# Source Water Assessment for Faith Bible Fellowship and School Big Lake, Alaska

A Hydrogeologic Susceptibility and Vulnerability Assessment

DRINKING WATER PROTECTION PROGRAM REPORT 182 PWSID 224573

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# Source Water Assessment for Faith Bible Fellowship and School's Source of Public Drinking Water, Big Lake, Alaska

By Sarah A. Bendewald

# **Drinking Water Protection Program Alaska Department of Environmental Conservation**

#### **EXECUTIVE SUMMARY**

The Public Water System for Faith Bible Fellowship and School is a Class A (non-transient/non-community) water system consisting of one well in the town of Big Lake, Alaska. Identified potential and current sources of contaminants for Faith Bible Fellowship and School's public drinking water source include: large capacity and residential septic systems, a municipal and an industrial landfill, highways and roads, and residential areas. These identified potential and existing sources of contamination are considered sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals. Overall, the public water sources for Faith Bible Fellowship and School received a vulnerability rating of **High** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, synthetic organic chemicals, and other organic chemicals and Medium for heavy metals.

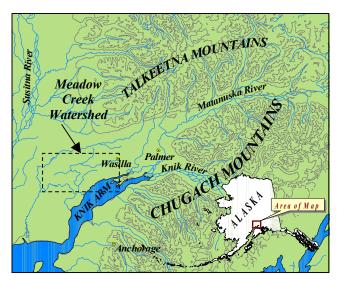


Figure 1. Index Map showing the location of the Matanuska-Susitna Valley and the Meadow Creek Watershed.

#### INTRODUCTION

The purpose of this environmental assessment is to provide public water system owners and/or operators, communities, and local governments with information they can use to preserve the quality of Alaska's public drinking water supplies. This assessment was completed for the source of public drinking water serving Faith Bible Fellowship and School. This water system consists of one well in the town of Big Lake, Alaska at the intersection of Kluane Drive and Hollywood Road. This assessment, known under the Alaska Drinking Water Protection Program as the Source Water Assessment, has combined a review of the natural hydrogeologic sensitivity with potential and existing contaminant risks to arrive at an overall vulnerability of the drinking water source to contamination. This assessment has been completed as a basis for local voluntary protection efforts and to assist agencies in their efforts to reduce risk to this public drinking water supply.

# DESCRIPTION OF THE MEADOW CREEK WATERSHED, ALASKA

#### Location

The Meadow Creek watershed is located within the Matanuska-Susitna Borough in southcentral Alaska. The Borough encompasses a total of 24.694 square miles supporting a population of approximately 60,000. It is contained within the watersheds of the Matanuska and Susitna Rivers which flow from the glacier melt waters in the Alaska Range, Talkeetna Mountains, and the Chugach Mountains to tidewater in the Knik Arm of Upper Cook Inlet (Jokela, Munter and Evans, 1991). This area between the Matanuska and Susitna Valleys is commonly referred to as the Mat-Su Valley. The Meadow Creek watershed extends from an area northwest of Wasilla to the west end of Big Lake, and contains 115 lakes, including Big Lake (Jokela, Munter and Evans, 1991) (see Figure 1). The towns of Wasilla, Big Lake, and Houston lie on the outskirts of its boundaries.

#### Climate

The climate in the Mat-Su Valley is considered transitional between the extreme temperature fluctuations of Interior Alaska and the wet conditions of the coastal areas.

The Meadow Creek watershed is less than 15 miles from Knik Arm and less than 75 miles from Prince William Sound. Summer temperatures are more moderate than those in the Interior due to the proximity to the coast. The Chugach and Talkeetna Mountains and the Alaska Range also protect the area from the frigid cold of the Interior Alaska winter and act to break up strong storm fronts (*Brabets*, 1997), (Western Regional Climate Center, 2000).

The Mat-Su Valley area averages about 18 inches of precipitation per year, including about 59 inches of snowfall. Winter thaws can decrease snow cover to a few inches. Mean monthly high temperatures range from about 22 degrees Farenheight in December and January to 69 degrees in July. The frost-free period in spring and summer averages 115 days, with the first frost usually arriving by September 1.

The record low for Wasilla was –50 degrees in January 1947. The highest recorded temperature was 90 degrees in 1969 (Wickersham Alaska Corporation, 1986).

#### **Physiography and Groundwater Conditions**

Glacial forces during the end of the last ice age shaped the Mat-Su Valley. Several glacial advances and retreats left a complex system of hills, ridges, lakes, and lowlands that define the topography of today. Surface elevations in the Mat-Su Valley range from sea level where the Knik and Matanuska Rivers enter the Cook Inlet to well over 6,000 feet in the peaks that bound the area. Landforms in the area consist of undulating ridges of glacial till and flat benches of sand and gravel outwash (*Matanuska-Susitna Borough*). The Meadow Creek watershed lies in relatively flat area of the Matanuska River valley.

The regional geology and ground water conditions of the Mat-Su Valley vary greatly by location. Glacial advances and retreats also formed a fluctuating subsurface system of unconsolidated layers comprised of fine- to coarse-grained particles (clay to boulders) and consolidated confining layers. The majority of wells in the Mat-Su Valley are located in unconsolidated layers consisting of relatively well-sorted sands and gravels. These unconsolidated layers vary substantially in size and distribution throughout the Valley. In general, the unconsolidated layers increase in thickness moving towards Cook Inlet (Jokela, Munter and Evans, 1991). The numerous confining layers in the area, ranging in thickness from

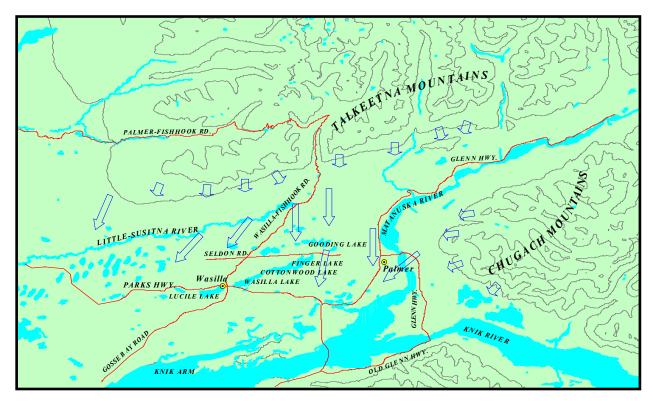


Figure 2. Map showing groundwater flow in the Matanuska-Susitna Valley (Jokela, Munter and Evans, 1991).

less than 1 foot to 60 feet, divide the unconsolidated layers.

Groundwater flow in the deeper confined aquifers of the Mat-Su Valley is generally north to south in the central region of the valley flowing toward the Matanuska River and gradually becoming more northeast to southwest in the western region. The direction of groundwater flow in the upper unconfined aquifers are more variable due to the influence from surficial topography as well as its close connection with surface water bodies (*Jokela, Munter and Evans, 1991*) (Figure 2). The groundwater flow direction of the Meadow Creek watershed was generally found to be northeast to southwest in both the unconfined and confined aquifers.

In the Mat-Su Valley, groundwater is primarily recharged by snowmelt and precipitation infiltrating both directly and also from the infiltration into the foothill slopes of the Talkeetna and Chugach Mountains.

# FAITH BIBLE FELLOWSHIP AND SCHOOL'S PUBLIC DRINKING WATER SYSTEM

Faith Bible Fellowship and School's public water system is a Class A (non-transient/non-community) water system. The system consists of one well near the intersection of Kluane Drive and Hollywood Road (T17N, R3W, Section 22). This area is at an elevation of approximately 50 feet above sea level.

According to the most recent Sanitary Survey (8/26/1993) completed for the water system, installation of the well occurred on December 12, 1981 to a total depth of approximately 144 feet below ground surface and was completed in 6-inch well casing. The well was installed with a cap providing a sanitary seal. A properly installed sanitary seal may provide protection against contaminants from entering the source waters at the well casing. The Sanitary Survey indicates the well is not properly grouted. Proper grouting provides added protection against contaminants travelling along the well casing and into source waters.

This system operates year-round and serves approximately 5 residents and over 100 non-residents through 2 service connections.

# ASSESSMENT AND PROTECTION AREA FOR FAITH BIBLE FELLOWSHIP AND SCHOOL'DRINKING WATER SOURCE

The Drinking Water Protection and Assessment Area that has been established for Faith Bible Fellowship and School's source of drinking water is the area that is

most sensitive to contamination. This area has served as a basis for assessing the risk of the drinking water source to contamination. The zones around the drinking water source outline the most critical area for the preservation of the quality of the drinking water for this system. For simplicity, this area will be known as your Drinking Water Protection Area and will serve as the focus for voluntary protection efforts.

Conceptually, groundwater enters the aquifer systems through infiltration of direct precipitation within the area and also from the infiltration into the foothill slopes of the Talkeetna Mountains. An analytical calculation was used to determine the size and shape of the area that contributes water to the well. The input parameters describing the attributes of the aquifer in this calculation were adopted from the U.S. Geological Survey (Patrick, Brabets, and Glass, 1989). This analytical calculation was used as a guide as the first step in establishing the protection area for each public drinking water source in Anchorage. Additional methods were further employed to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at meaningful and conservative protection areas with respect to public health (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

The Drinking Water Protection Areas established for wells by the Alaska Department of Environmental Conservation are separated into zones. These zones correspond to a time-of-travel. Time-of-travel is the time required for water to move in the saturated zone of the ground from a specific point to the well. The Drinking Water Protection Area for Faith Bible Fellowship and School contains four zones, Zone A through Zone D (See Map 1 in Appendix A). Zone A corresponds to the area between the well and the distance equal to 1/4 of the distance of the 2-year timeof-travel. Depending on where a contaminant source is located within Zone A, travel time for a contaminant to the wells may be on the order of several days to several hours. Zone A also extends downgradient from the wells to take into account the area of the aquifer that is influenced by pumping of the wells.

Zone B corresponds to a time-of-travel of less than two years. Zones C and D correspond to those areas between 5 years and 10 years time-of-travel, respectively.

# INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within the Drinking Water Protection Area for Faith Bible Fellowship and School. This survey was completed through a search of agency records and other publicly available information. Potential sources of contamination to drinking water supplies cover a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

For the basis of this assessment and all Class A public water system assessments, six categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses
- Nitrates and/or nitrites
- Volatile organic chemicals
- Heavy metals, cyanide, and other inorganic chemicals
- Synthetic organic chemicals
- Other organic chemicals

Maps 2, 3 and 4 in Appendix C depict the Contaminant Source Inventory for Faith Bible Fellowship and School. Table 1 in Appendix B lists the inventoried potential sources of contamination within Zones A through D. Below is a summary of the contaminant sources inventoried within the Drinking Water Protection Area for Faith Bible Fellowship and School:

- A municipal landfill;
- an industrial landfill;
- large capacity septic systems;
- residential septic systems;
- highways and roads, and
- approximately 170 acres of residential area.

These potential and existing contaminant sources present risk for all six categories of drinking water contaminants for Faith Bible Fellowship and School 's source of public drinking water.

#### RANKING OF CONTAMINANT RISKS

Potential and existing sources of contamination have been identified, sorted, and ranked according to what type and level of risk they represent. Ranking of contaminant risks for a "potential" or "existing" source of contamination is a function of toxicity and volumes of specific contaminants associated with that source. Contaminant risks are further a function of the number and density of those types of contaminant sources as well as the proximity of those sources to the public drinking water wells.

# VULNERABILITY OF FAITH BIBLE FELLOWSHIP AND SCHOOL' DRINKING WATER SOURCE

Vulnerability of a drinking water source to contamination is a combination of two factors:

- natural susceptibility; and
- contaminant risks.

Each of the six categories of drinking water contaminants have been analyzed and an overall vulnerability score of 0 to 100 ultimately assigned:

Natural Susceptibility (0 - 50 points)

+

Contaminant Risks (0 - 50 points)

=

Vulnerability of the Drinking Water Source to Contamination (0 - 100).

A score for the Natural Susceptibility is achieved by analyzing the properties of the well and the aquifer.

Susceptibility of the Wellhead (0 - 25 Points)+
Susceptibility of the Aquifer (0 - 25 Points)

= Natural Susceptibility (Susceptibility of the Well) (0-50 Points)

The well serving Faith Bible Fellowship and School was completed in a confined aquifer. The depth to the confining layer is approximately 45 feet below land surface. The saturated thickness of the aquifer in which the well is screened in is approximately 60 feet and composed of silty clay and gravel and gravel. Layers of silty clay confine the aquifer in this area. The presence of a confining layer inhibits contaminants that enter the subsurface within the vicinity of the well and Drinking Water Protection Area to migrate to the screened portion of the well.

Combining the susceptibility of the wellhead and the aquifer to contamination leads to a score (0 - 50 points) and rating of overall Susceptibility of the well to contamination (See Appendix D). Table 1 depicts the overall Susceptibility score and rating for the sources of public drinking water serving Faith Bible Fellowship and School.

Table 1. Natural Susceptibility - Susceptibility of the Wellheads and Aquifer to Contamination

	Score	Rating
Susceptibility of the Wellheads Susceptibility of the	10	Medium
Aquifer	18	High
Natural Susceptibility	28	Medium

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. A score (0 – 50 points) and rating of Contaminant Risks (See Appendix D) is assigned based on the findings of the Contaminant Source Inventory (See Appendix B - Table 1 – Table 7). This portion of the analysis examines recent existing or historical contamination that has been detected at the drinking water sources through routine sampling. It also reviews contamination that has or may have occurred but has not arrived or been detected at the either well. Table 2 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 2. Contaminant Risks of Faith Bible Fellowship and School's Public Drinking Water Source to Contamination by Category

		•
Contaminant Risks	Score	Rating
Bacteria and Viruses	50	Very High
Nitrates and/or Nitrites	50	Very High
Volatile Organic		
Chemicals	37	High
Heavy Metals, Cyanide,		
And Other Inorganic		
Chemicals	30	High
Synthetic Organic		
Chemicals	40	Very High
Other Organic		
Chemicals	45	Very High

Appendix D contains fourteen charts, which together form the 'Vulnerability Analysis' for a Class A public drinking water system. Chart 1 analyzes the 'Susceptibility of the Wellhead' to contamination by looking at the construction of the well and its surrounding area. Chart 2 analyzes the 'Susceptibility of the Aquifer' to contamination by looking at the naturally occurring attributes of the water source and influences on the groundwater system that might lead to contamination. Chart 3 analyzes 'Contaminant Risks' for the drinking water source with respect to bacteria and viruses. The 'Contaminant Risks' portion of the analysis considers potential sources of contaminants as

well as a review of contamination that has or may have occurred but has not arrived or been detected at the well. Lastly, Chart 4 contains the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 14 contain the Contaminant Risks and Vulnerability Analysis for nitrates and nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

Vulnerability of drinking water sources to contamination is the combination of susceptibility of the aquifer and the well with contaminant risks. Table 3 contains the overall vulnerability scores (0-100) and ratings for each of the six categories of drinking water contaminants (See Appendix D). Note: scores are rounded off to the nearest five.

Table 3. Overall Vulnerability of Faith Bible Fellowship and School's Public Drinking Water Source to Contamination by Category

Category	Score	Rating
Bacteria and Viruses	75	High
Nitrates and Nitrites	75	High
Volatile Organic Chemicals Heavy Metals, Cyanide,	65	High
and Other Inorganic Chemicals Synthetic Organic	55	Medium
Chemicals Other Organic	70	High
Chemicals	75	High

Tables 2 through 7 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

The three large capacity septic systems found in zones A and B and also the density of residential septic systems significantly increase the risk for bacteria and viruses and nitrates and nitrites. Large capacity septic systems are classified as a type of Class V Injection well, and differ from residential septic systems in that they serve multiple dwellings, businesses, or communities. This classification does not include single family residential and other non-residential system serving less than 20 people. Septic systems are designed to leach domestic wastewater in the subsurface. If engineered and operating properly, leach fields for septic systems should filter and stop the migration of microorganisms in the subsurface. However, failure of a septic system can result in the migration of contaminants away from the leach field,

sometimes to great distances, especially in highly transmissive soils.

Only a small amount of bacteria and viruses are required to endanger public health. Bacteria and viruses have not been detected during recent water sampling of the system at Faith Bible Fellowship and School, but it receives a ranking of high because of the potential risk sources.

Nitrates and/or nitrites are found in natural background concentration at this site, as elsewhere throughout Alaska. Nitrate concentrations in uncontaminated groundwater are typically less than 2 milligrams per liter (mg/L) and are derived primarily from the decomposition of organic matter in soils [Wang, Strelakos, Jokela, 2000]. Sampling history for Faith Bible Fellowship and School's well indicates that low concentrations of nitrate have been detected (See Chart 5 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D). Existing nitrate concentration is approximately 0.4 mg/L or 4% of the Maximum Contaminant Level (MCL) of 10mg/L. The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful health effects. Due to the high solubility and weak retention by soil, nitrates are very mobile, moving at approximately the same rate as water. Though existing nitrate contamination was detected at the site, concentrations remain at very safe levels with respect to human health.

The highest risk potential for five of the six contaminant categories, nitrates and nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals is the former Big Lake municipal landfill found in zone C of the protection area. This landfill was first permitted in 1973 and was closed in 1991 according to the Alaska Department of Conservation (ADEC) records. A risk assessment of the site conducted in 1993 concluded that although the groundwater on site was impacted by the landfill activities, the groundwater has not been affected offsite (EMCON, 1993). A benzene plume (benzene is included in the volatile organic chemical contaminant category) detected beneath part of the landfill still exists and although it has not been found to be migrating, it requires continued monitoring. Local groundwater flow in the area of the aquifer above that which Faith Bible Fellowship and School's well is screened in was shown to be north to northwest, flowing from the landfill towards the well. Ongoing testing of the monitoring and private wells in the area of Faith Bible Fellowship and School's public water source continues to reveal no contamination.

#### **SUMMARY**

A Source Water Assessment has been completed for the sources of public drinking water serving Faith Bible Fellowship and School. The overall vulnerability of this source to contamination is **High** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, synthetic organic chemicals and other organic chemicals and **Medium** for heavy metals. This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of Faith Bible Fellowship and School to protect public health. It is anticipated that Source Water Assessments will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of Faith Bible Fellowship and School's public drinking water source.

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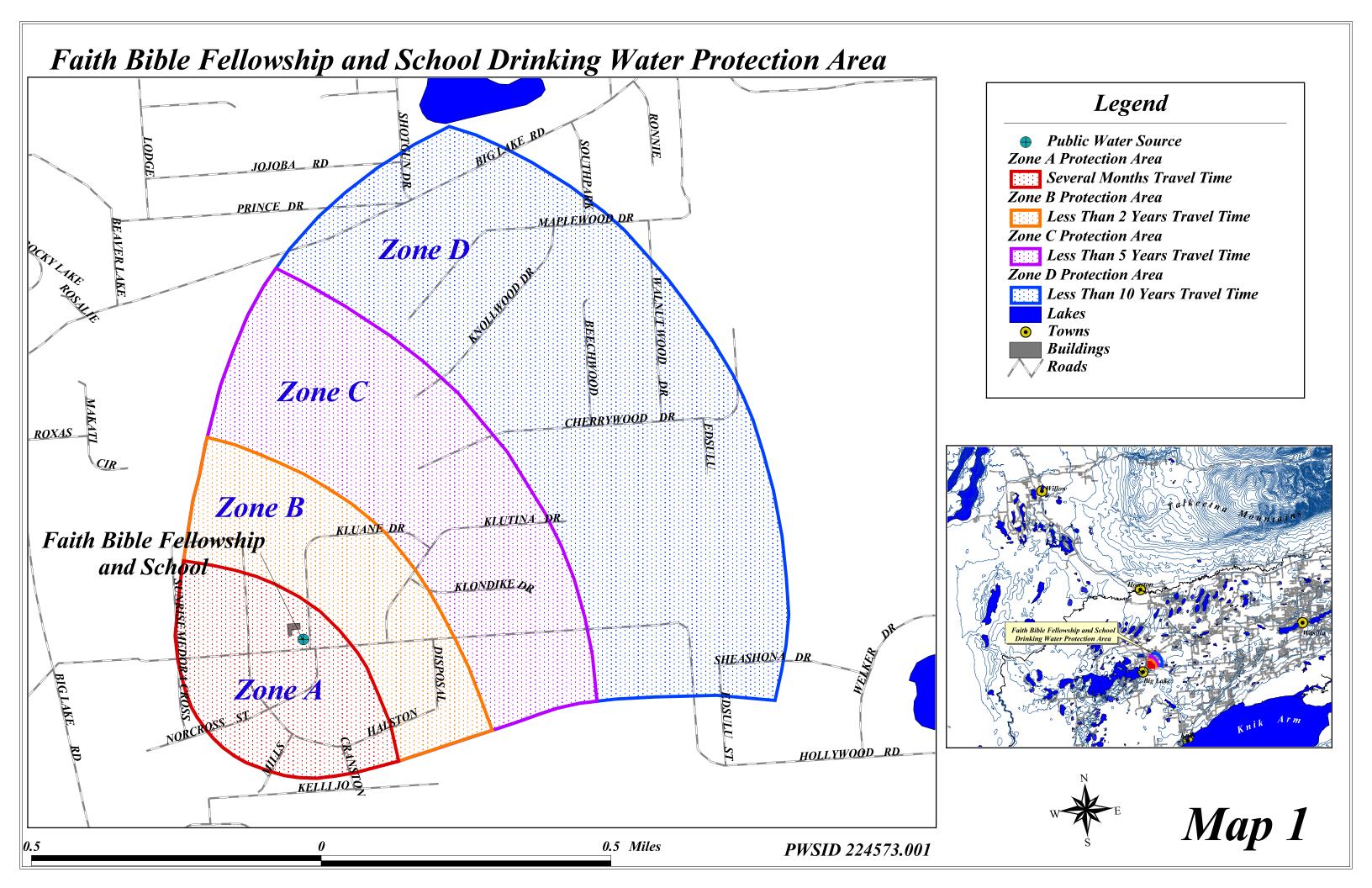
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# **APPENDIX A**

# Faith Bible Fellowship and School Drinking Water Protection Area



### **APPENDIX B**

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School

# Contaminant Source Inventory for Faith Bible Fellowship and School

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Location	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Corner of Kluane Dr and Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Hollywood Rd	3	
Residential Areas	R01	R1-1	A	Between Sunrise Dr to Cranston St	2	61 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-01	A	Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-05	A	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-06	A	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-07	A	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-08	A	Corner of Halston Ave and Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-09	A	Corner of Hollywood Dr and Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-10	A	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-11	A	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-12	A	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-13	A	Corner of Hollywood Dr and Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-14	A	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-15	A	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-16	A	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-17	A	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-18	A	Corner of Sunrise Dr and Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-19	A	Medora Cross	3	
Septic systems (serves one single-family home)	R02	R2-20	A	Norcross St	3	

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-21	A	Mills Ct	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Hollywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Kluane Dr	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Sunrise Dr	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Halston Ave	2	
Highways and roads, dirt/gravel	X24	X24-05	A	Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-06	A	Mills Ct	2	
Highways and roads, dirt/gravel	X24	X24-07	A	Cranston	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	В	Halston Ave	3	
Residential Areas	R01	R1-2	В	Along Kluane Dr and Halson Ave	2	42 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-22	В	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-23	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-24	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-25	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-26	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-27	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-28	В	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-29	В	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-30	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-31	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-32	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-33	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-34	В	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-35	В	Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-36	В	Klutina Dr	3	

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-37	В	Corner of Hollywood Rd and Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-38	В	Kluane Dr	3	
Highways and roads, dirt/gravel	X24	X24-08	В	Klutina Dr	2	
Landfills (municipal; Class III)	D51	D51-1	C	Hollywood Rd	4	
Residential Areas	R01	R1-3	С	Along Knollwood Dr, Cherrywood Dr. Klutina Dr and Klondkie Dr	2	55 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-39to49	С	Between Knollwood Dr and Hollywood Rd	3	
Highways and roads, dirt/gravel	X24	X24-09	C	Klondike Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Cherrywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-11	C	Knollwood Dr	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	D	Big Lake Rd	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	D	Big Lake Rd	4	
Landfills (industrial; type of industrial waste?)	D52	D52-1	D	Big Lake Rd between Beaver Lake and Shotgun Rds	4	Drilling waste

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Bacteria and Viruses

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	High	1	Corner of Kluane Dr and Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	High	2	Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	В	High	3	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	4	Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	5	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	6	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	7	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-05	A	Low	8	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-06	A	Low	9	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-07	A	Low	10	Halston Ave	3	
Residential Areas	R01	R1-1	A	Low		Between Sunrise Dr to Cranston St	2	61 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-08	A	Low		Corner of Halston Ave and Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-09	A	Low		Corner of Hollywood Dr and Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-10	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-11	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-12	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-13	A	Low		Corner of Hollywood Dr and Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-14	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-15	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-16	A	Low		Sunrise Dr	3	

#### Table 2 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Bacteria and Viruses

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-17	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-18	A	Low		Corner of Sunrise Dr and Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-19	A	Low		Medora Cross	3	
Septic systems (serves one single-family home)	R02	R2-20	A	Low		Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-21	A	Low		Mills Ct	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Hollywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Kluane Dr	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Sunrise Dr	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Halston Ave	2	
Highways and roads, dirt/gravel	X24	X24-05	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-06	A	Low		Mills Ct	2	
Highways and roads, dirt/gravel	X24	X24-07	A	Low		Cranston	2	
Residential Areas	R01	R1-2	В	Low		Along Kluane Dr and Halson Ave	2	42 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-22	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-23	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-24	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-25	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-26	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-27	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-28	В	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-29	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-30	В	Low		Sunrise Dr	3	

#### Table 2 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Bacteria and Viruses

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-31	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-32	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-33	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-34	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-35	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-36	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-37	В	Low		Corner of Hollywood Rd and Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-38	В	Low		Kluane Dr	3	
Highways and roads, dirt/gravel	X24	X24-08	В	Low		Klutina Dr	2	

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Nitrates/Nitrites

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Landfills (municipal; Class III)	D51	D51-1	C	Very High	1	Hollywood Rd	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	High	2	Corner of Kluane Dr and Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	High	3	Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	В	High	4	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	5	Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	6	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	7	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	8	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-05	A	Low	9	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-06	A	Low	10	Halston Ave	3	
Residential Areas	R01	R1-1	A	Low		Between Sunrise Dr to Cranston St	2	61 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-07	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-08	A	Low		Corner of Halston Ave and Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-09	A	Low		Corner of Hollywood Dr and Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-10	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-11	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-12	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-13	A	Low		Corner of Hollywood Dr and Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-14	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-15	A	Low		Sunrise Dr	3	

#### Table 3 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Nitrates/Nitrites

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-16	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-17	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-18	A	Low		Corner of Sunrise Dr and Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-19	A	Low		Medora Cross	3	
Septic systems (serves one single-family home)	R02	R2-20	A	Low		Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-21	A	Low		Mills Ct	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Hollywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Kluane Dr	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Sunrise Dr	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Halston Ave	2	
Highways and roads, dirt/gravel	X24	X24-05	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-06	A	Low		Mills Ct	2	
Highways and roads, dirt/gravel	X24	X24-07	A	Low		Cranston	2	
Residential Areas	R01	R1-2	В	Low		Along Kluane Dr and Halson Ave	2	42 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-22	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-23	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-24	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-25	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-26	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-27	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-28	В	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-29	В	Low		Kluane Dr	3	

#### Table 3 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Nitrates/Nitrites

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-30	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-31	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-32	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-33	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-34	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-35	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-36	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-37	В	Low		Corner of Hollywood Rd and Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-38	В	Low		Kluane Dr	3	
Highways and roads, dirt/gravel	X24	X24-08	В	Low		Klutina Dr	2	
Residential Areas	R01	R1-3	С	Low		Along Knollwood Dr, Cherrywood Dr. Klutina Dr and Klondkie Dr	2	55 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-39to49	С	Low		Between Knollwood Dr and Hollywood Rd	3	
Highways and roads, dirt/gravel	X24	X24-09	C	Low		Klondike Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Low		Cherrywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-11	C	Low		Knollwood Dr	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	D	High		Big Lake Rd	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	D	High		Big Lake Rd	4	

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Volatile Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Landfills (municipal; Class III)	D51	D51-1	C	High	1	Hollywood Rd	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	Corner of Kluane Dr and Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	3	Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	В	Low	4	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	5	Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	6	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	7	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	8	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-05	A	Low	9	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-06	A	Low	10	Halston Ave	3	
Residential Areas	R01	R1-1	A	Low		Between Sunrise Dr to Cranston St	2	61 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-07	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-08	A	Low		Corner of Halston Ave and Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-09	A	Low		Corner of Hollywood Dr and Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-10	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-11	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-12	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-13	A	Low		Corner of Hollywood Dr and Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-14	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-15	A	Low		Sunrise Dr	3	

#### Table 4 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Volatile Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-16	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-17	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-18	A	Low		Corner of Sunrise Dr and Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-19	A	Low		Medora Cross	3	
Septic systems (serves one single-family home)	R02	R2-20	A	Low		Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-21	A	Low		Mills Ct	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Hollywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Kluane Dr	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Sunrise Dr	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Halston Ave	2	
Highways and roads, dirt/gravel	X24	X24-05	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-06	A	Low		Mills Ct	2	
Highways and roads, dirt/gravel	X24	X24-07	A	Low		Cranston	2	
Residential Areas	R01	R1-2	В	Low		Along Kluane Dr and Halson Ave	2	42 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-22	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-23	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-24	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-25	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-26	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-27	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-28	В	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-29	В	Low		Kluane Dr	3	

#### Table 4 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Volatile Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-30	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-31	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-32	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-33	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-34	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-35	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-36	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-37	В	Low		Corner of Hollywood Rd and Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-38	В	Low		Kluane Dr	3	
Highways and roads, dirt/gravel	X24	X24-08	В	Low		Klutina Dr	2	
Residential Areas	R01	R1-3	С	Low		Along Knollwood Dr, Cherrywood Dr. Klutina Dr and Klondkie Dr	2	55 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-39to49	С	Low		Between Knollwood Dr and Hollywood Rd	3	
Highways and roads, dirt/gravel	X24	X24-09	С	Low		Klondike Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Low		Cherrywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-11	С	Low		Knollwood Dr	2	

## Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Landfills (municipal; Class III)	D51	D51-1	C	High	1	Hollywood Rd	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	Corner of Kluane Dr and Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	3	Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	В	Low	4	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	5	Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	6	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	7	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	8	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-05	A	Low	9	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-06	A	Low	10	Halston Ave	3	
Residential Areas	R01	R1-1	A	Low		Between Sunrise Dr to Cranston St	2	61 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-07	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-08	A	Low		Corner of Halston Ave and Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-09	A	Low		Corner of Hollywood Dr and Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-10	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-11	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-12	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-13	A	Low		Corner of Hollywood Dr and Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-14	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-15	A	Low		Sunrise Dr	3	

#### Table 5 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School

# Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-16	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-17	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-18	A	Low		Corner of Sunrise Dr and Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-19	A	Low		Medora Cross	3	
Septic systems (serves one single-family home)	R02	R2-20	Α	Low		Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-21	A	Low		Mills Ct	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Hollywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Kluane Dr	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Sunrise Dr	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Halston Ave	2	
Highways and roads, dirt/gravel	X24	X24-05	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-06	A	Low		Mills Ct	2	
Highways and roads, dirt/gravel	X24	X24-07	A	Low		Cranston	2	
Residential Areas	R01	R1-2	В	Low		Along Kluane Dr and Halson Ave	2	42 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-22	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-23	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-24	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-25	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-26	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-27	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-28	В	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-29	В	Low		Kluane Dr	3	

#### Table 5 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School

# Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-30	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-31	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-32	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-33	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-34	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-35	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-36	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-37	В	Low		Corner of Hollywood Rd and Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-38	В	Low		Kluane Dr	3	
Highways and roads, dirt/gravel	X24	X24-08	В	Low		Klutina Dr	2	
Residential Areas	R01	R1-3	С	Low		Along Knollwood Dr, Cherrywood Dr. Klutina Dr and Klondkie Dr	2	55 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-39to49	С	Low		Between Knollwood Dr and Hollywood Rd	3	
Highways and roads, dirt/gravel	X24	X24-09	С	Low		Klondike Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	С	Low		Cherrywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-11	С	Low		Knollwood Dr	2	

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Synthetic Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Landfills (municipal; Class III)	D51	D51-1	C	Very High	1	Hollywood Rd	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	Corner of Kluane Dr and Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	3	Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	В	Low	4	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	5	Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	6	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	7	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	8	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-05	A	Low	9	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-06	A	Low	10	Halston Ave	3	
Residential Areas	R01	R1-1	A	Low		Between Sunrise Dr to Cranston St	2	61 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-07	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-08	A	Low		Corner of Halston Ave and Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-09	A	Low		Corner of Hollywood Dr and Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-10	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-11	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-12	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-13	A	Low		Corner of Hollywood Dr and Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-14	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-15	A	Low		Sunrise Dr	3	

#### Table 6 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Synthetic Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-16	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-17	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-18	A	Low		Corner of Sunrise Dr and Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-19	A	Low		Medora Cross	3	
Septic systems (serves one single-family home)	R02	R2-20	A	Low		Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-21	A	Low		Mills Ct	3	
Residential Areas	R01	R1-2	В	Low		Along Kluane Dr and Halson Ave	2	42 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-22	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-23	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-24	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-25	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-26	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-27	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-28	В	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-29	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-30	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-31	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-32	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-33	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-34	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-35	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-36	В	Low		Klutina Dr	3	

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Synthetic Organic Chemicals

#### PWSID 224573.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone		Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-37	В	Low		Corner of Hollywood Rd and Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-38	В	Low		Kluane Dr	3	
Residential Areas	R01	R1-3	С	Low		Along Knollwood Dr, Cherrywood Dr. Klutina Dr and Klondkie Dr	2	55 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-39to49	С	Low		Between Knollwood Dr and Hollywood Rd	3	

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Other Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Landfills (municipal; Class III)	D51	D51-1	C	Very High	1	Hollywood Rd	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	Corner of Kluane Dr and Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	3	Hollywood Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	В	Low	4	Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	5	Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	6	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	7	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	8	Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-05	A	Low	9	Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-06	A	Low	10	Halston Ave	3	
Residential Areas	R01	R1-1	A	Low		Between Sunrise Dr to Cranston St	2	61 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-07	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-08	A	Low		Corner of Halston Ave and Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-09	A	Low		Corner of Hollywood Dr and Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-10	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-11	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-12	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-13	A	Low		Corner of Hollywood Dr and Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-14	A	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-15	A	Low		Sunrise Dr	3	

#### Table 7 (continued)

# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Other Organic Chemicals

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-16	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-17	A	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-18	A	Low		Corner of Sunrise Dr and Hollywood Rd	3	
Septic systems (serves one single-family home)	R02	R2-19	A	Low		Medora Cross	3	
Septic systems (serves one single-family home)	R02	R2-20	A	Low		Norcross St	3	
Septic systems (serves one single-family home)	R02	R2-21	A	Low		Mills Ct	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Hollywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Kluane Dr	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Sunrise Dr	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Halston Ave	2	
Highways and roads, dirt/gravel	X24	X24-05	A	Low		Norcross St	2	
Highways and roads, dirt/gravel	X24	X24-06	A	Low		Mills Ct	2	
Highways and roads, dirt/gravel	X24	X24-07	A	Low		Cranston	2	
Residential Areas	R01	R1-2	В	Low		Along Kluane Dr and Halson Ave	2	42 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-22	В	Low		Kluane Dr	3	
Septic systems (serves one single-family home)	R02	R2-23	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-24	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-25	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-26	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-27	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-28	В	Low		Halston Ave	3	
Septic systems (serves one single-family home)	R02	R2-29	В	Low		Kluane Dr	3	

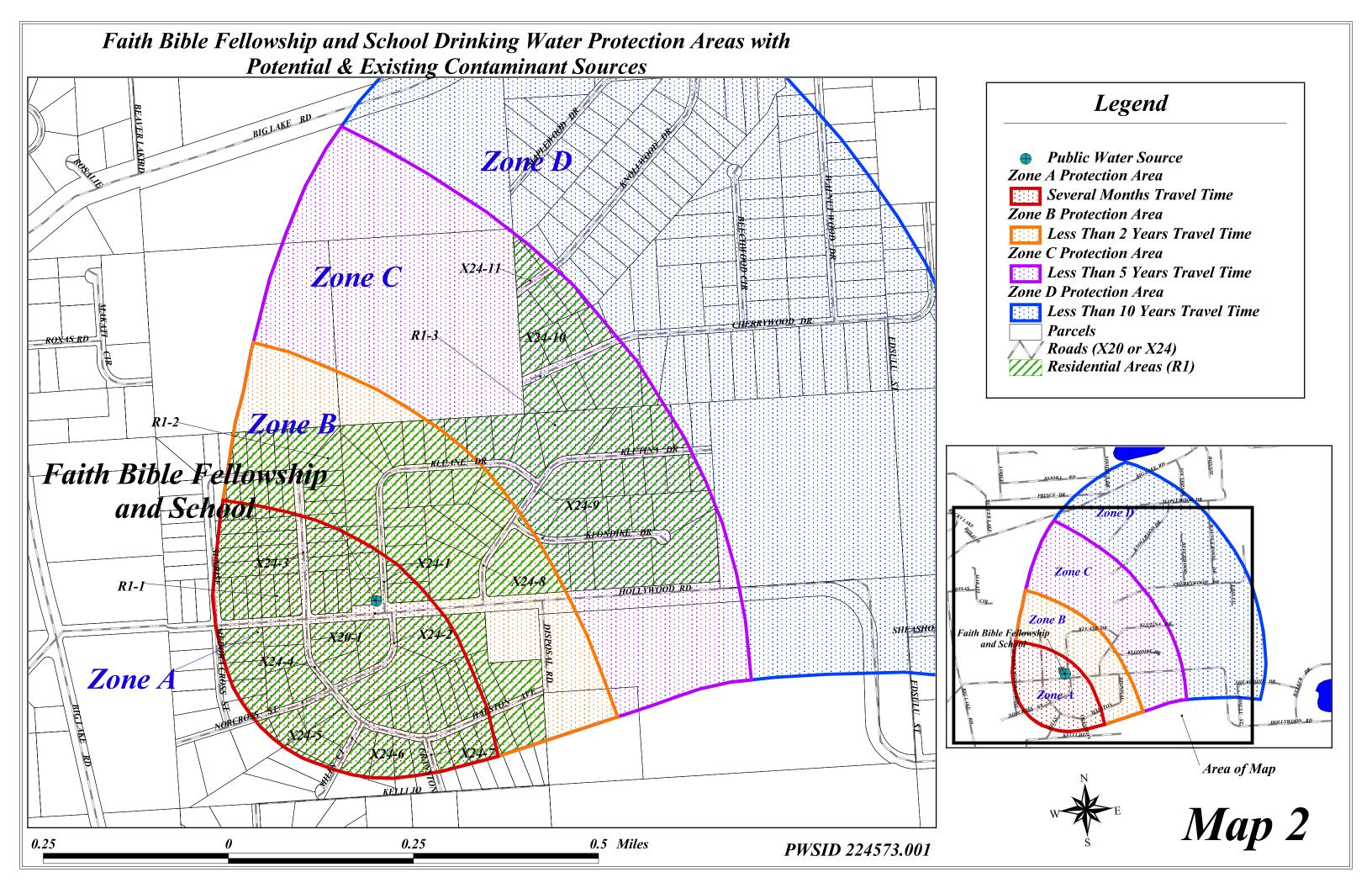
#### Table 7 (continued)

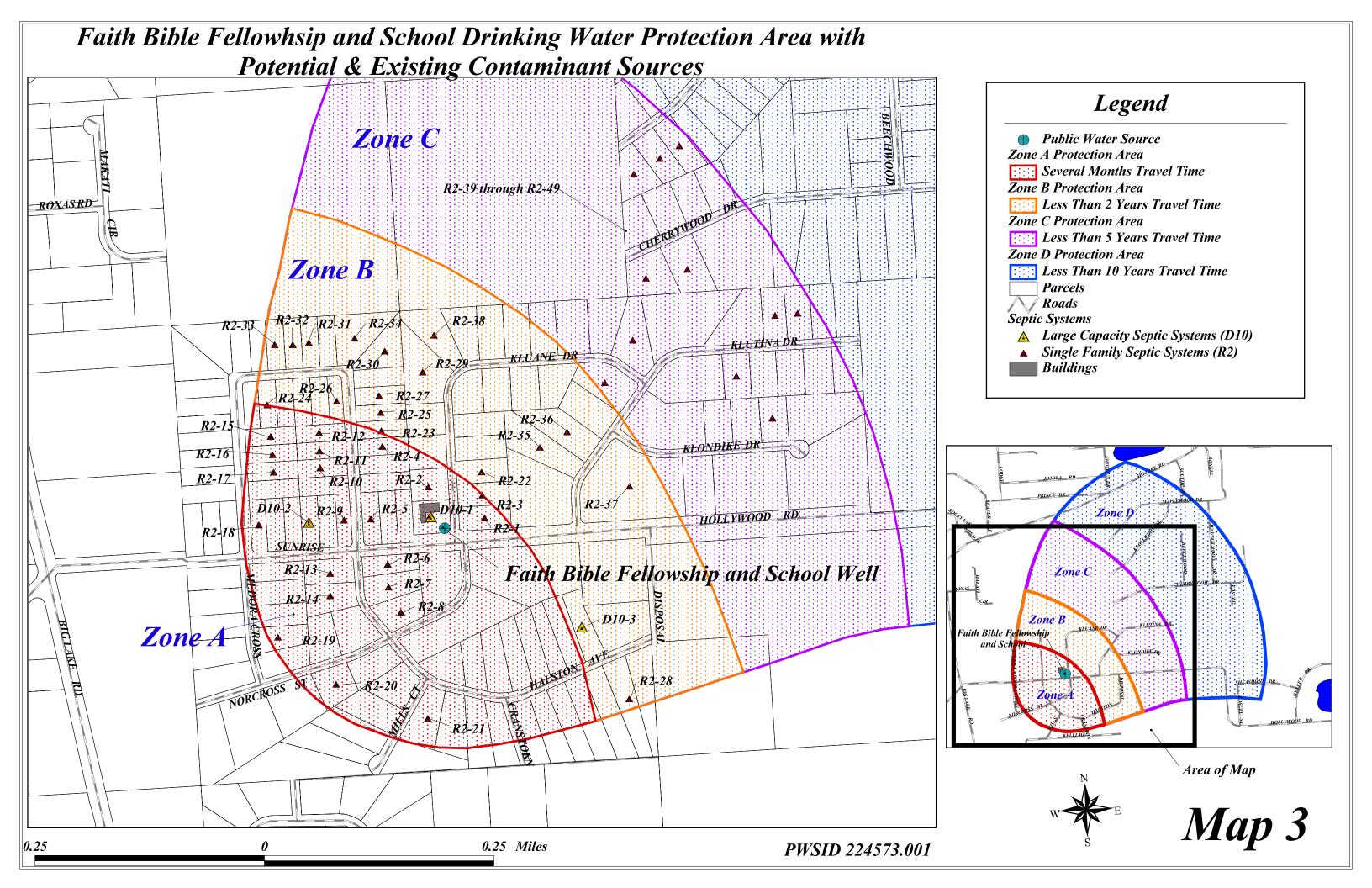
# Contaminant Source Inventory and Risk Ranking for Faith Bible Fellowship and School Sources of Other Organic Chemicals

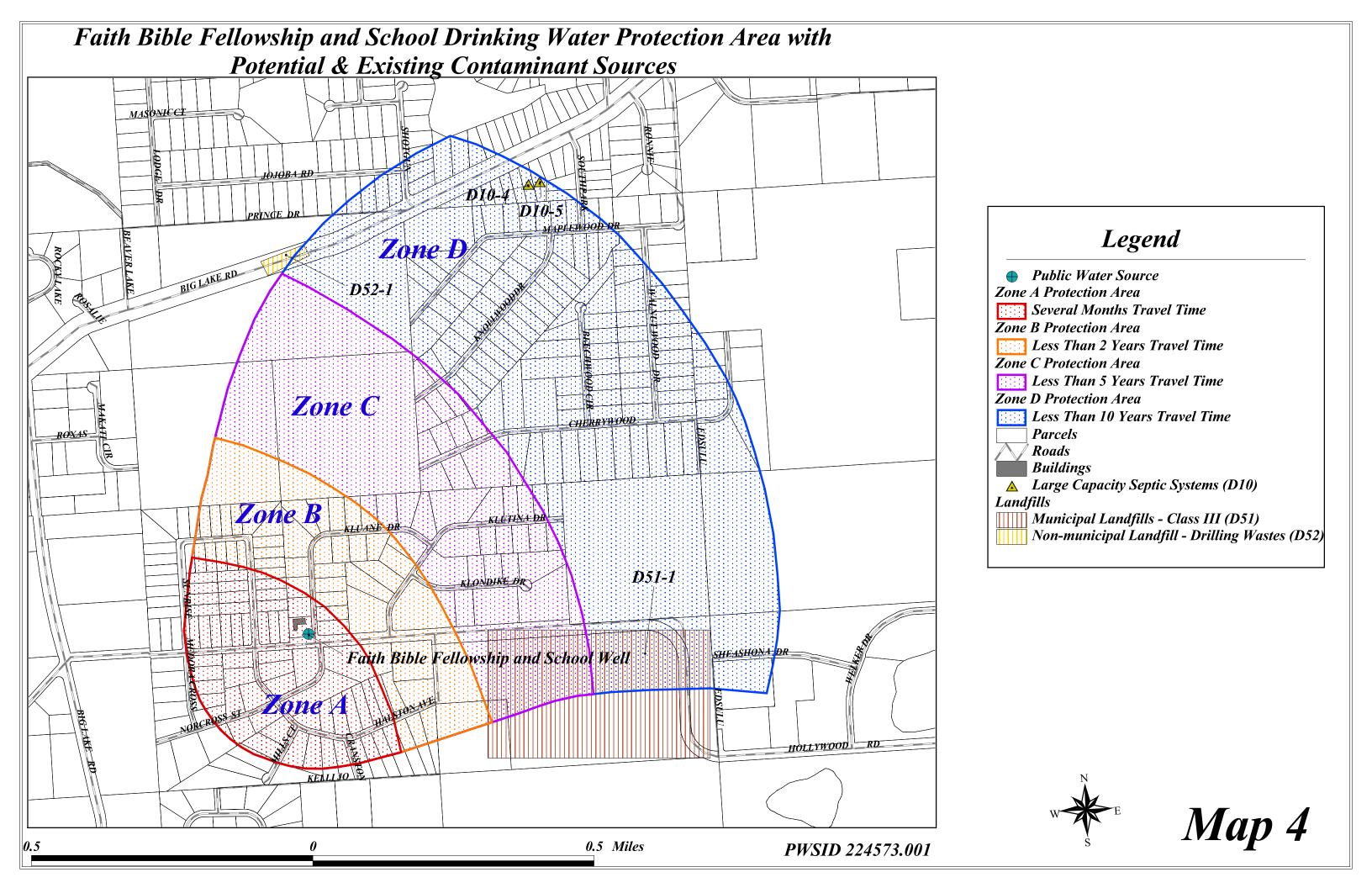
Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Septic systems (serves one single-family home)	R02	R2-30	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-31	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-32	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-33	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-34	В	Low		Sunrise Dr	3	
Septic systems (serves one single-family home)	R02	R2-35	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-36	В	Low		Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-37	В	Low		Corner of Hollywood Rd and Klutina Dr	3	
Septic systems (serves one single-family home)	R02	R2-38	В	Low		Kluane Dr	3	
Highways and roads, dirt/gravel	X24	X24-08	В	Low		Klutina Dr	2	
Residential Areas	R01	R1-3	С	Low		Along Knollwood Dr, Cherrywood Dr. Klutina Dr and Klondkie Dr	2	55 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-39to49	С	Low		Between Knollwood Dr and Hollywood Rd	3	
Highways and roads, dirt/gravel	X24	X24-09	С	Low		Klondike Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	С	Low		Cherrywood Dr	2	
Highways and roads, dirt/gravel	X24	X24-11	С	Low		Knollwood Dr	2	
Landfills (industrial; type of industrial waste?)	D52	D52-1	D	Very High		Big Lake Rd between Beaver Lake and Shotgun Rds	4	Drilling waste

### **APPENDIX C**

# Faith Bible Fellowship and School Drinking Water Protection Area and Potential and Existing Contaminant Sources







## APPENDIX D

## Vulnerability Analysis for Faith Bible Fellowship and School Public Drinking Water Source

Chart 1. Susceptibility of the wellhead - Faith Bible Fellowship and School

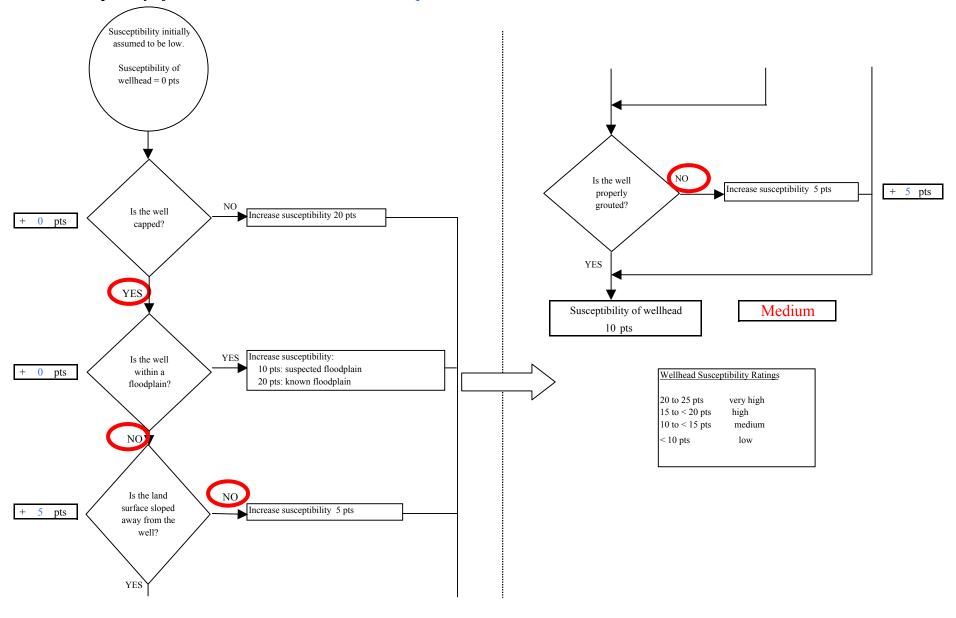
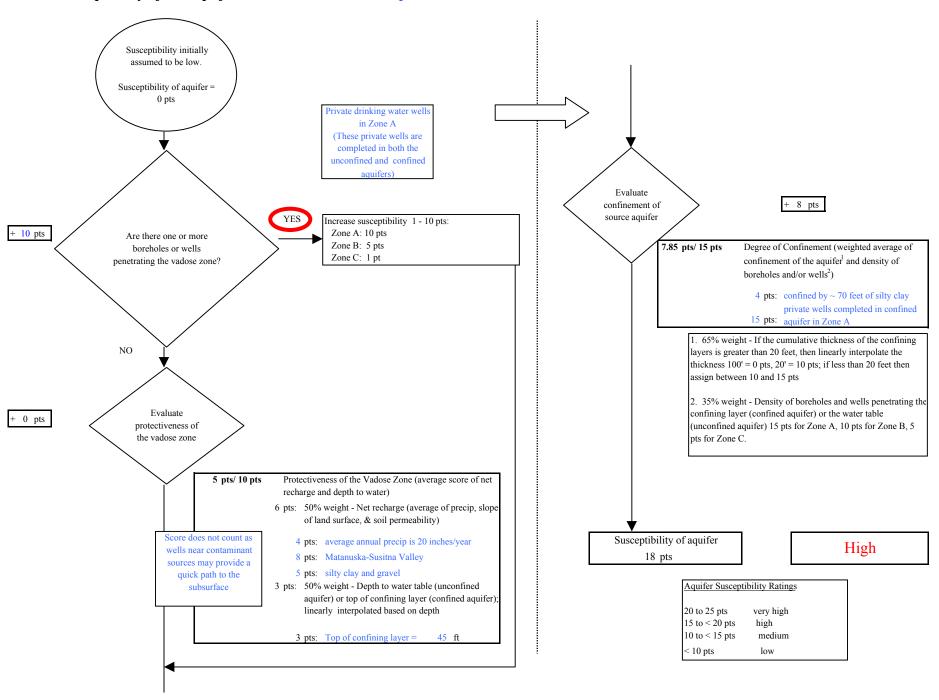
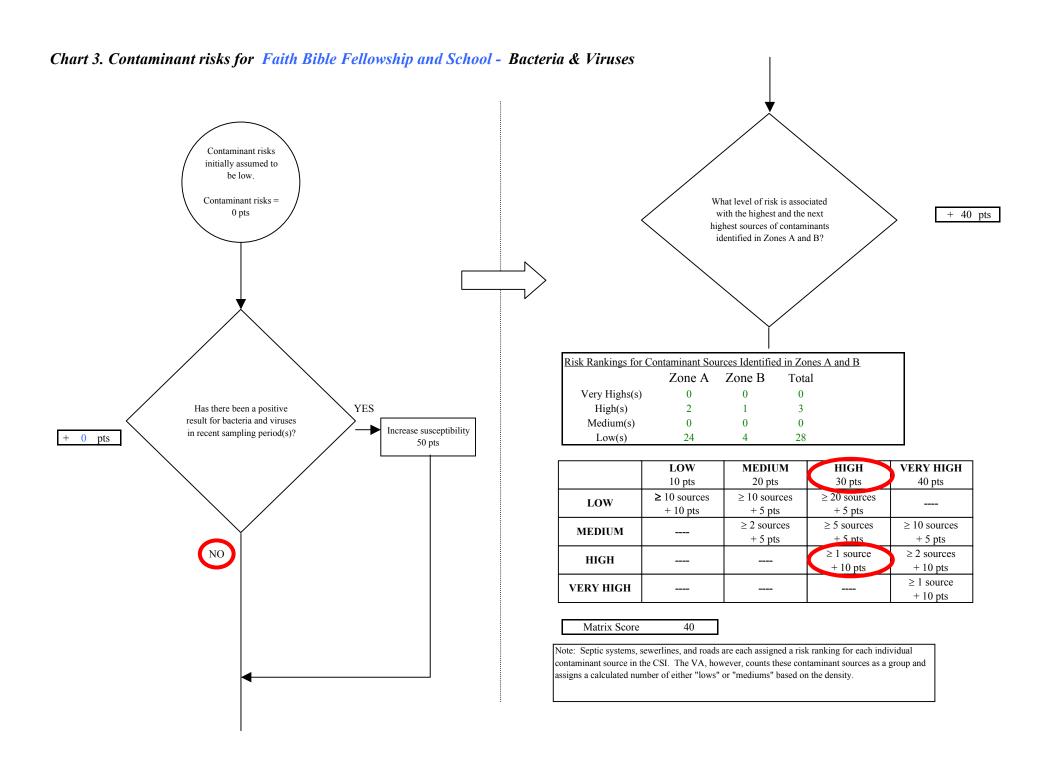
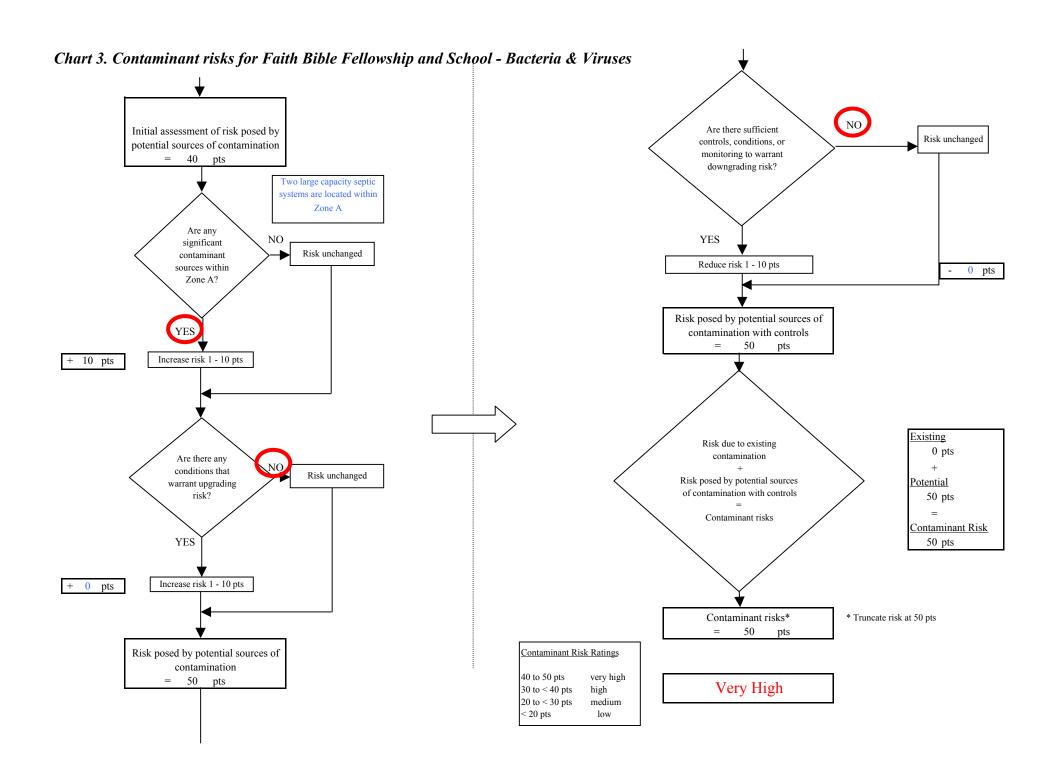


Chart 2. Susceptibility of the aquifer - Faith Bible Fellowship and School

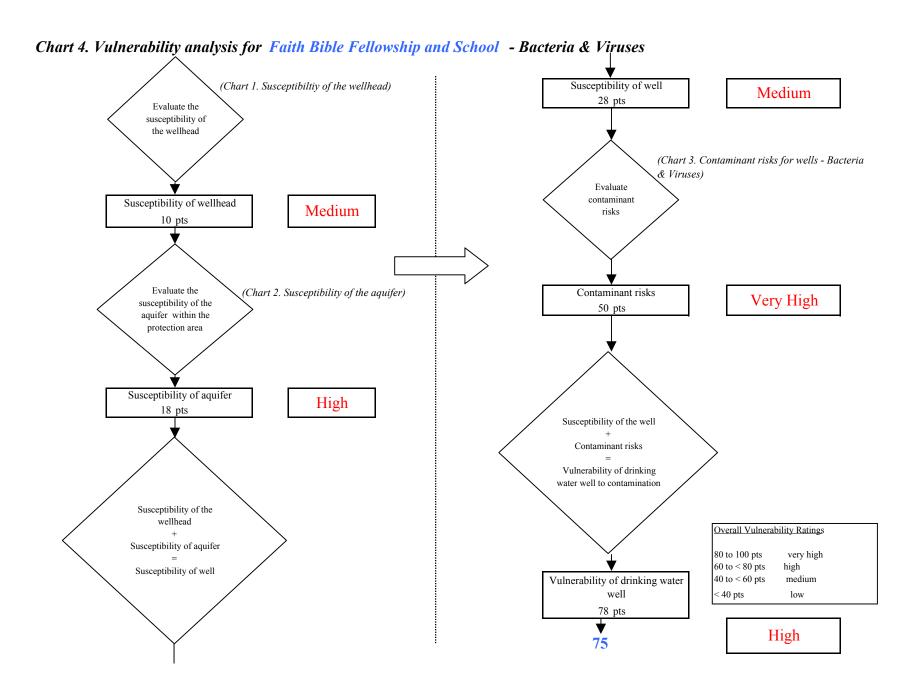


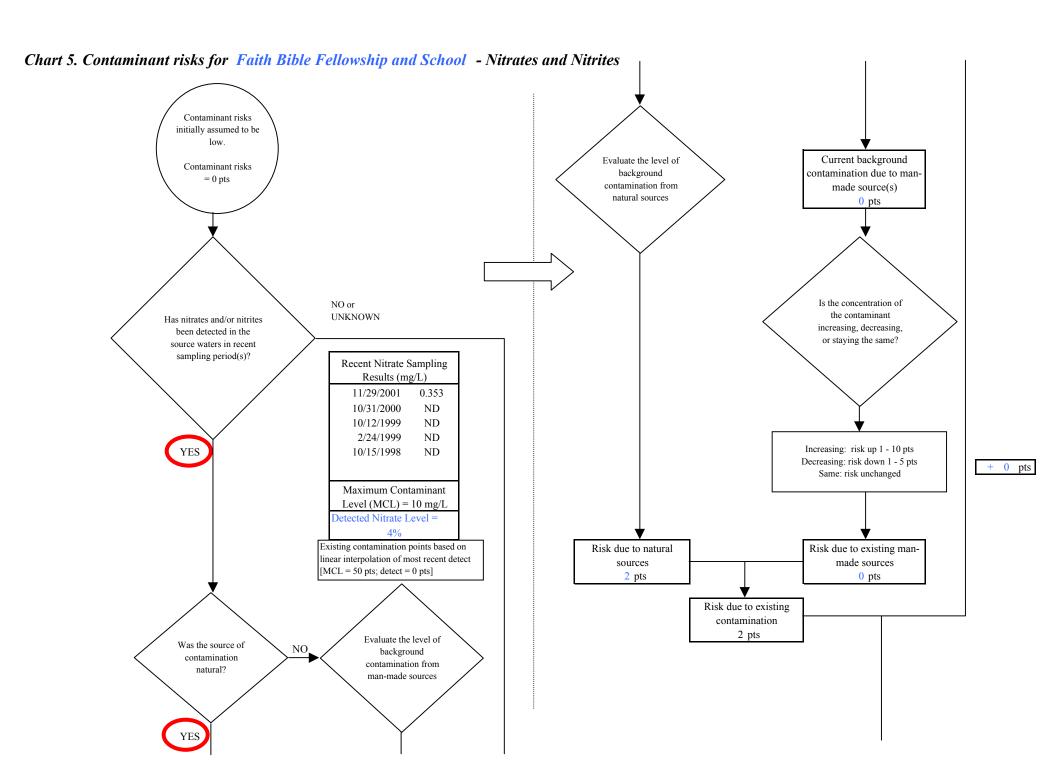
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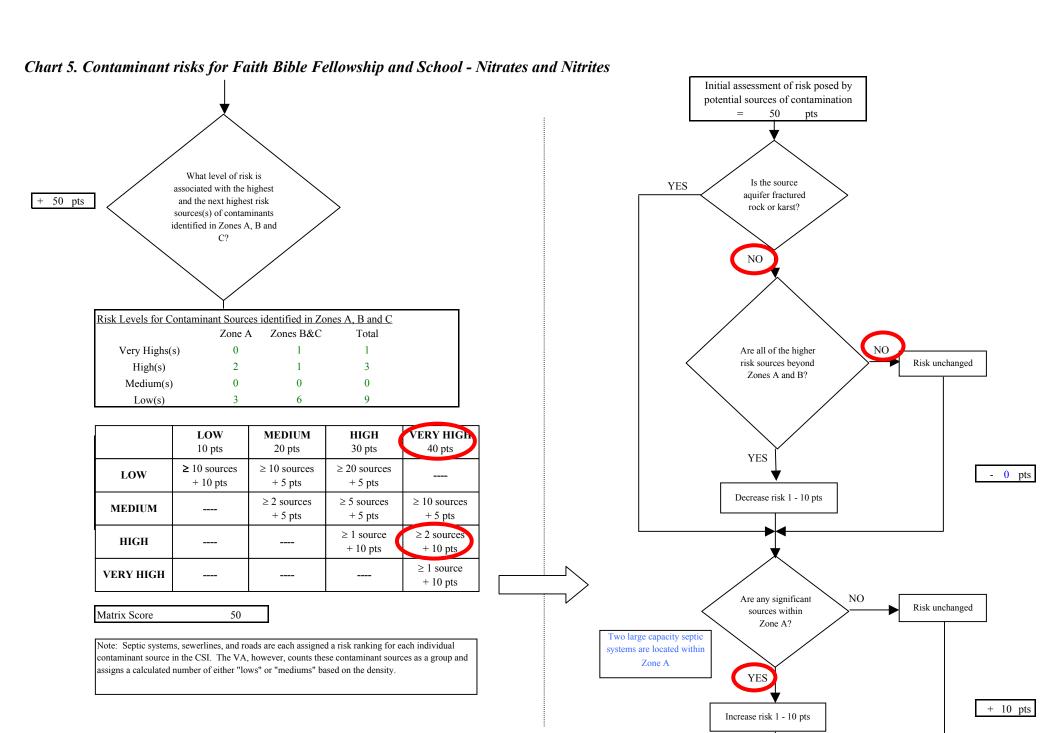


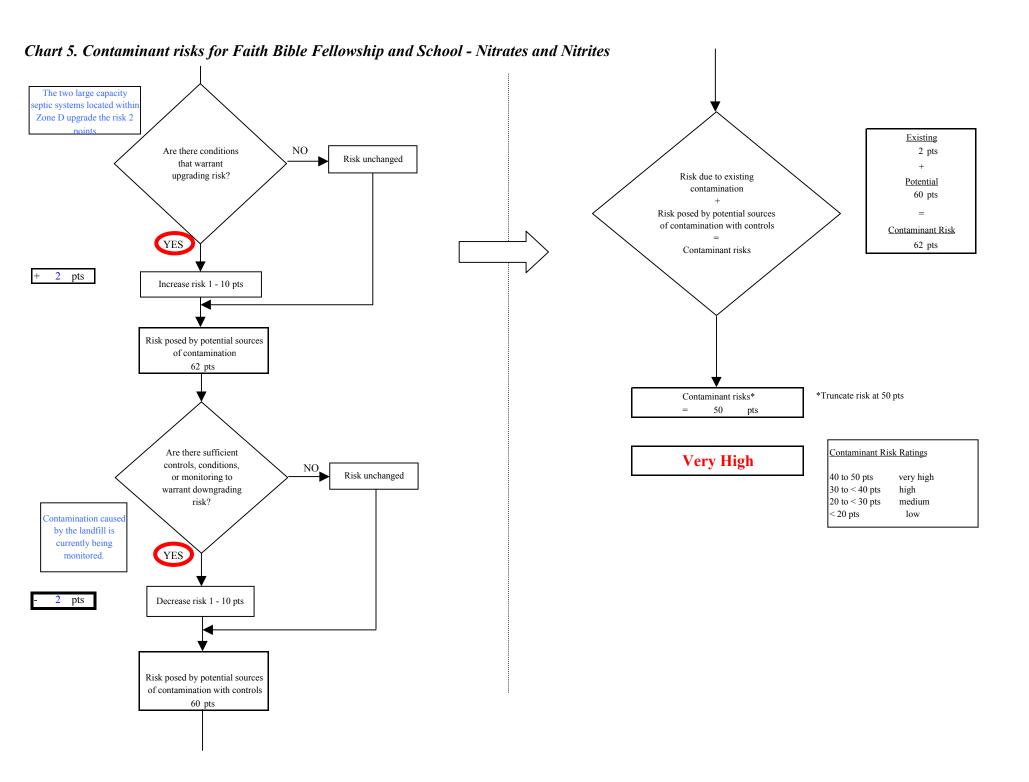
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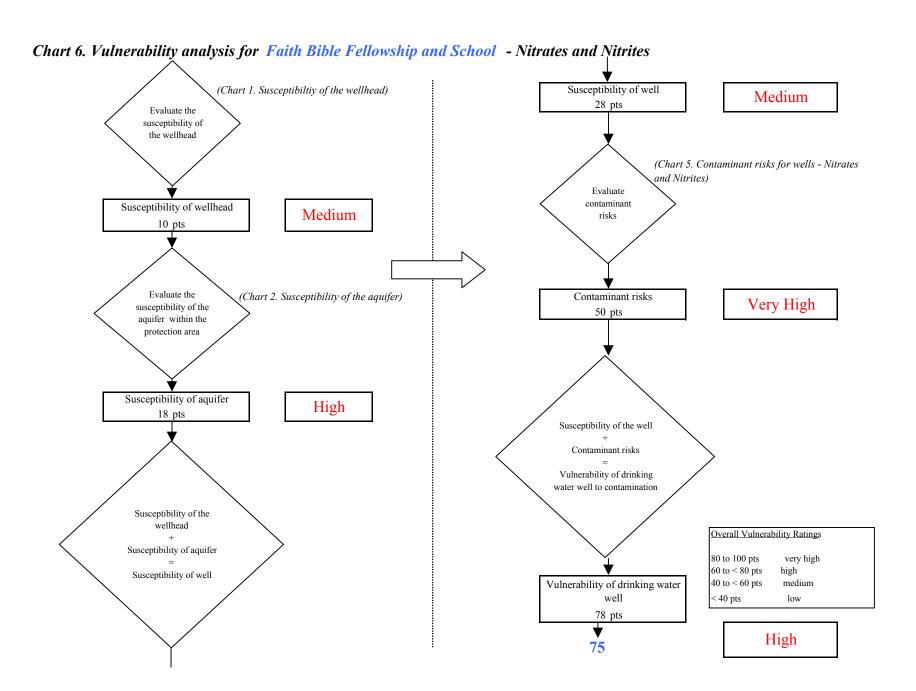


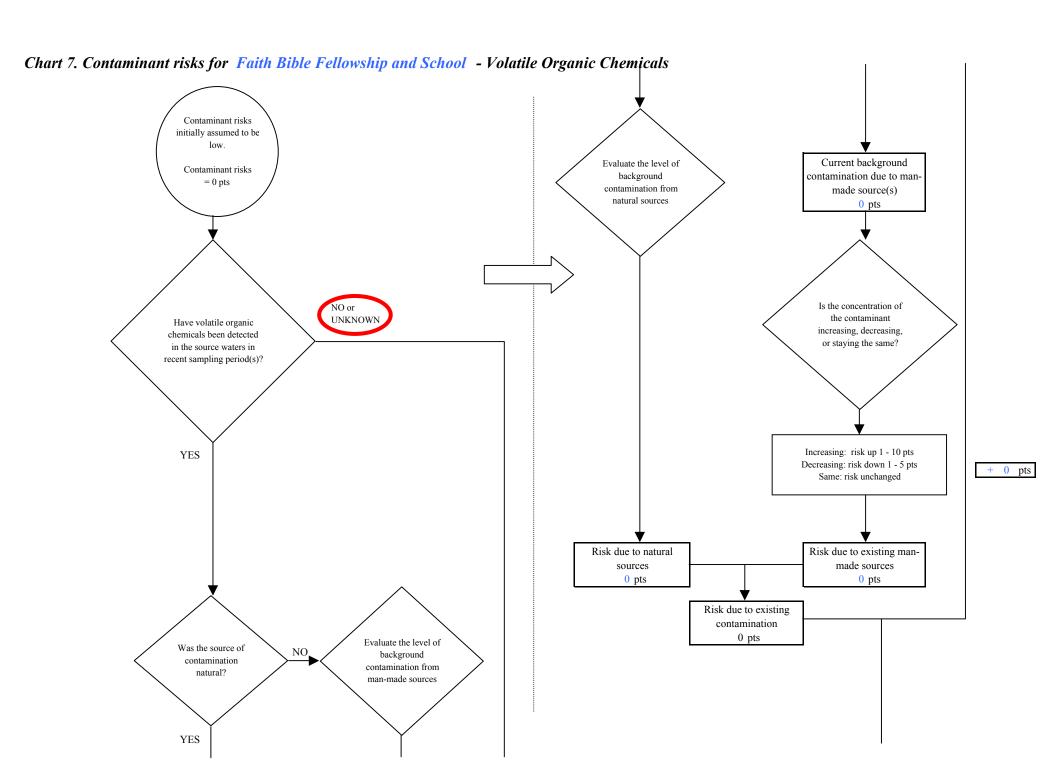
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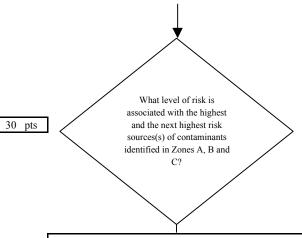
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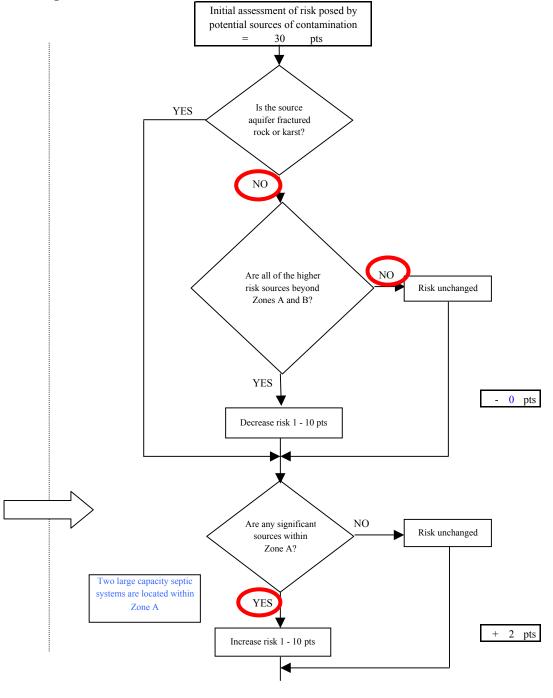


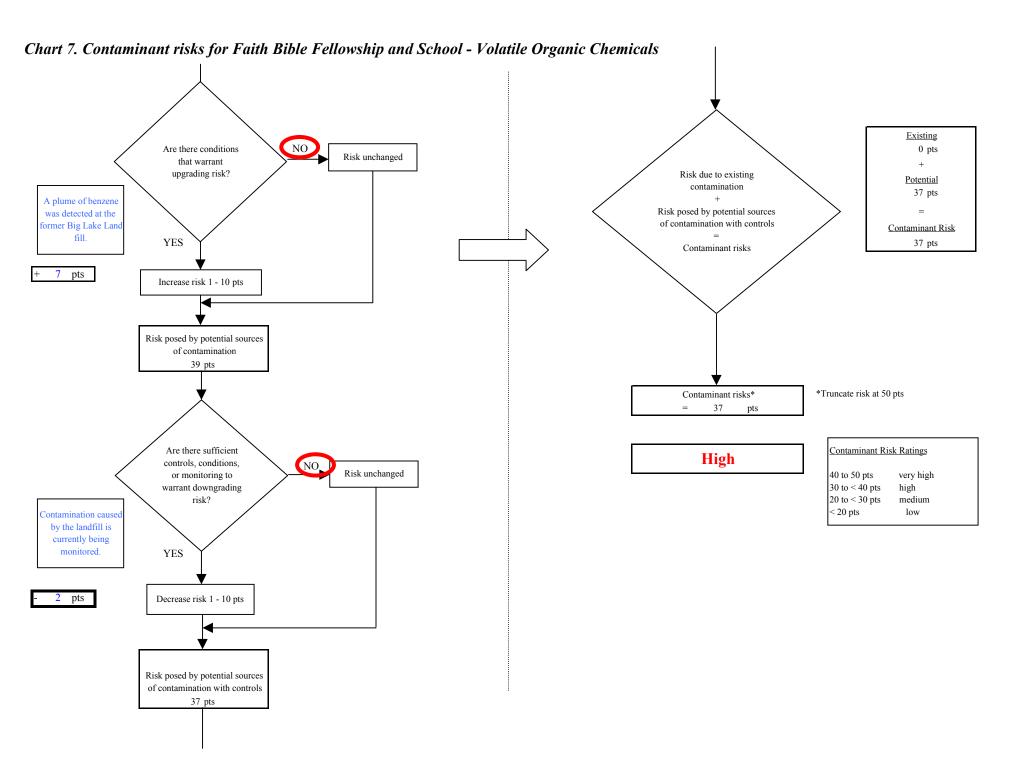
Risk Levels for Contaminant Sources identified in Zones A, B and C				
	Zone A	Zones B&C	Total	
Very Highs(s)	0	0	0	
High(s)	0	1	1	
Medium(s)	0	0	0	
Low(s)	7	5	12	

	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	
MEDIUM		≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH			≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH				≥ 1 source + 10 pts

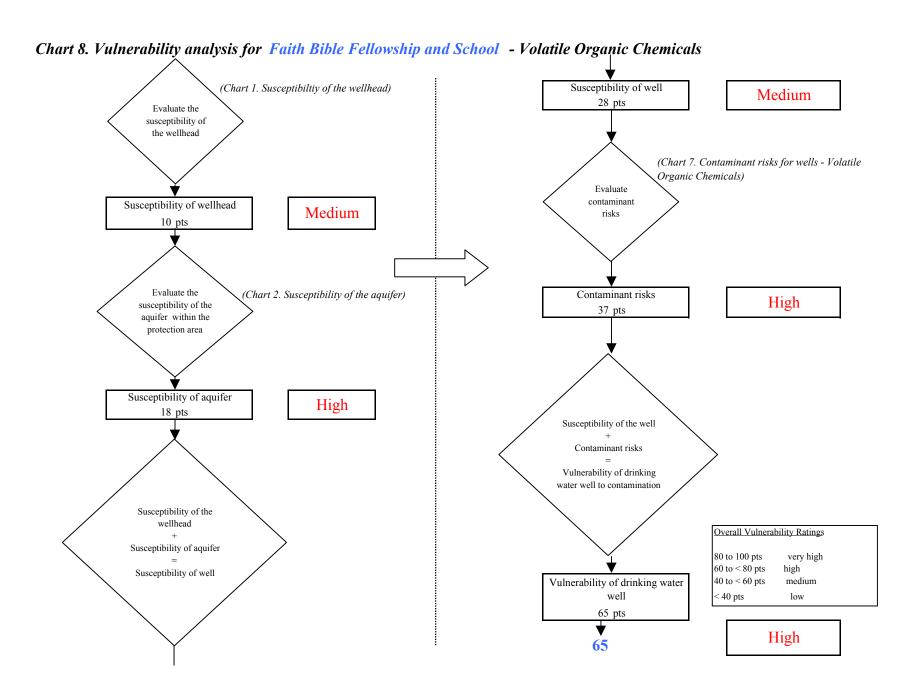
Matrix Score 30

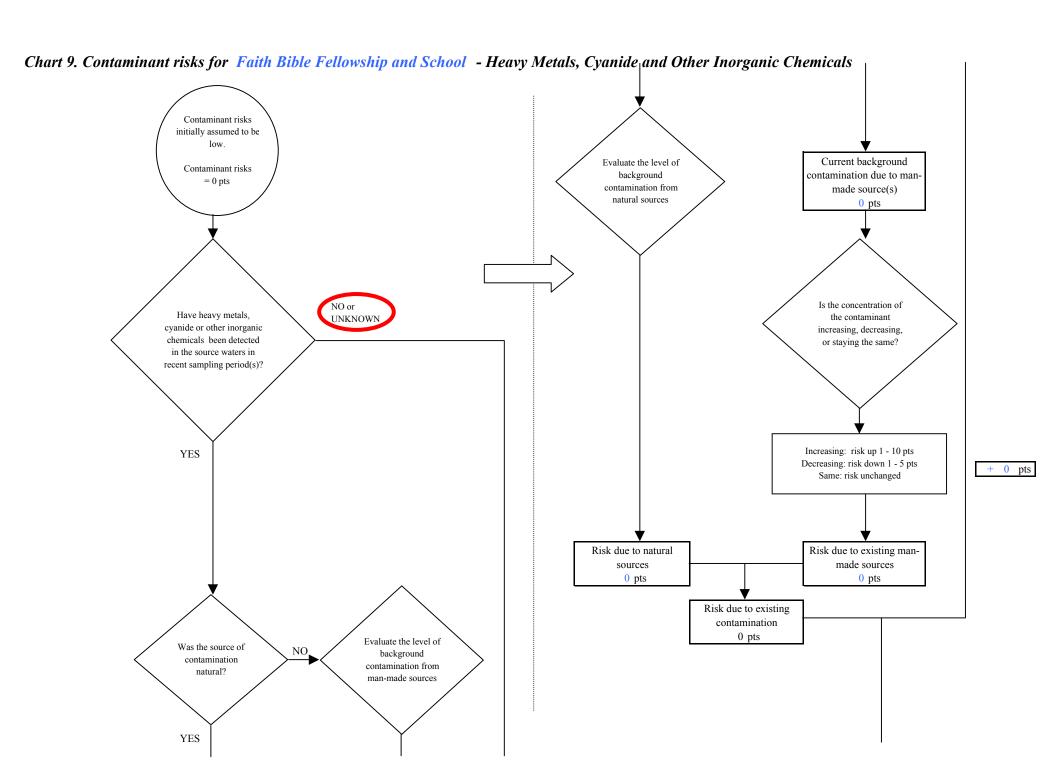
Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.





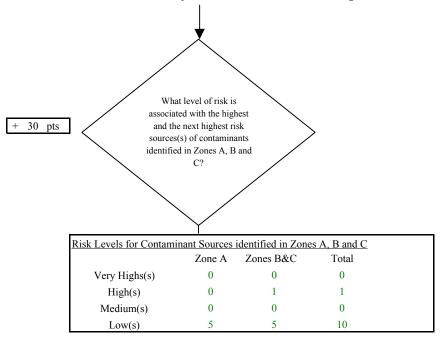
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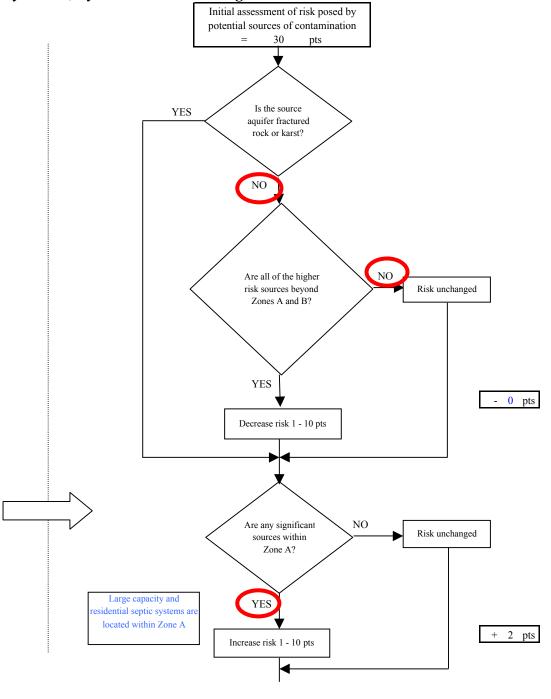


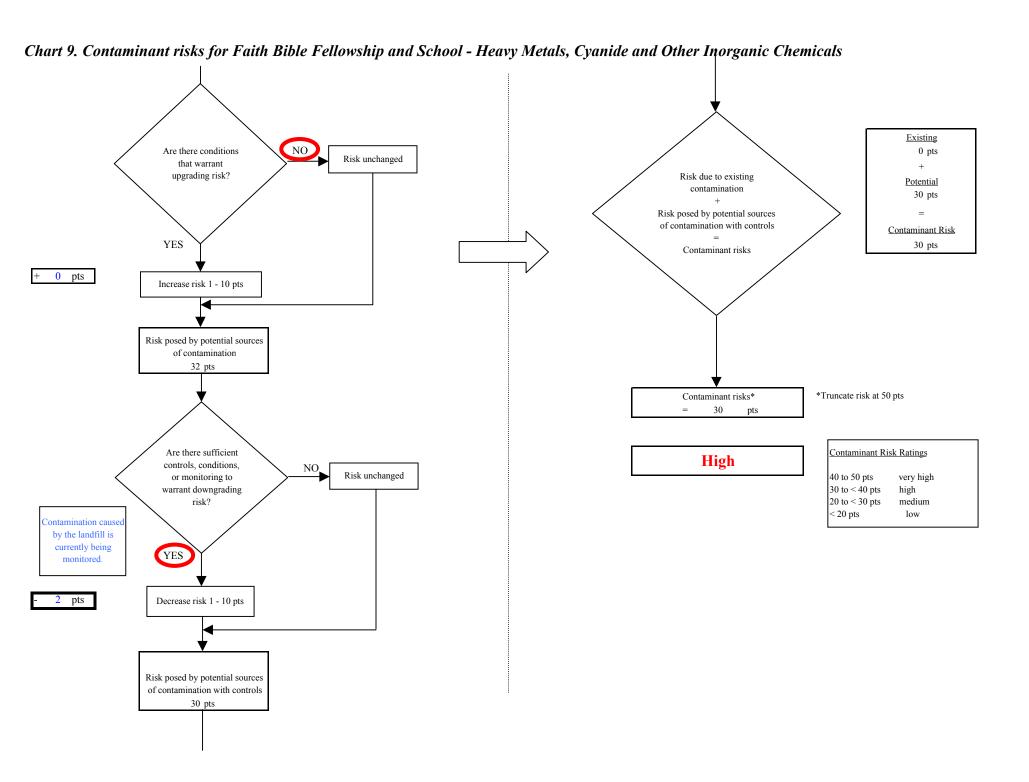


	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	
MEDIUM		≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH			≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH				≥ 1 source + 10 pts

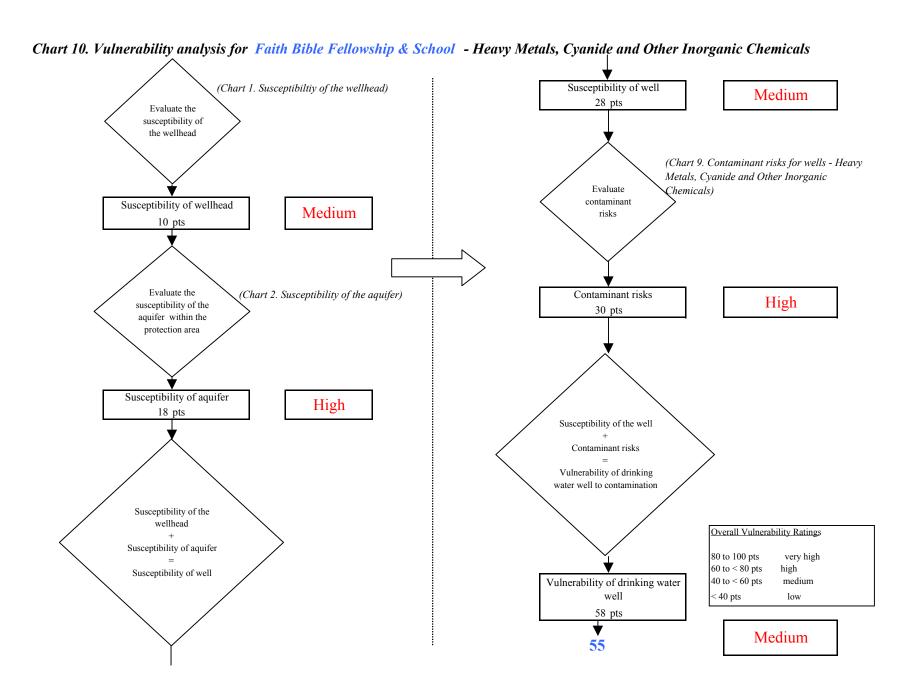
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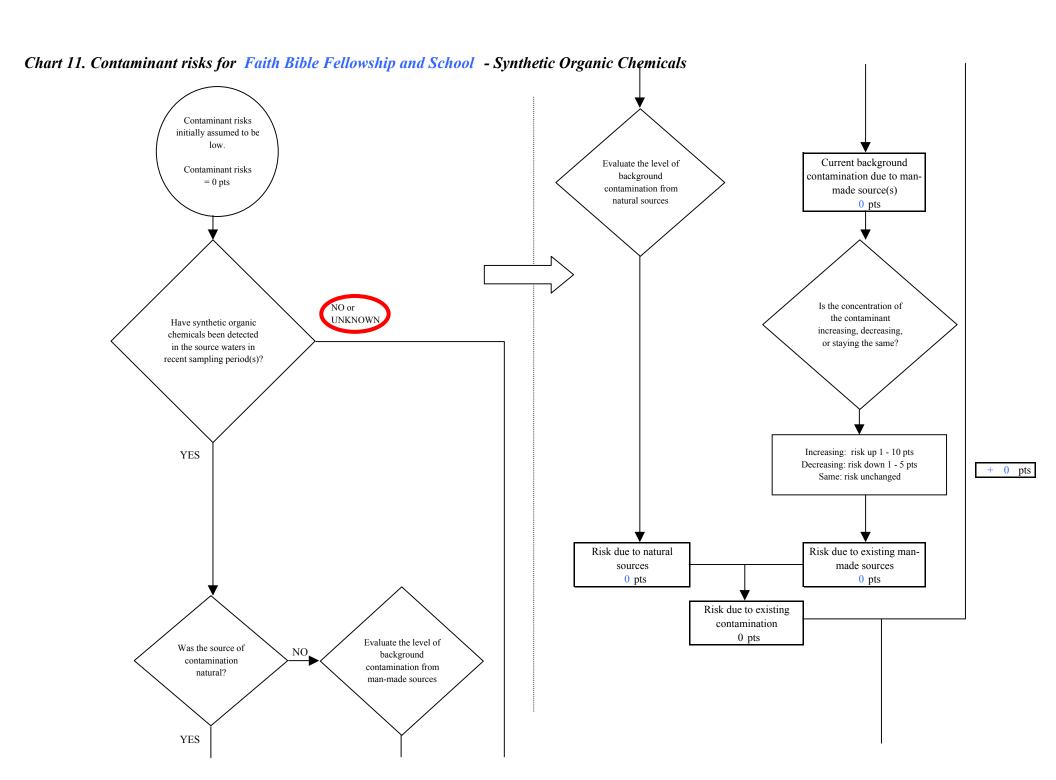
Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.





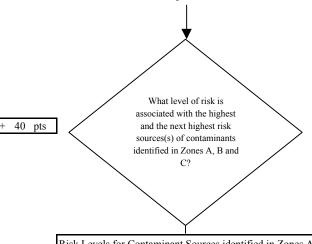
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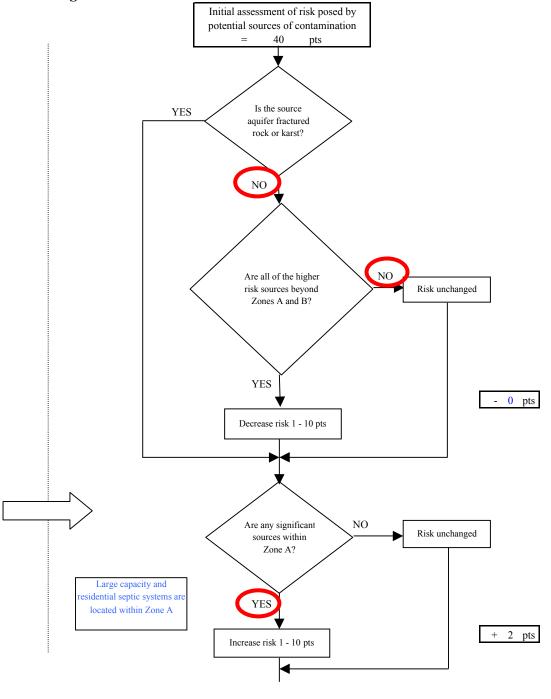


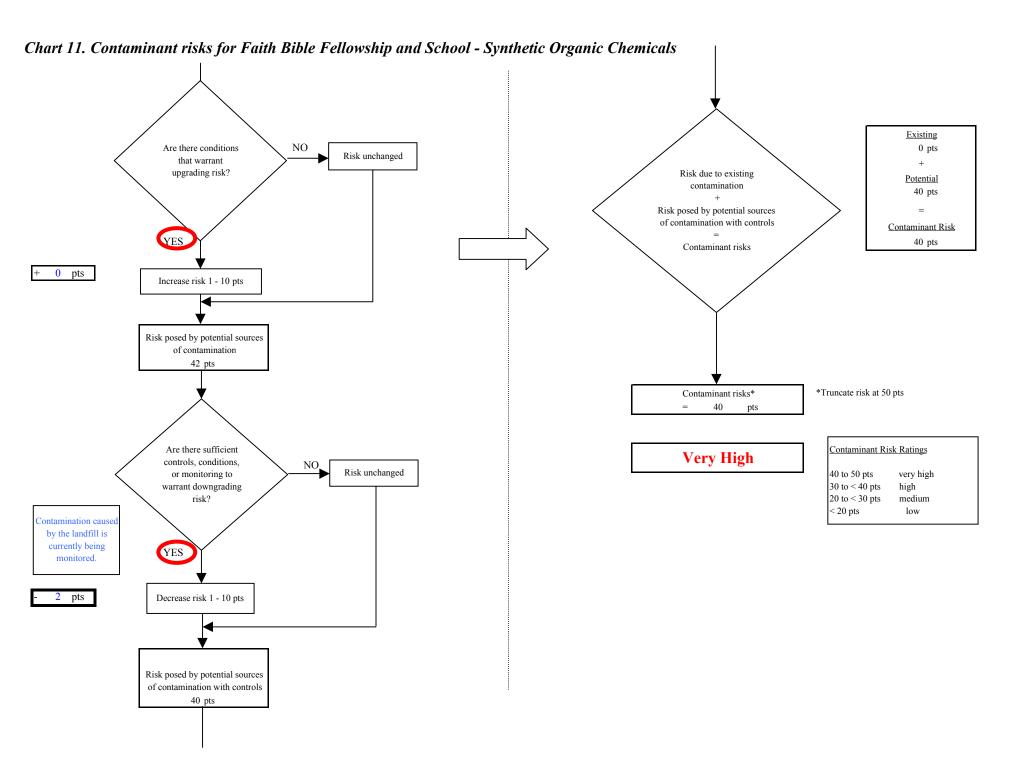
sk Levels for Contaminant Sources identified in Zones A, B and C					
	Zone A	Zone A Zones B&C Total			
Very Highs(s)	0	1	1		
High(s)	0	0	0		
Medium(s)	0	0	0		
Low(s)	4	4	8		

	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	
MEDIUM		≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH			≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH				≥ 1 source + 10 pts

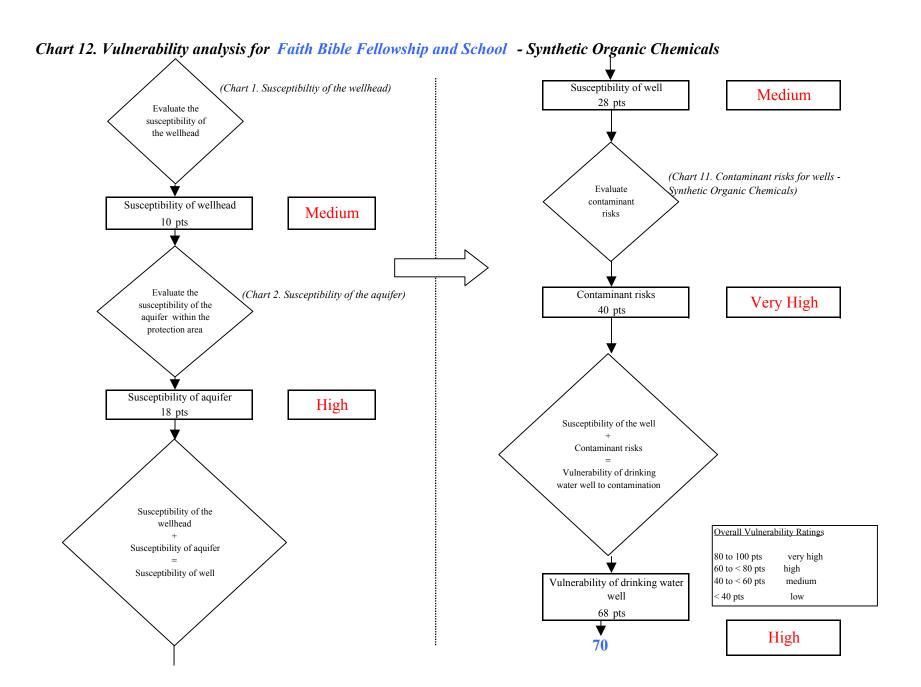
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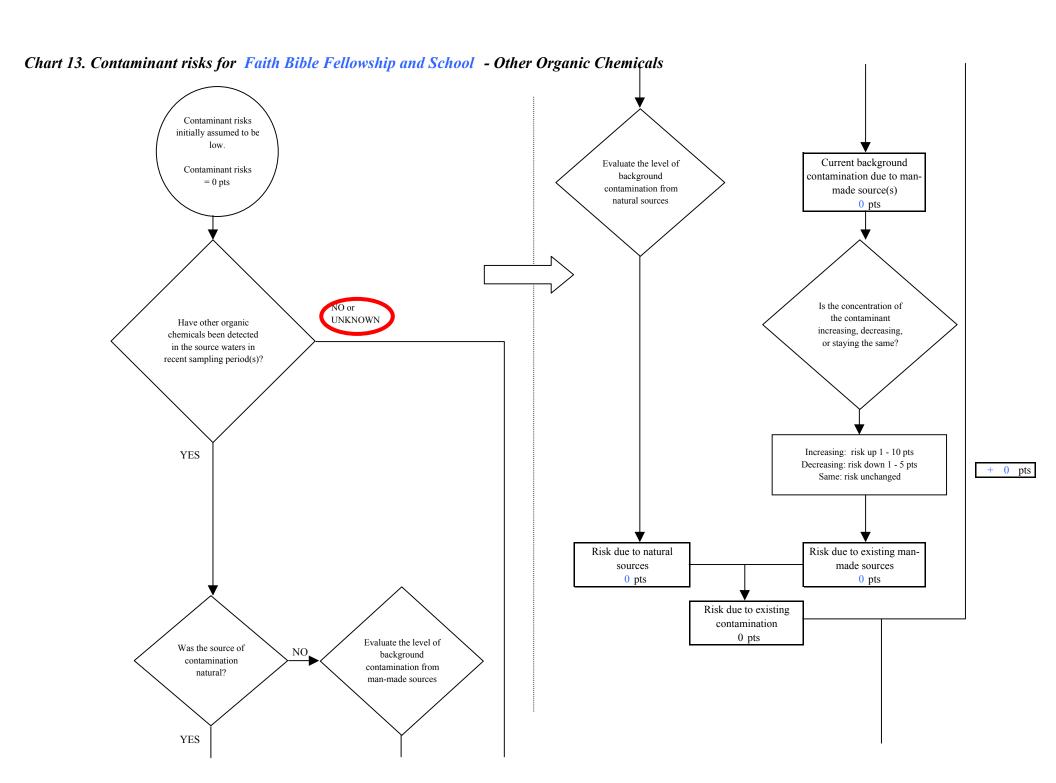
Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.



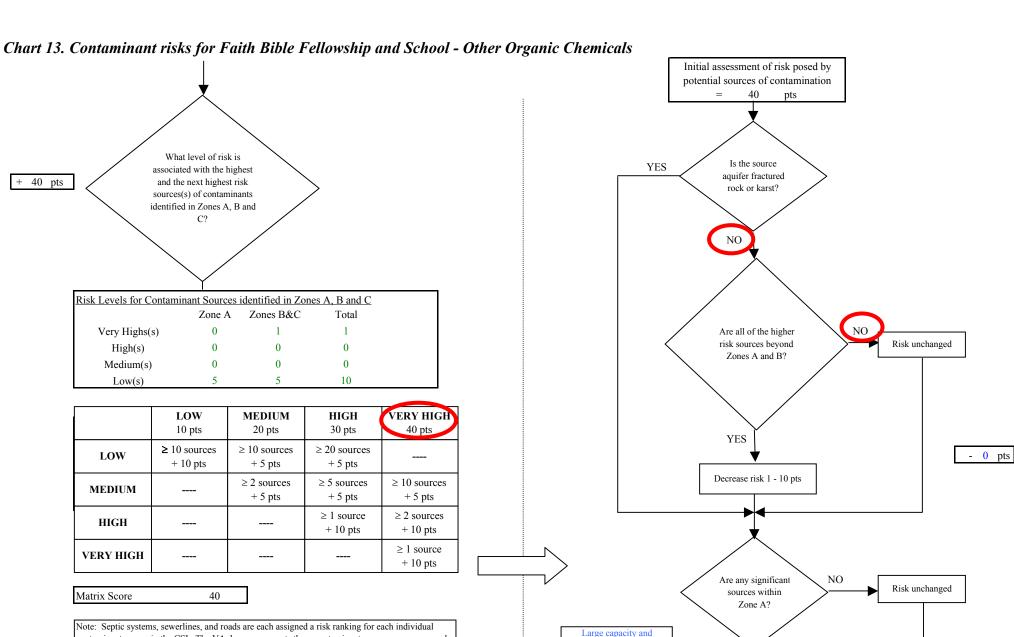


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Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

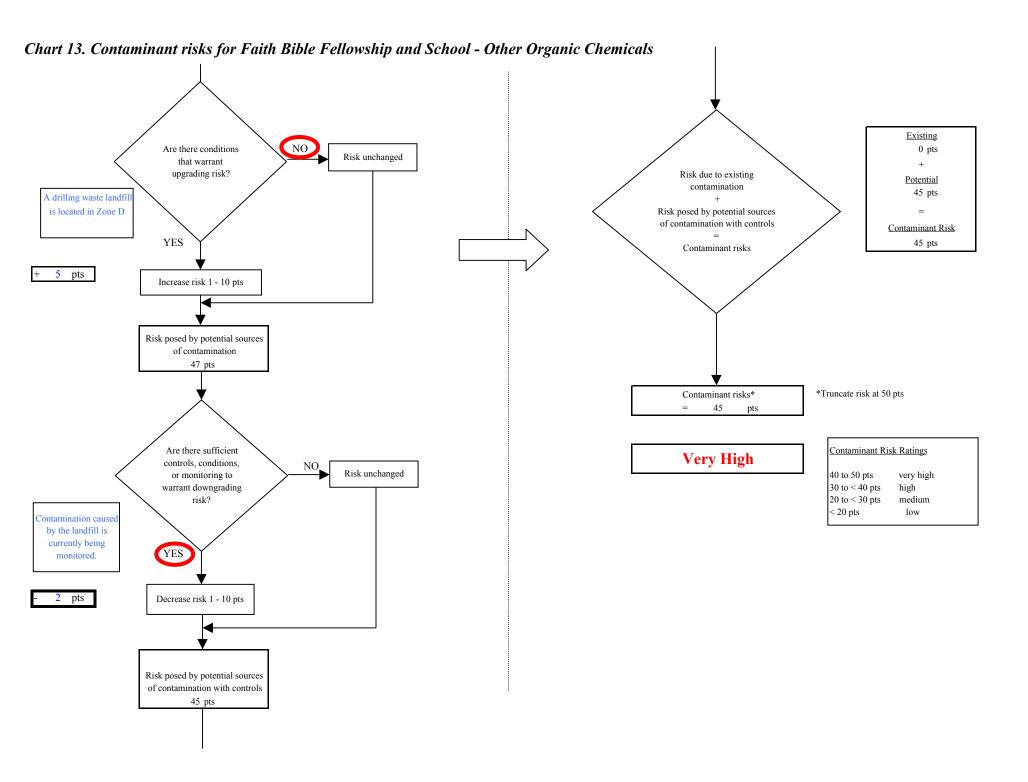
esidential septic systems are

located within Zone A

YES

Increase risk 1 - 10 pts

+ 2 pts



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