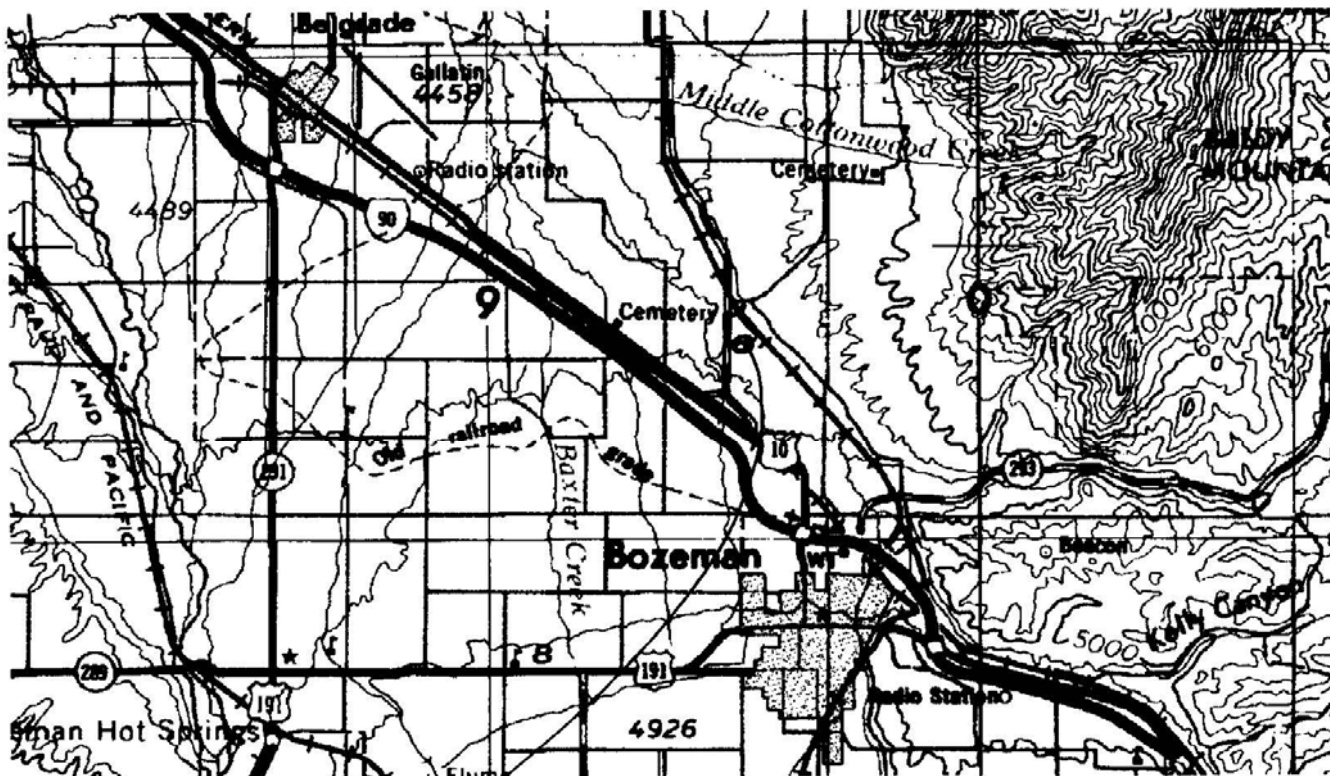
**SANITARY SURVEY FORM - DIAGRAMS** Page \_\_\_\_ of \_\_\_\_

Draw brief site plan showing location of well(s), springs(s), water storage, distribution system, pumphouse(s), entry point(s), treatment, etc. and label with appropriate facility designation. (See example on instruction sheet)



Draw brief schematic of pumphouse facilities (pressure control assemblies, treatment(s) valves, filters, meters, electrical controls, etc.)





PWSID 00796  
 SPRINGHILL PARK SUBDIVISION  
 BOZEMAN, MT

'Bozeman 250K; MT,WY'; Scale: 1" = 2.104Mi 3,387Mt 11,111Ft, 1 Mi = 0.475" , 1 cm = 1,333Mt

**APPENDIX B**

**WATER QUALITY ANALYTICAL RESULTS**



**APPENDIX C**

**CONCURRENCE LETTER**