Source Water Assessment for Alaska Artesian Bottling Company Wasilla, Alaska

A Hydrogeologic Susceptibility and Vulnerability Assessment

DRINKING WATER PROTECTION PROGRAM REPORT 180
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ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION: 2002

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Source Water Assessment for Alaska Artesian Bottling Company's Source of Public Drinking Water, Wasilla Area, Alaska

By Sarah A. Bendewald

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Public Water System for Alaska Artesian Bottling Company is a Class A (non-transient/non-community) water system consisting of one well approximately nine miles west of Wasilla along the Parks Highway. Identified potential and current sources of contaminants for Alaska Artesian Bottling Company include: large capacity and residential septic systems, motor vehicle waste injection wells, a heavy equipment storage area, a veterinary clinic, 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 Alaska Artesian Bottling Company received a vulnerability rating of **Medium** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, heavy metals and other organic chemicals, and **Low** for synthetic organic chemicals.

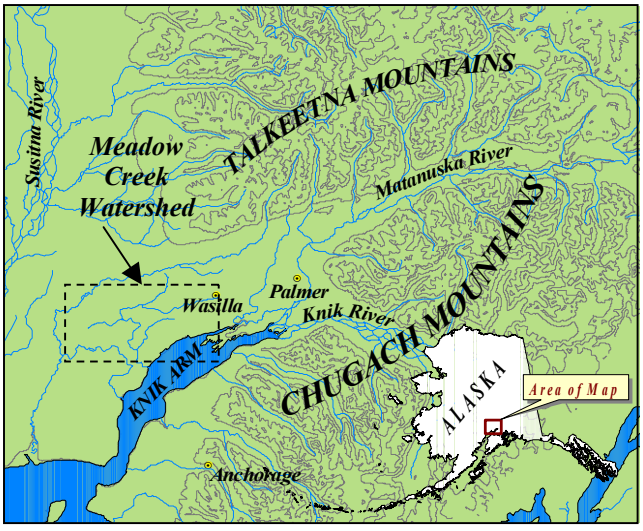

Figure 1. Index Map showing the location of the Matanuska-Susitna Valley and the Meadow Creek Watershed.

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 Alaska Artesian Bottling Company. This water system consists of one well in the Wasilla area. 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

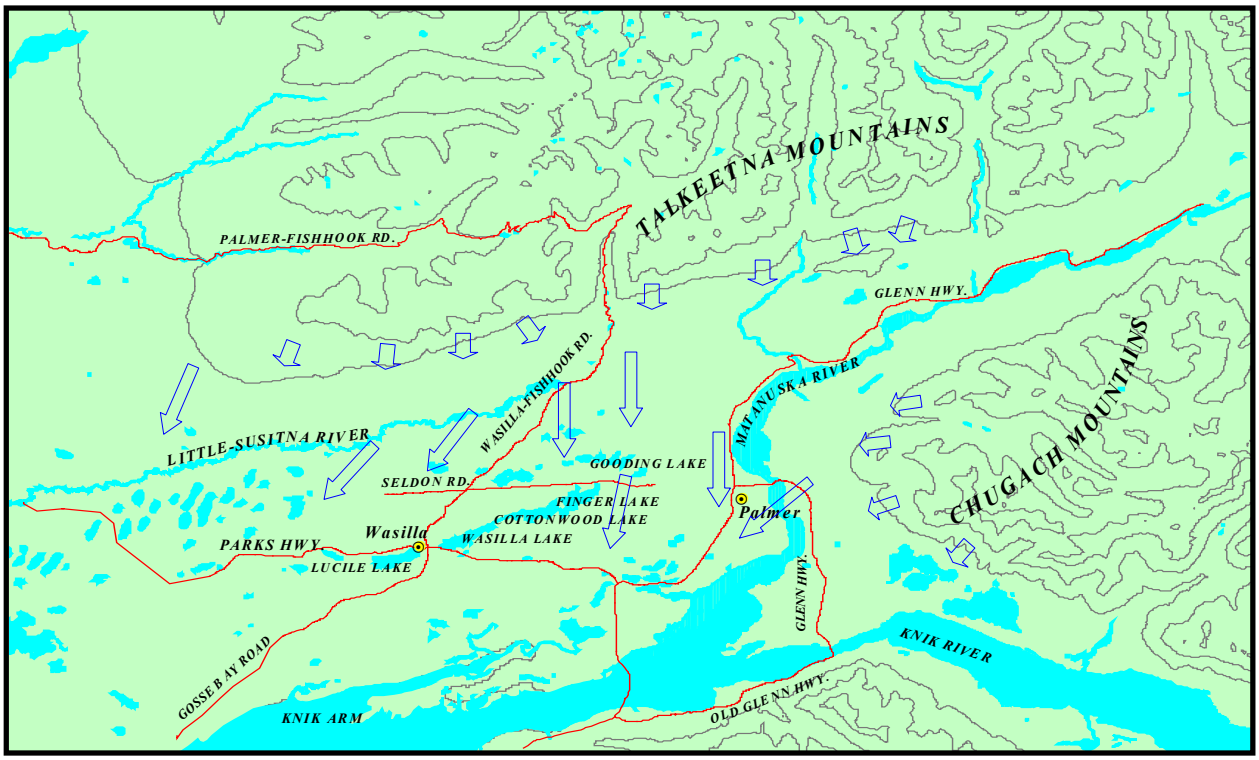

Figure 2. Map showing groundwater flow in the Matanuska-Susitna Valley (Jokela, Munter and Evans, 1991).

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.

ALASKA ARTESIAN BOTTLING COMPANY' PUBLIC DRINKING WATER SYSTEM

Alaska Artesian Bottling Company' public water system is a Class A (non-transient/non-community) water system. The system consists of one well near the intersection of the Parks Highway and Ridgecrest Road (T17N, R2W, Section 17). This area is at an elevation of approximately 250 feet above sea level.

According to the water quality/quantity assessment completed for the water system (Gilfilian Engineering & Engineering Testing, 12/8/1994), installation of the well occurred on April 20 – 26,1976 to a total depth of 102 feet below ground surface and was completed in 6-inch well casing. The water system will use this existing well with a newly installed wellhouse and water distribution system. A sanitary seal has been installed on the well. A properly installed sanitary seal may provide protection against contaminants from entering the source waters at the well casing. The well casing extends over 40 inches above ground surface and the drainage around the wellhouse is adequate. The well was properly grouted at the time the water line was installed. Proper grouting provides added protection against contaminants travelling along the well casing and into source waters.

This system is a commercial water bottling plant employing a maximum of 6 employees and is capable of producing approximately 20 gallons of packaged water per minute (Gilfilian Engineering & Engineering Testing, 12/8/1994).

ASSESSMENT AND PROTECTION AREA FOR ALASKA ARTESIAN BOTTLING COMPANY' DRINKING WATER SOURCE

The Drinking Water Protection and Assessment Area that has been established for Alaska Artesian Bottling Company'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 Alaska Artesian Bottling Company 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 ¼ of the distance of the 2-year time-of-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 Alaska Artesian Bottling Company. 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 and 3 in Appendix C depict the Contaminant Source Inventory for Alaska Artesian Bottling Company. 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 Alaska Artesian Bottling Company:

- Heavy equipment storage area;
- large capacity septic systems;
- motor vehicle waste injection wells;
- veterinary clinic;
- residential septic systems;
- highways and roads, and
- approximately 86 acres of residential area.

These potential and existing contaminant sources present risk for all six categories of drinking water contaminants for Alaska Artesian Bottling Company '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 ALASKA ARTESIAN BOTTLING COMPANY'S 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 Alaska Artesian Bottling Company was completed in a confined aquifer under artesian pressure. The depth to the confining layer is approximately 55 feet below land surface. The saturated thickness of the aquifer in which the well is screened in is approximately 23 feet and composed of silty gravel and gravel. Layers of fine silt 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.

In addition to the presence of a confining layer, the source waters for Alaska Artesian Bottling Company are locally quite protected due to a significant component of upward pressure in the area of the well. The artesian properties of this well should provide very protective conditions from the movement of contaminants in the subsurface close to the well. However, the confining silt and clay layers tend to be discontinuous and thin in the Matanuska-Susitna valley. Therefore, contaminants that enter the subsurface in other areas may enter the confined aquifer uninhibited by the absence of a protective layer.

Private drinking water wells in the protection area may provide a quick pathway to the subsurface for contaminants. Therefore, these private wells increase the susceptibility of the source waters to contamination for Alaska Artesian Bottling Company's well. Combining the susceptibility of the wellhead and the aquifer to contamination leads to a score (0 – 50 points) and rating of overall Susceptibility (See Appendix D). Table 1 shows the overall Susceptibility score and rating for Alaska Artesian Bottling Company.

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

	Score	Rating
Susceptibility of the Wellheads	0	Low
Susceptibility of the Aquifer	15	High
Natural Susceptibility	15	Low

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 Alaska Artesian Bottling Company's Public Drinking Water Source to Contamination by Category

Contaminant Risks	Score	Rating
Bacteria and Viruses	40	Very High
Nitrates and/or Nitrites	42	Very High
Volatile Organic Chemicals	37	High
Heavy Metals, Cyanide, And Other Inorganic Chemicals	32	High
Synthetic Organic Chemicals	22	Medium
Other Organic Chemicals	27	Medium

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 Alaska Artesian Bottling Company's Public Drinking Water Source to Contamination by Category

Category	Score	Rating
Bacteria and Viruses	55	Medium
Nitrates and Nitrites	55	Medium
Volatile Organic Chemicals	50	Medium
Heavy Metals, Cyanide, and Other Inorganic Chemicals	45	Medium
Synthetic Organic Chemicals	35	Low
Other Organic Chemicals	40	Medium

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 highest risk potential for bacteria and viruses are the four large capacity septic systems, a type of Class V injection well, located in zone A. Large capacity septic systems differ from residential septic systems in that they serve multiple dwellings, businesses, or communities. 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 Alaska Artesian Bottling Company, but it receives a ranking of high because of the potential risk sources.

The highest risk potential for nitrates and nitrates are also the four large capacity septic systems along with the additional three large capacity septic systems in Zone C. Due to the high solubility and weak retention by soil, nitrates are very mobile in soil, moving at approximately the same rate as water. Nitrates have not been detected during recent sampling of Alaska Artesian Bottling Company's water system indicating the potential risk sources are not currently influencing the water. The water system also receives a ranking of high based on the potential risk.

The Alaska Department of Environmental Conservation (ADEC) identified a site within Alaska Artesian Bottling Company's protection area as having a potential motor vehicle waste disposal well, a type of Class V injection well, based on the land use type and lack of sewerline coverage in the area. The U.S. Environmental Protection Agency (EPA) has banned this type of well since April 2000 because of their extreme threat to groundwater quality. This ban requires all existing injection wells of this type be phased out and closed. The highest risk potential for both the volatile organic chemicals and the heavy metals, cyanide and other inorganic chemicals contaminant categories is this motor vehicle waste disposal well located in Zone C.

Other significant potential sources of contamination for these two contaminant categories include the large capacity and residential septic systems, the heavy equipment storage area, and the veterinary clinic.

The large capacity septic systems, the motor vehicle waste disposal well, and the veterinary clinic combine to upgrade the risk for synthetic organic chemicals.

The heavy equipment storage area and the motor vehicle waste disposal well are the two largest sources of risk for the other organic chemicals contaminant category.

SUMMARY

A *Source Water Assessment* has been completed for the sources of public drinking water serving Alaska Artesian Bottling Company. The overall vulnerability of this source to contamination is **High** for bacteria and viruses and nitrates and nitrites, and **Medium** for volatile organic chemicals, heavy metals, synthetic organic chemicals and other organic chemicals. 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 Alaska Artesian Bottling Company 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 Alaska Artesian Bottling Company's public drinking water source.

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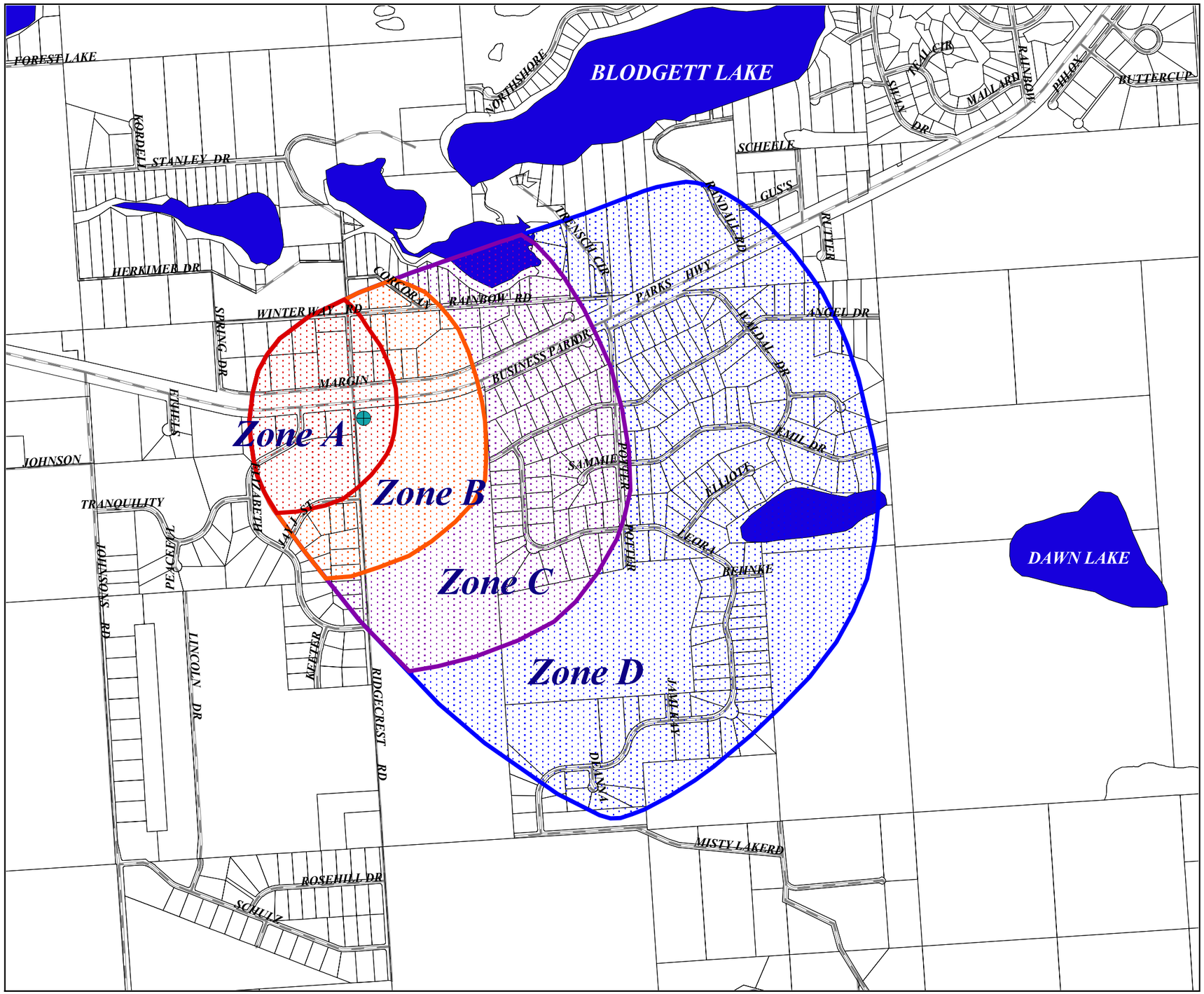
APPENDIX A

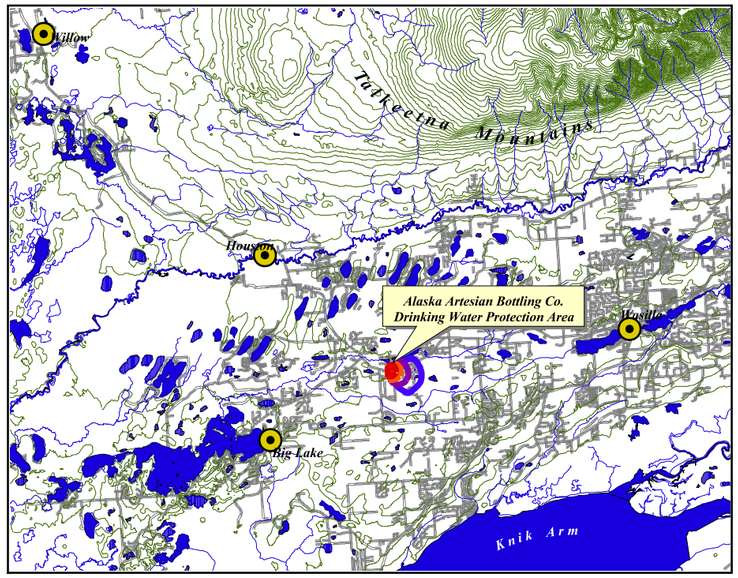
Alaska Artesian Bottling Company
Drinking Water Protection Area

Alaska Artesian Bottling Company Drinking Water Protection Area



Legend

- Alaska Artesian Bottling Co. Well
- Zone A Protection Area
  - Several Months Travel Time
- Zone B Protection Area
  - Less Than 2 Years Travel Time
- Zone C Protection Area
  - Less Than 5 Years Travel Time
- Zone D Protection Area
  - Less Than 10 Years Travel Time
- Lakes
- Parcels
- Roads



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Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Company

Table 1

Contaminant Source Inventory for
Alaska Artesian Bottling Co.

PWSID 225324.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Location*	*Map Number*	*Comments*
Heavy equipment rental/storage	C18	C18-1	A	Ridgecrest & Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Elizabeth Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	A	Unnamed margin of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	A	Parks Hwy	3	
Residential Areas	R01	R1-1	A	Along Parks Hwy	2	13 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-01	A	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Winter Way	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Elizabeth Dr	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Ridgecrest Rd	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	A	Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Unnamed margin of Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Elizabeth Dr	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Winter Way	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Jay J St	2	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Elizabeth Dr & Parks hwy	3	
Residential Areas	R01	R1-2	B	along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-05	B	Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-06	B	Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-07	B	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-08	B	Elizabeth Dr	3	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Location*	*Map Number*	*Comments*
Septic systems (serves one single-family home)	R02	R2-09	B	Ridgecrest Rd	3	
Highways and roads, dirt/gravel	X24	X24-05	B	Corcoran	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	C	Unnamed margin road of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-6	C	Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-7	C	Leora Dr	3	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	C	Business Park Dr	3	
Residential Areas	R01	R1-3	C	between Rainbow Rd and Leora Dr	2	54 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-11to34	C	Between Rainbow Rd and Leora Dr	3	
Highways and roads, dirt/gravel	X24	X24-06	C	Angel Dr	2	
Highways and roads, dirt/gravel	X24	X24-07	C	Leora Dr	2	
Highways and roads, dirt/gravel	X24	X24-08	C	Sammie	2	
Highways and roads, dirt/gravel	X24	X24-09	C	Business Park Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Pooter Rd	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-8	D	Parks Hwy	3	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-2	D	Waldal Dr	3	

Table 2

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. Sources of Bacteria and Viruses

PWSID 225324.001

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	Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	High	2	Elizabeth Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	A	High	3	Unnamed margin of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	A	High	4	Parks Hwy	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Medium	5	Elizabeth Dr & Parks hwy	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	6	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	7	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	8	Winter Way	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	9	Elizabeth Dr	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	10	Ridgecrest Rd	2	
Residential Areas	R01	R1-1	A	Low		Along Parks Hwy	2	13 acres of residential area in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-2	A	Low		Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Unnamed margin of Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Elizabeth Dr	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Winter Way	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Jay J St	2	
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-05	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-06	B	Low		Rainbow Rd	3	

Table 2 (continued)

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. Sources of Bacteria and Viruses

PWSID 225324.001

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	R2-07	B	Low		Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-08	B	Low		Elizabeth Dr	3	
Septic systems (serves one single-family home)	R02	R2-09	B	Low		Ridgecrest Rd	3	
Highways and roads, dirt/gravel	X24	X24-05	B	Low		Corcoran	2	

Table 3

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. Sources of Nitrates/Nitrites

PWSID 225324.001

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	Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	High	2	Elizabeth Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	A	High	3	Unnamed margin of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	A	High	4	Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	C	High	5	Unnamed margin road of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-6	C	High	6	Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-7	C	High	7	Leora Dr	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	8	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	9	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	10	Winter Way	3	
Residential Areas	R01	R1-1	A	Low		Along Parks Hwy	2	13 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-04	A	Low		Elizabeth Dr	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Ridgecrest Rd	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	A	Low		Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Unnamed margin of Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Elizabeth Dr	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Winter Way	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Jay J St	2	
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. 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*
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-05	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-06	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-07	B	Low		Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-08	B	Low		Elizabeth Dr	3	
Septic systems (serves one single-family home)	R02	R2-09	B	Low		Ridgecrest Rd	3	
Highways and roads, dirt/gravel	X24	X24-05	B	Low		Corcoran	2	
Residential Areas	R01	R1-3	C	Low		between Rainbow Rd and Leora Dr	2	54 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-11to34	C	Low		Between Rainbow Rd and Leora Dr	3	
Highways and roads, dirt/gravel	X24	X24-06	C	Low		Angel Dr	2	
Highways and roads, dirt/gravel	X24	X24-07	C	Low		Leora Dr	2	
Highways and roads, dirt/gravel	X24	X24-08	C	Low		Sammie	2	
Highways and roads, dirt/gravel	X24	X24-09	C	Low		Business Park Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Low		Pooter Rd	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-8	D	High		Parks Hwy	3	

Table 4

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. Sources of Volatile Organic Chemicals

PWSID 225324.001

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) Motor Vehicle Waste Disposal Well	D42	D42-1	C	High	1	Business Park Dr	3	
Heavy equipment rental/storage	C18	C18-1	A	Medium	2	Ridgecrest & Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	3	Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	4	Elizabeth Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	A	Low	5	Unnamed margin of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	A	Low	6	Parks Hwy	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Low	7	Elizabeth Dr & Parks hwy	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	8	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	9	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	10	Winter Way	3	
Residential Areas	R01	R1-1	A	Low		Along Parks Hwy	2	13 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-04	A	Low		Elizabeth Dr	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Ridgecrest Rd	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	A	Low		Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Unnamed margin of Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Elizabeth Dr	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Winter Way	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Jay J St	2	
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-05	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-06	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-07	B	Low		Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-08	B	Low		Elizabeth Dr	3	
Septic systems (serves one single-family home)	R02	R2-09	B	Low		Ridgecrest Rd	3	
Highways and roads, dirt/gravel	X24	X24-05	B	Low		Corcoran	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	C	Low		Unnamed margin road of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-6	C	Low		Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-7	C	Low		Leora Dr	3	
Residential Areas	R01	R1-3	C	Low		between Rainbow Rd and Leora Dr	2	54 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-11to34	C	Low		Between Rainbow Rd and Leora Dr	3	
Highways and roads, dirt/gravel	X24	X24-06	C	Low		Angel Dr	2	
Highways and roads, dirt/gravel	X24	X24-07	C	Low		Leora Dr	2	
Highways and roads, dirt/gravel	X24	X24-08	C	Low		Sammie	2	
Highways and roads, dirt/gravel	X24	X24-09	C	Low		Business Park Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Low		Pooter Rd	2	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-2	D	High		Waldal Dr	3	

Table 5

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co.
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 225324.001

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) Motor Vehicle Waste Disposal Well	D42	D42-1	C	High	1	Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	3	Elizabeth Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	A	Low	4	Unnamed margin of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	A	Low	5	Parks Hwy	3	
Heavy equipment rental/storage	C18	C18-1	A	Low	6	Ridgecrest & Parks Hwy	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Low	7	Elizabeth Dr & Parks hwy	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	8	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	9	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	10	Winter Way	3	
Residential Areas	R01	R1-1	A	Low		Along Parks Hwy	2	13 acres of residential area in Zone A
Septic systems (serves one single-family home)	R02	R2-04	A	Low		Elizabeth Dr	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Ridgecrest Rd	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	A	Low		Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Unnamed margin of Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Elizabeth Dr	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Winter Way	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Jay J St	2	
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-05	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-06	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-07	B	Low		Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-08	B	Low		Elizabeth Dr	3	
Septic systems (serves one single-family home)	R02	R2-09	B	Low		Ridgecrest Rd	3	
Highways and roads, dirt/gravel	X24	X24-05	B	Low		Corcoran	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	C	Low		Unnamed margin road of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-6	C	Low		Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-7	C	Low		Leora Dr	3	
Residential Areas	R01	R1-3	C	Low		between Rainbow Rd and Leora Dr	2	54 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-11to34	C	Low		Between Rainbow Rd and Leora Dr	3	
Highways and roads, dirt/gravel	X24	X24-06	C	Low		Angel Dr	2	
Highways and roads, dirt/gravel	X24	X24-07	C	Low		Leora Dr	2	
Highways and roads, dirt/gravel	X24	X24-08	C	Low		Sammie	2	
Highways and roads, dirt/gravel	X24	X24-09	C	Low		Business Park Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Low		Pooter Rd	2	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-2	D	High		Waldal Dr	3	

Table 6

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. Sources of Synthetic Organic Chemicals

PWSID 225324.001

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	Low	1	Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	2	Elizabeth Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	A	Low	3	Unnamed margin of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	A	Low	4	Parks Hwy	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Low	5	Elizabeth Dr & Parks hwy	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	6	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	7	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	8	Winter Way	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	9	Elizabeth Dr	3	
Residential Areas	R01	R1-1	A	Low	10	Along Parks Hwy	2	13 acres of residential area in Zone A
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-05	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-06	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-07	B	Low		Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-08	B	Low		Elizabeth Dr	3	
Septic systems (serves one single-family home)	R02	R2-09	B	Low		Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	C	Low		Unnamed margin road of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-6	C	Low		Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-7	C	Low		Leora Dr	3	

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) Motor Vehicle Waste Disposal Well	D42	D42-1	C	Low		Business Park Dr	3	
Residential Areas	R01	R1-3	C	Low		between Rainbow Rd and Leora Dr	2	54 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-11to34	C	Low		Between Rainbow Rd and Leora Dr	3	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-2	D	Low		Waldal Dr	3	

Table 7

Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. Sources of Other Organic Chemicals

PWSID 225324.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map Number	Comments
Heavy equipment rental/storage	C18	C18-1	A	Medium	1	Ridgecrest & Parks Hwy	3	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	C	Medium	2	Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	3	Ridgecrest Rd	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	A	Low	4	Elizabeth Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	A	Low	5	Unnamed margin of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-4	A	Low	6	Parks Hwy	3	
Septic systems (serves one single-family home)	R02	R2-01	A	Low	7	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-02	A	Low	8	Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-03	A	Low	9	Winter Way	3	
Septic systems (serves one single-family home)	R02	R2-04	A	Low	10	Elizabeth Dr	3	
Residential Areas	R01	R1-1	A	Low		Along Parks Hwy	2	13 acres of residential area in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		Ridgecrest Rd	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	A	Low		Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-01	A	Low		Unnamed margin of Parks Hwy	2	
Highways and roads, dirt/gravel	X24	X24-02	A	Low		Elizabeth Dr	2	
Highways and roads, dirt/gravel	X24	X24-03	A	Low		Winter Way	2	
Highways and roads, dirt/gravel	X24	X24-04	A	Low		Jay J St	2	
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Residential Areas	R01	R1-2	B	Low		along Rainbow Rd and Ridgecrest Rd	2	19 acres of residential area in Zone B
Septic systems (serves one single-family home)	R02	R2-05	B	Low		Rainbow Rd	3	

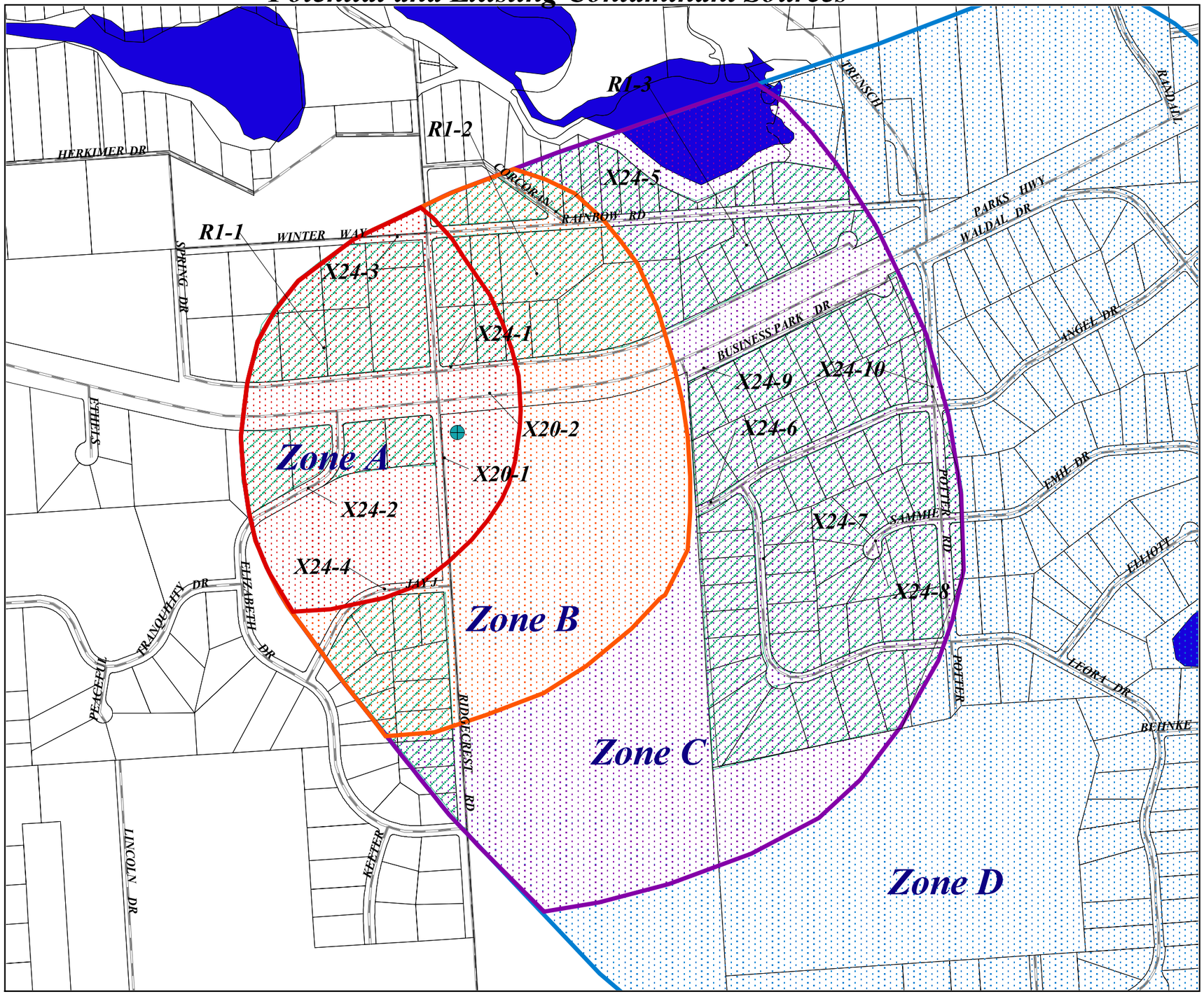
Contaminant Source Inventory and Risk Ranking for Alaska Artesian Bottling Co. Sources of Other Organic Chemicals

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	R2-06	B	Low		Rainbow Rd	3	
Septic systems (serves one single-family home)	R02	R2-07	B	Low		Ridgecrest Rd	3	
Septic systems (serves one single-family home)	R02	R2-08	B	Low		Elizabeth Dr	3	
Septic systems (serves one single-family home)	R02	R2-09	B	Low		Ridgecrest Rd	3	
Highways and roads, dirt/gravel	X24	X24-05	B	Low		Corcoran	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-5	C	Low		Unnamed margin road of Parks Hwy	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-6	C	Low		Business Park Dr	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-7	C	Low		Leora Dr	3	
Residential Areas	R01	R1-3	C	Low		between Rainbow Rd and Leora Dr	2	54 acres of residential area in Zone C
Septic systems (serves one single-family home)	R02	R2-11to34	C	Low		Between Rainbow Rd and Leora Dr	3	
Highways and roads, dirt/gravel	X24	X24-06	C	Low		Angel Dr	2	
Highways and roads, dirt/gravel	X24	X24-07	C	Low		Leora Dr	2	
Highways and roads, dirt/gravel	X24	X24-08	C	Low		Sammie	2	
Highways and roads, dirt/gravel	X24	X24-09	C	Low		Business Park Dr	2	
Highways and roads, dirt/gravel	X24	X24-10	C	Low		Pooter Rd	2	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-2	D	Medium		Waldal Dr	3	

APPENDIX C

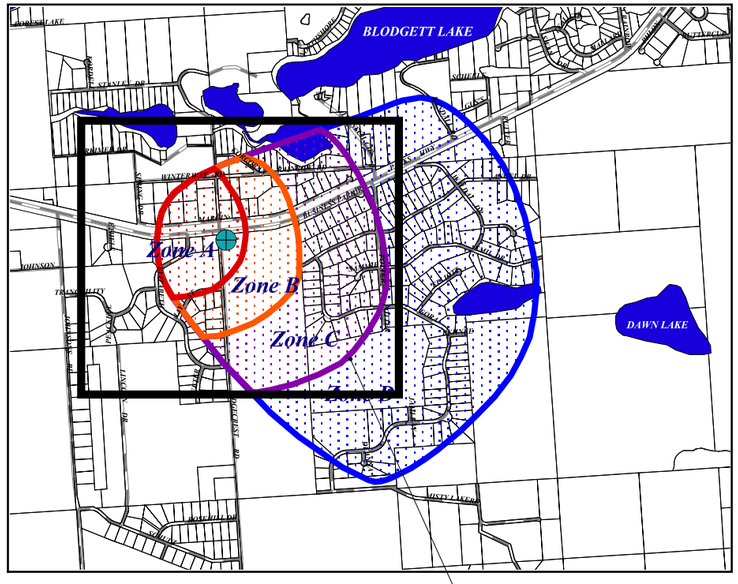
Alaska Artesian Bottling Company
Drinking Water Protection Area
and Potential and Existing Contaminant Sources

Alaska Artesian Bottling Company Drinking Water Protection Area with Potential and Existing Contaminant Sources



Legend

- Alaska Artesian Bottling Co. Well
- Zone A Protection Area
  - Several Months Travel Time
- Zone B Protection Area
  - Less Than 2 Years Travel Time
- Zone C Protection Area
  - Less Than 5 Years Travel Time
- Zone D Protection Area
  - Less Than 10 years Travel Time
- Parcels
- Lakes
- Roads (X20 or X24)
- Residential Areas (R1)



Area of Map

N
W
E
S

0.25 0 0.25 0.5 *Miles*

PWSID 225324.001

Map 2

Alaska Artesian Bottling Company Drinking Water Protection Area with Potential and Existing Contaminant Sources

HERKIMER DR
CORCORAN LOOP
WINTER WAY
SPRING DR
PARKS HWY
BUSINESS PARK DR
BOLTER RD
ANGEL DR
MARGIN WAY
RIDGECREST RD
EMIL DR
LEORA DR
ELLIOTT CIR
TRANQUILITY
ELIZABETH DR
JAY J ST

R2-1
R2-2
R2-3
R2-4
R2-5
R2-6
R2-7
R2-8
R2-9
R2-10
R2-11 through R2-34
D10-1
D10-2
D10-3
D10-4
D10-5
D10-6
D10-7
D10-8
D10-9
D42-1
D42-2
X40-1
C18-1

Zone A
Zone B
Zone C
Zone D

0.25 0 0.25 0.5 Miles

PWSID 225324.001

Legend

- Alaska Artesian Bottling Co. Well

Zone A Protection Area
- Several Months Travel Time

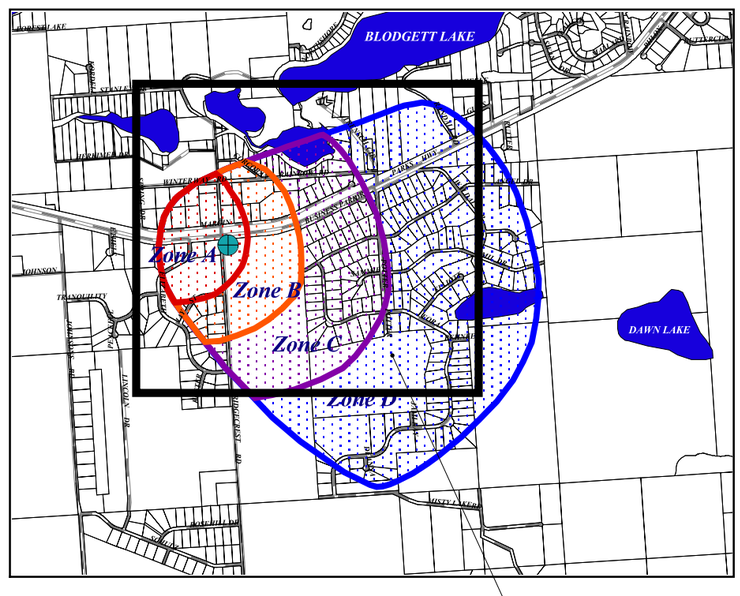
Zone B Protection Area
- Less Than 2 Years Travel Time

Zone C Protection Area
- Less Than 5 Years Travel Time

Zone D Protection Area
- Less Than 10 years Travel Time
- Parcels
- Lakes
- Roads

Potential Contaminant Sources
- Heavy equipment rental/storage (C18)
- Medical/veterinary facilities (X40)

Septic Systems
- Large Capacity Septic Systems (D10)
- Motor Vehicle Waste Class V Injection Well (D42)
- Single Family Septic Systems (R2)



N
W E
S

Map 3

APPENDIX D

Vulnerability Analysis for Alaska Artesian Bottling Company Public Drinking Water Source

Chart 1. Susceptibility of the wellhead - Alaska Artesian Bottling Company

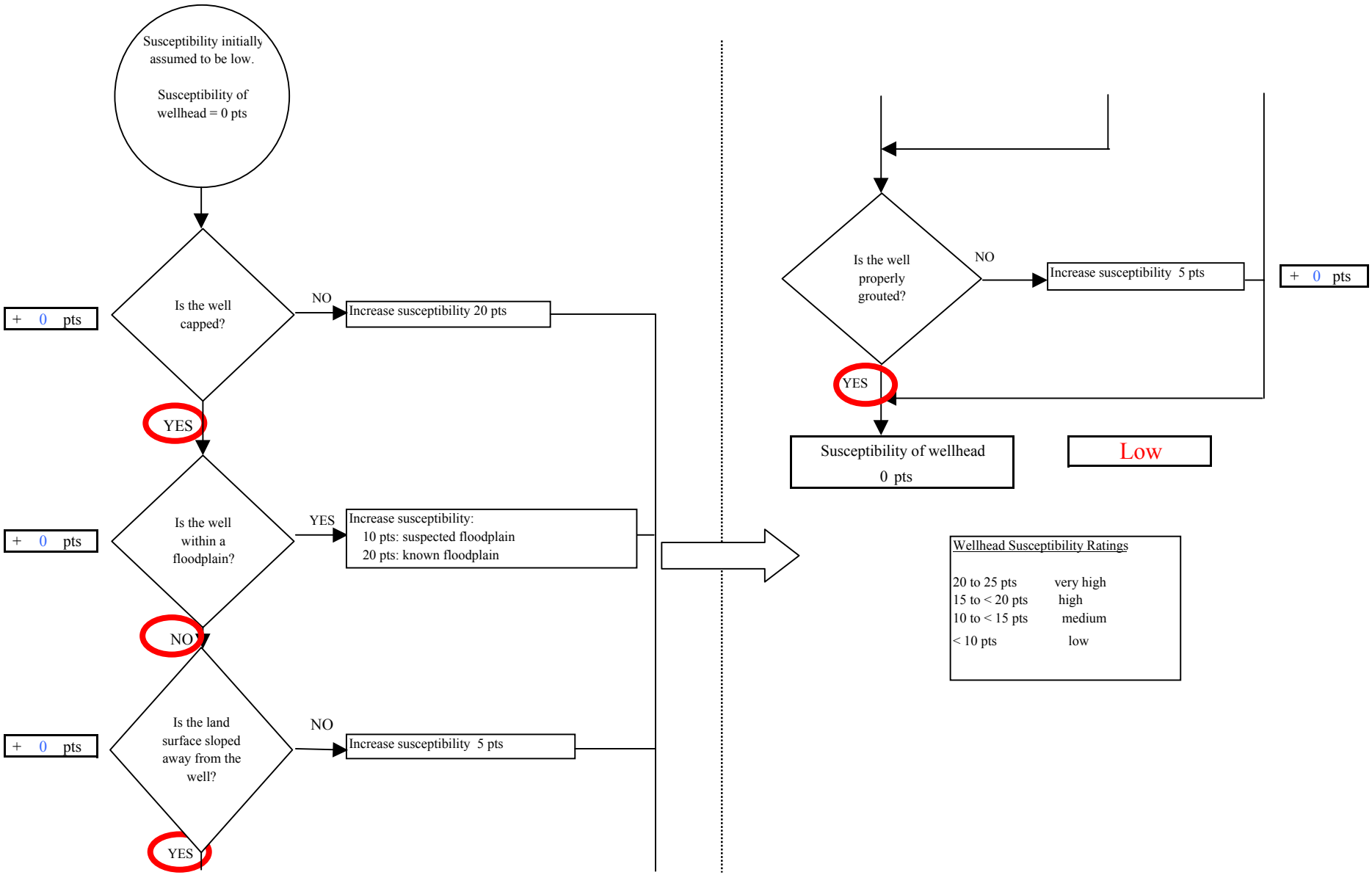


Chart 2. Susceptibility of the aquifer - Alaska Artesian Bottling Company

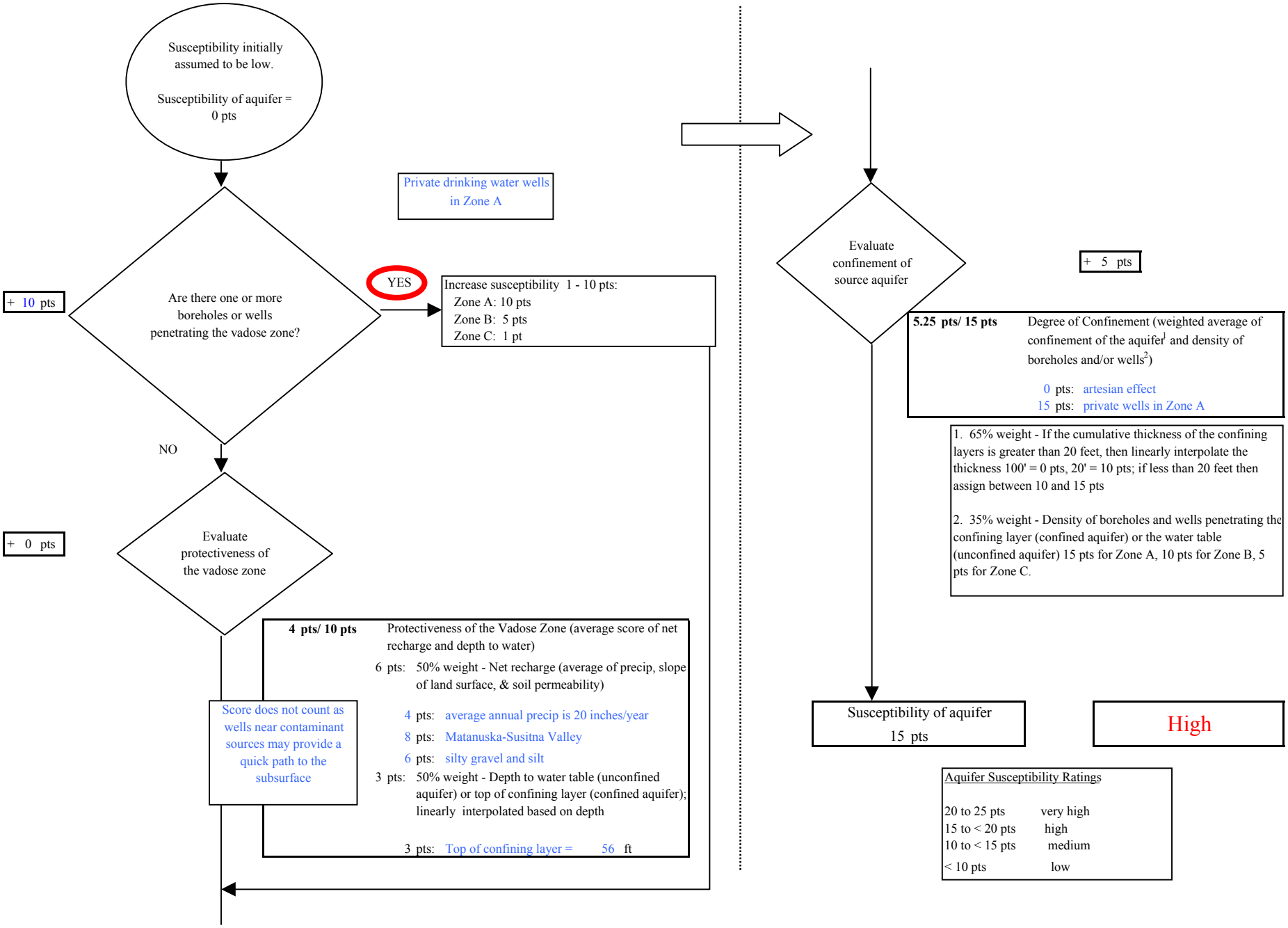
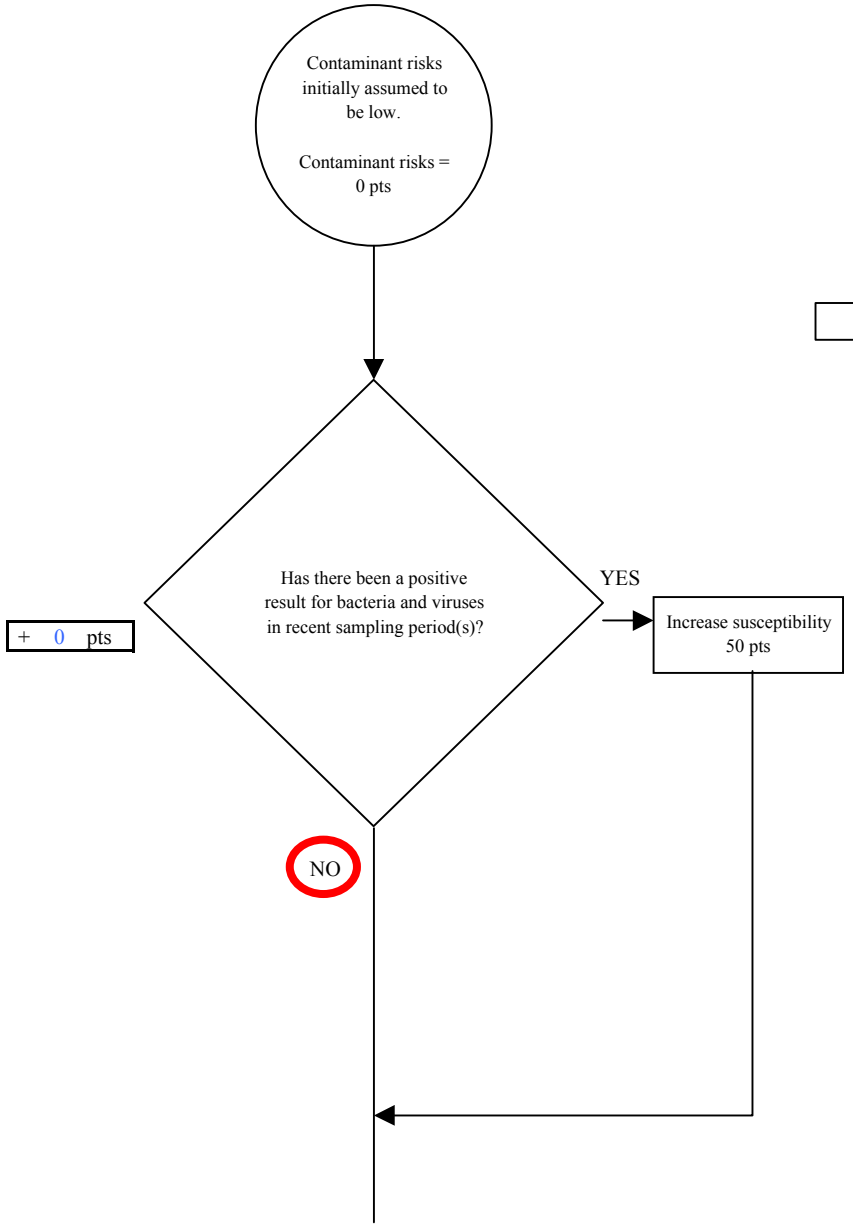
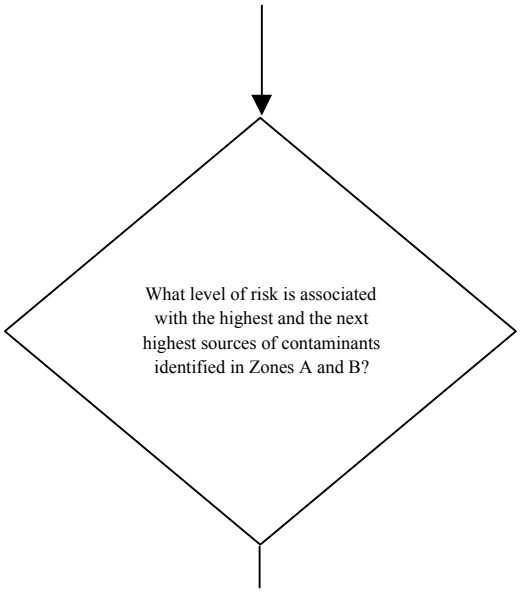


Chart 3. Contaminant risks for Alaska Artesian Bottling Company - Bacteria & Viruses





+ 40 pts

Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	4	0	4
Medium(s)	1	0	1
Low(s)	6	4	10

	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 40

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.

Chart 3. Contaminant risks for Alaska Artesian Bottling Company - Bacteria & Viruses

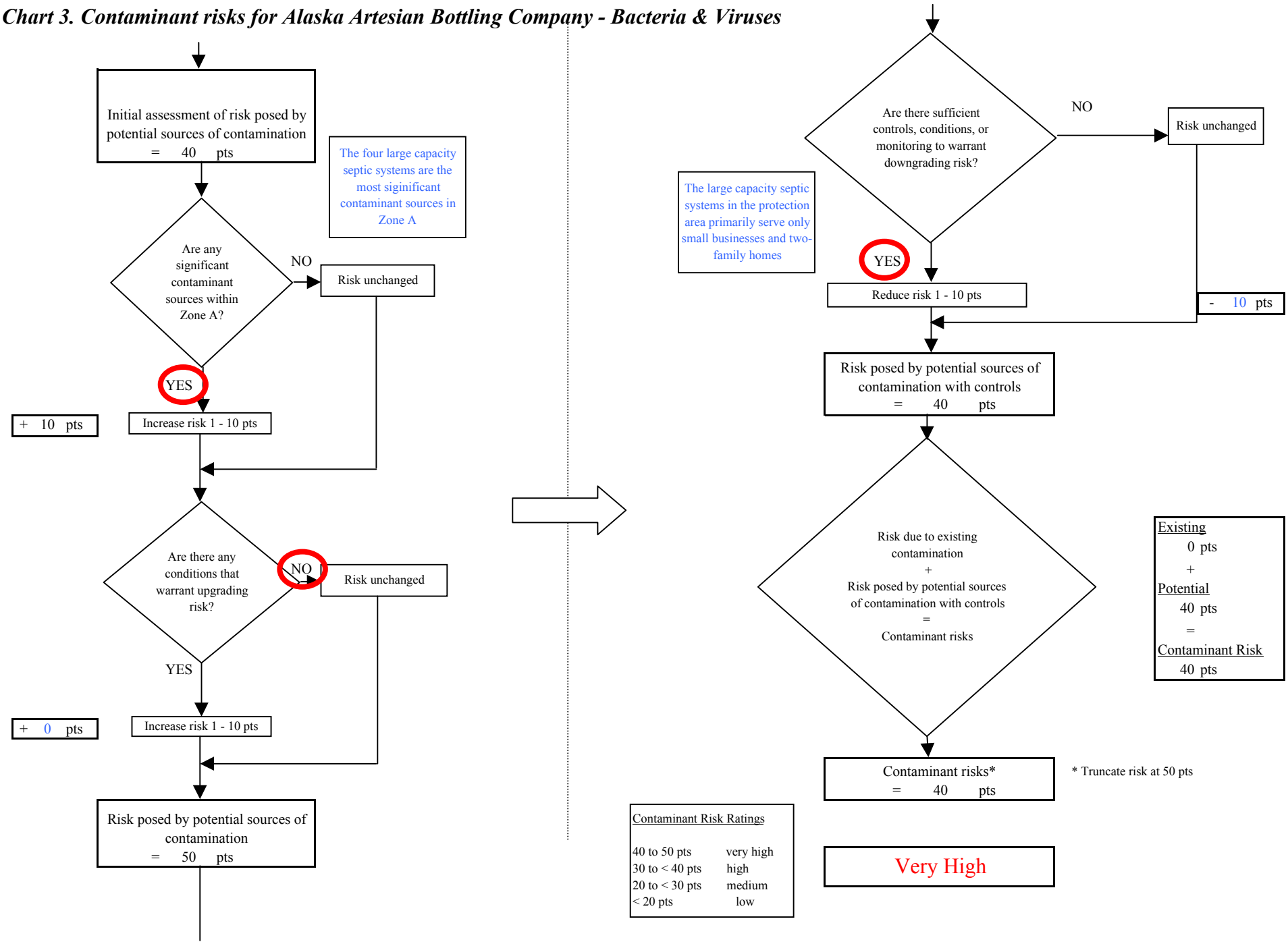


Chart 4. Vulnerability analysis for Alaska Artesian Bottling Company - Bacteria & Viruses

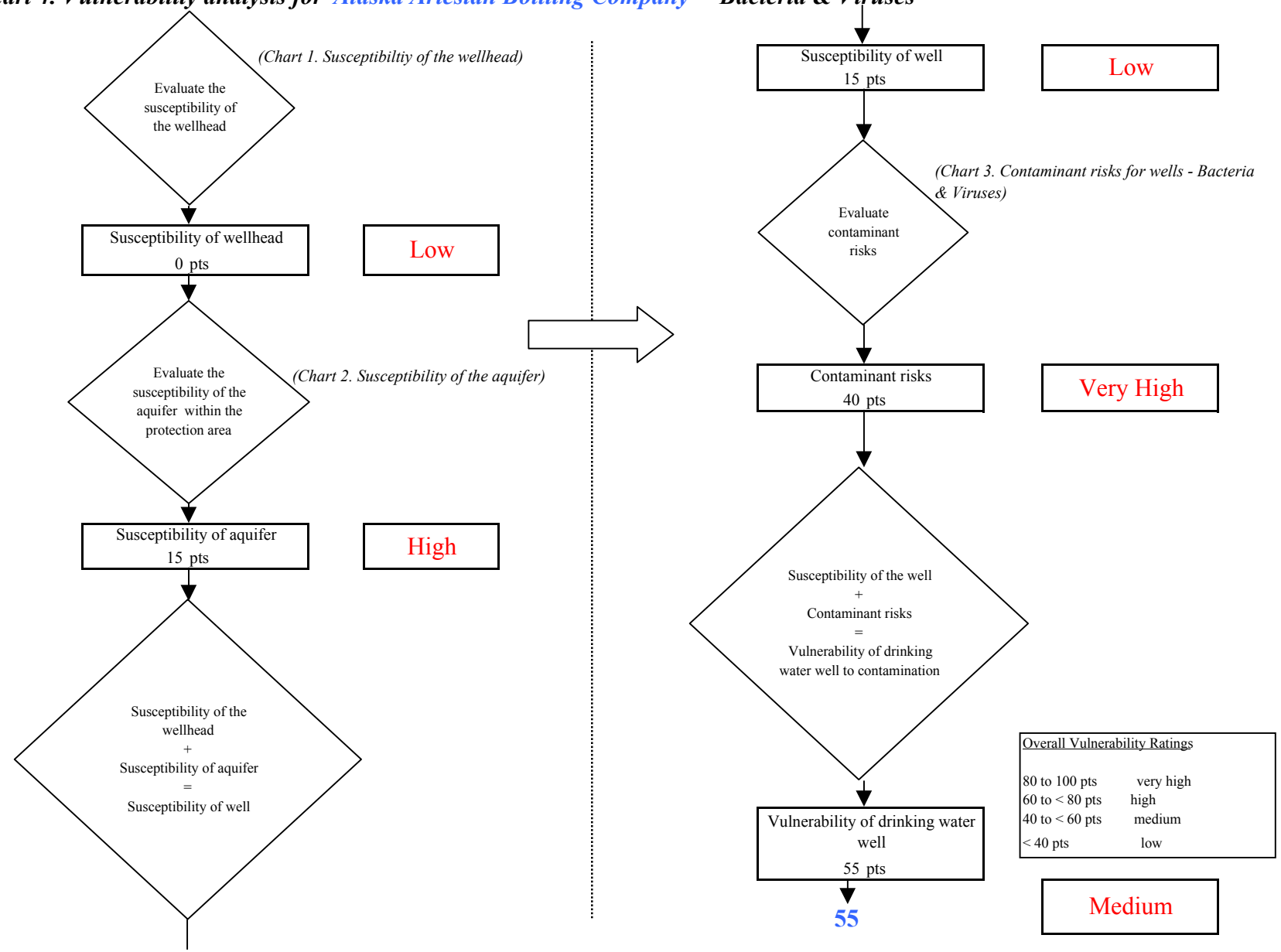


Chart 5. Contaminant risks for Alaska Artesian Bottling Company - Nitrates and Nitrites

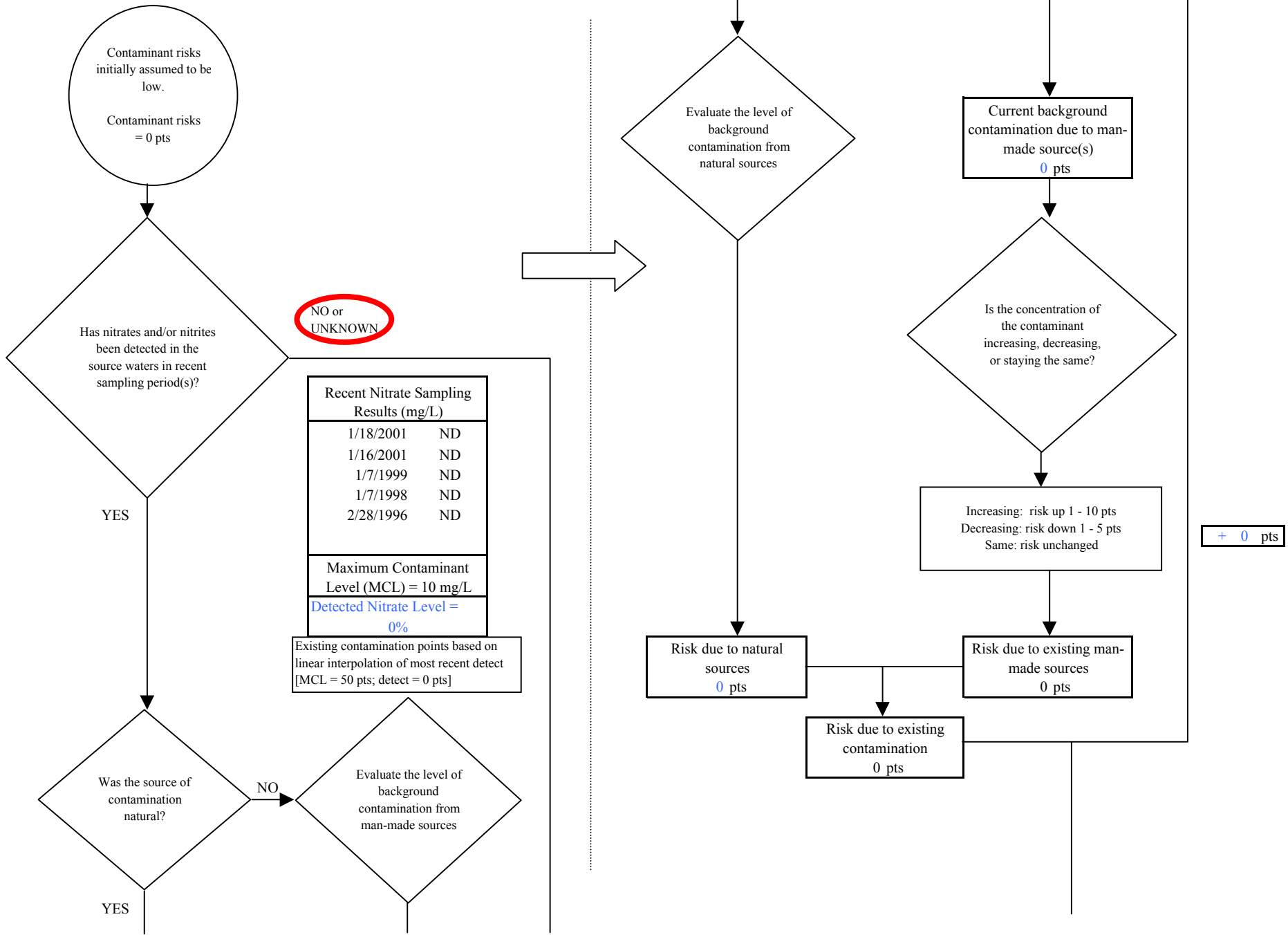
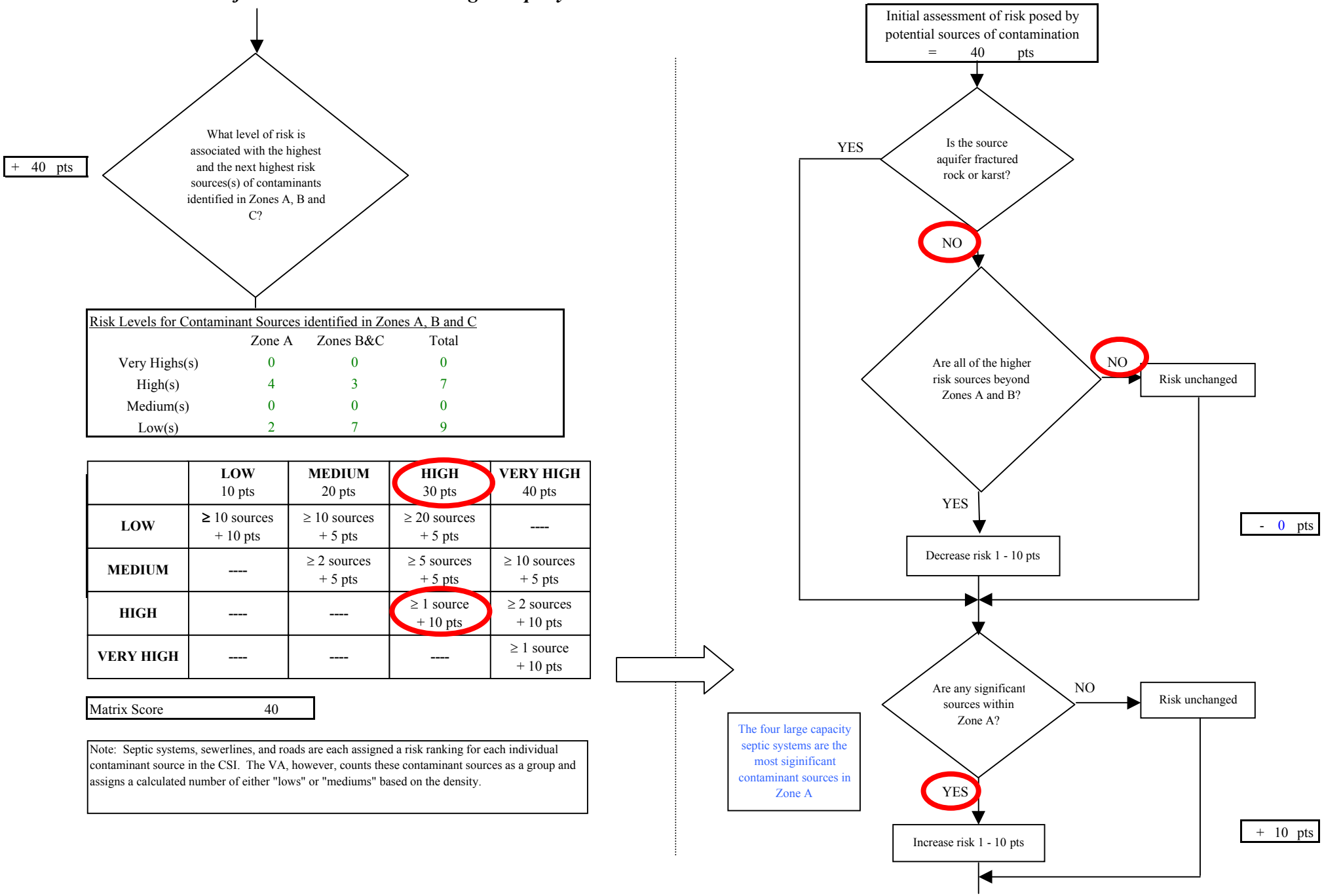


Chart 5. Contaminant risks for Alaska Artesian Bottling Company - Nitrates and Nitrites



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)	4	3	7
Medium(s)	0	0	0
Low(s)	2	7	9

	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 40

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.

Chart 5. Contaminant risks for Alaska Artesian Bottling Company - Nitrates and Nitrites

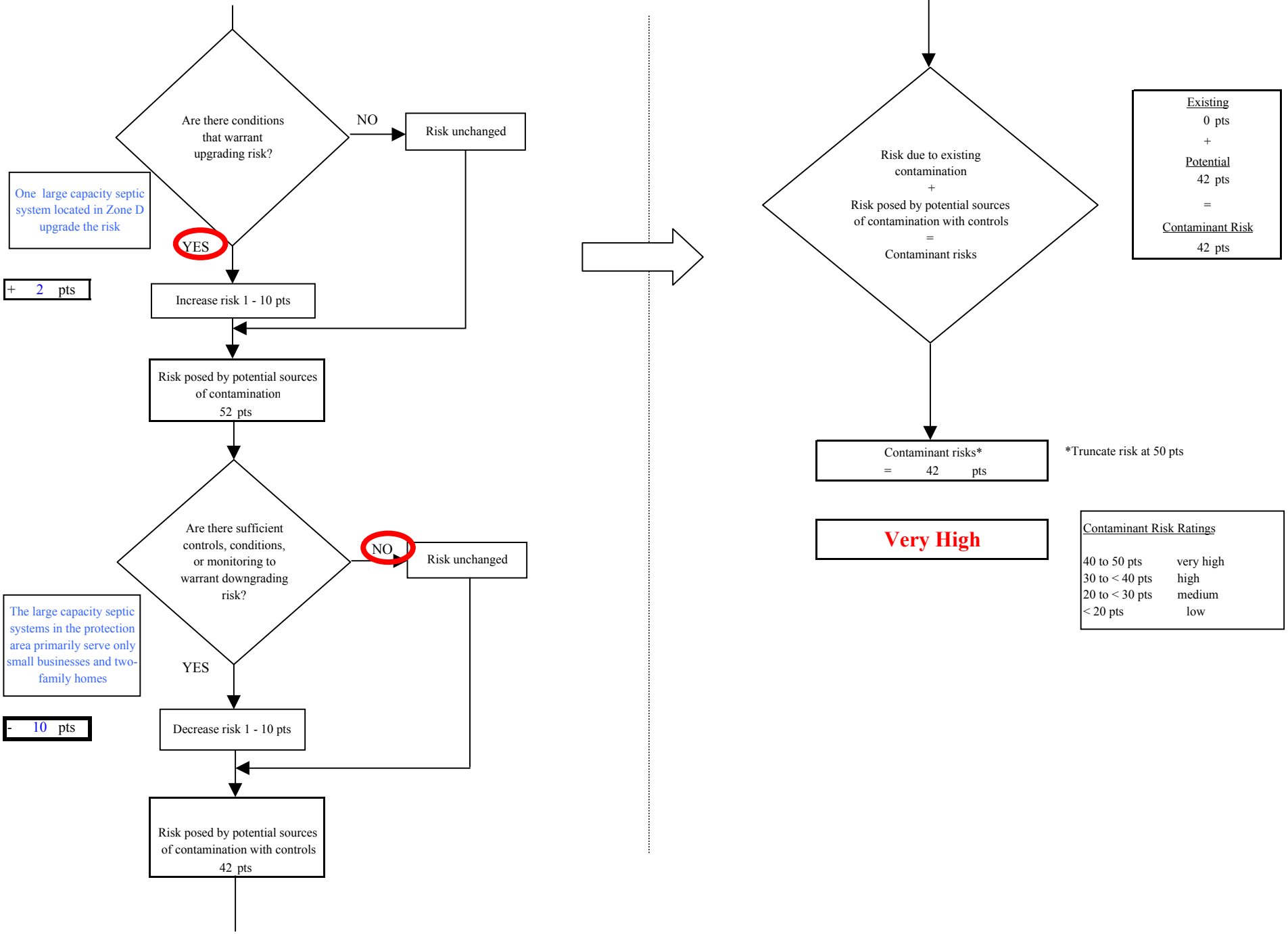


Chart 6. Vulnerability analysis for Alaska Artesian Bottling Company - Nitrates and Nitrites

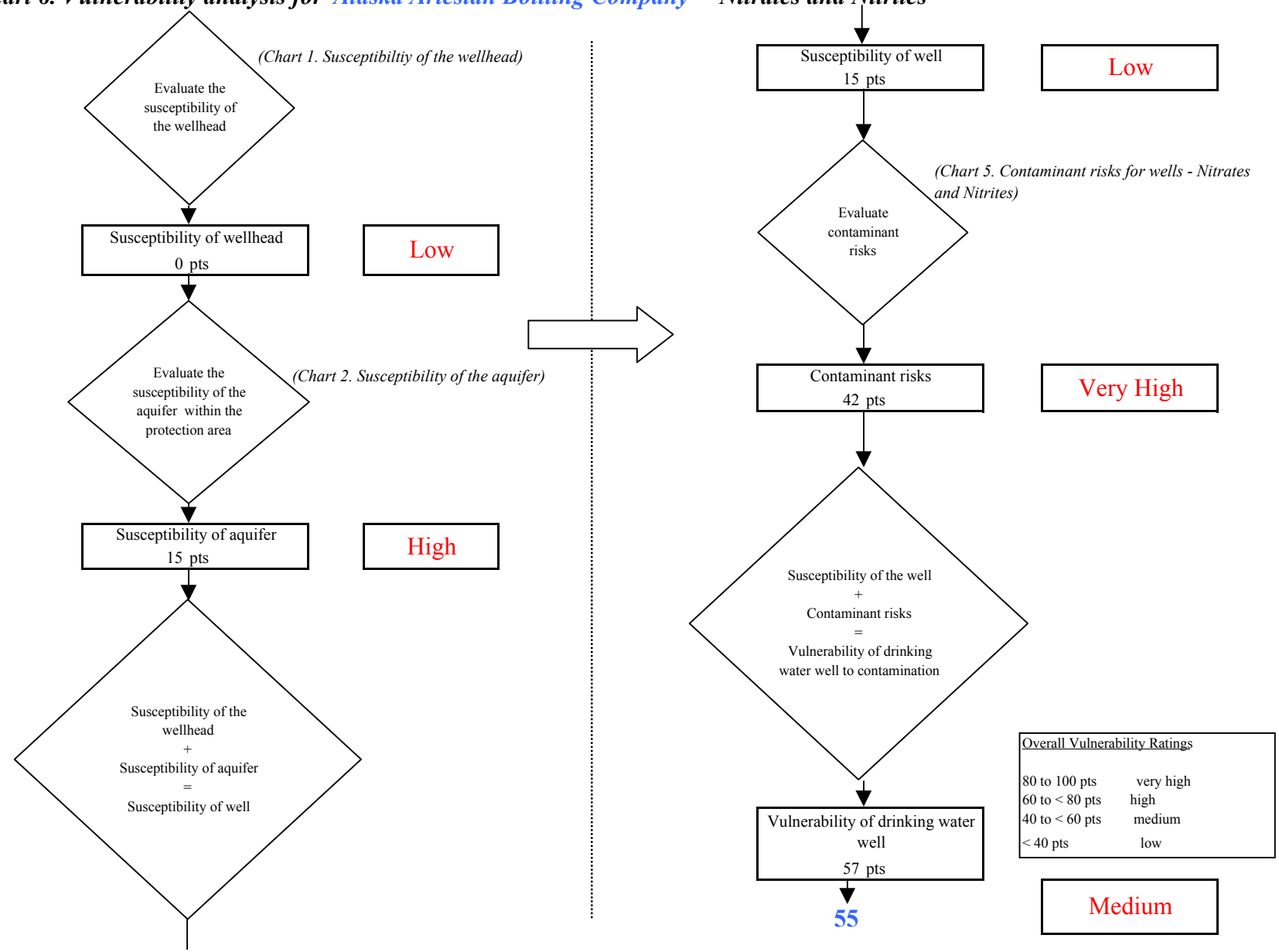


Chart 7. Contaminant risks for Alaska Artesian Bottling Company - Volatile Organic Chemicals

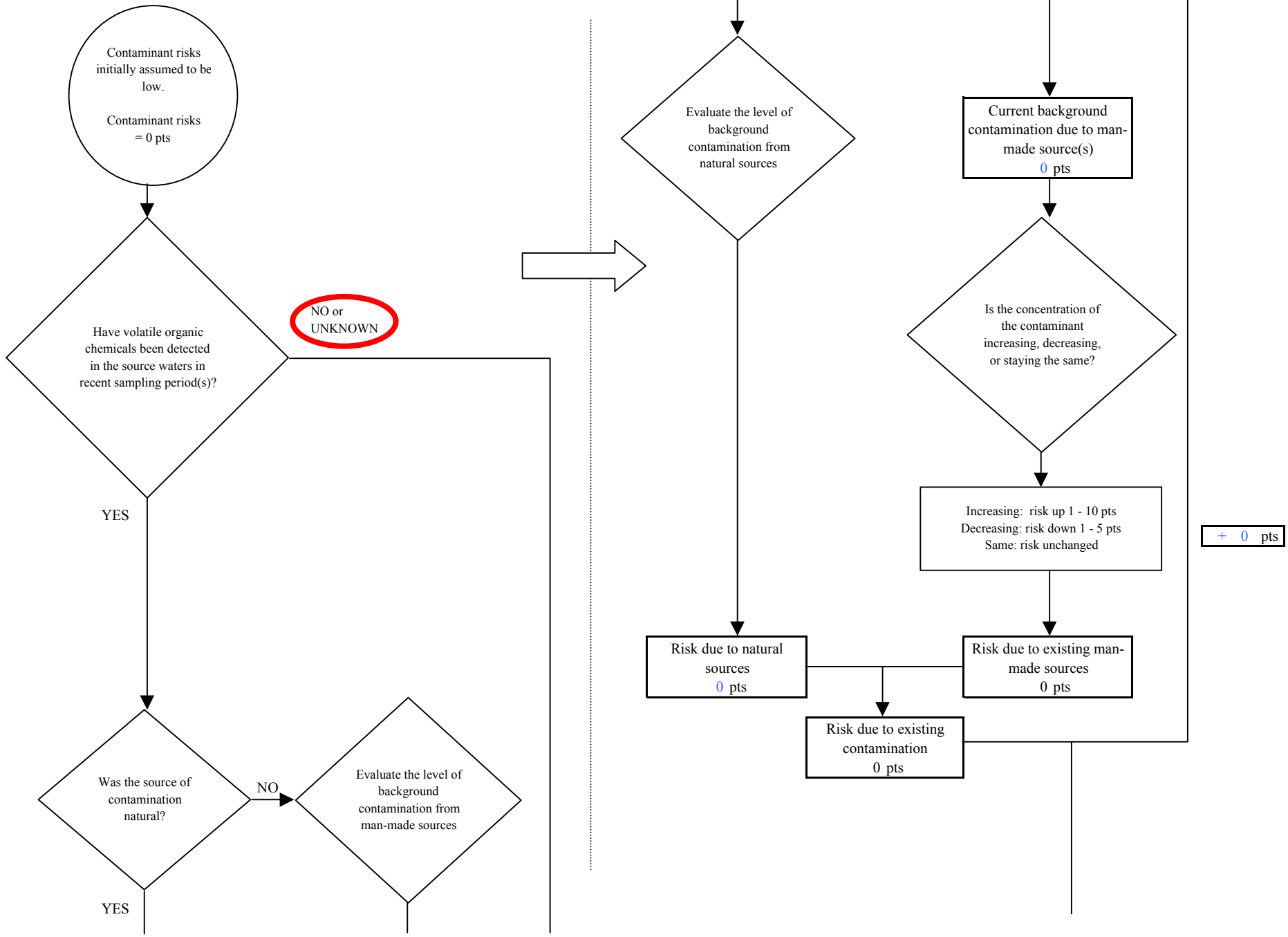


Chart 7. Contaminant risks for Alaska Artesian Bottling Company - Volatile Organic Chemicals

+ 30 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

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)	1	0	1
Low(s)	8	8	16

	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.

Initial assessment of risk posed by potential sources of contamination = 30 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

The heavy equipment storage is the most siginificant contaminant source in Zone A

YES

Increase risk 1 - 10 pts

+ 5 pts

Chart 7. Contaminant risks for Alaska Artesian Bottling Company - Volatile Organic Chemicals

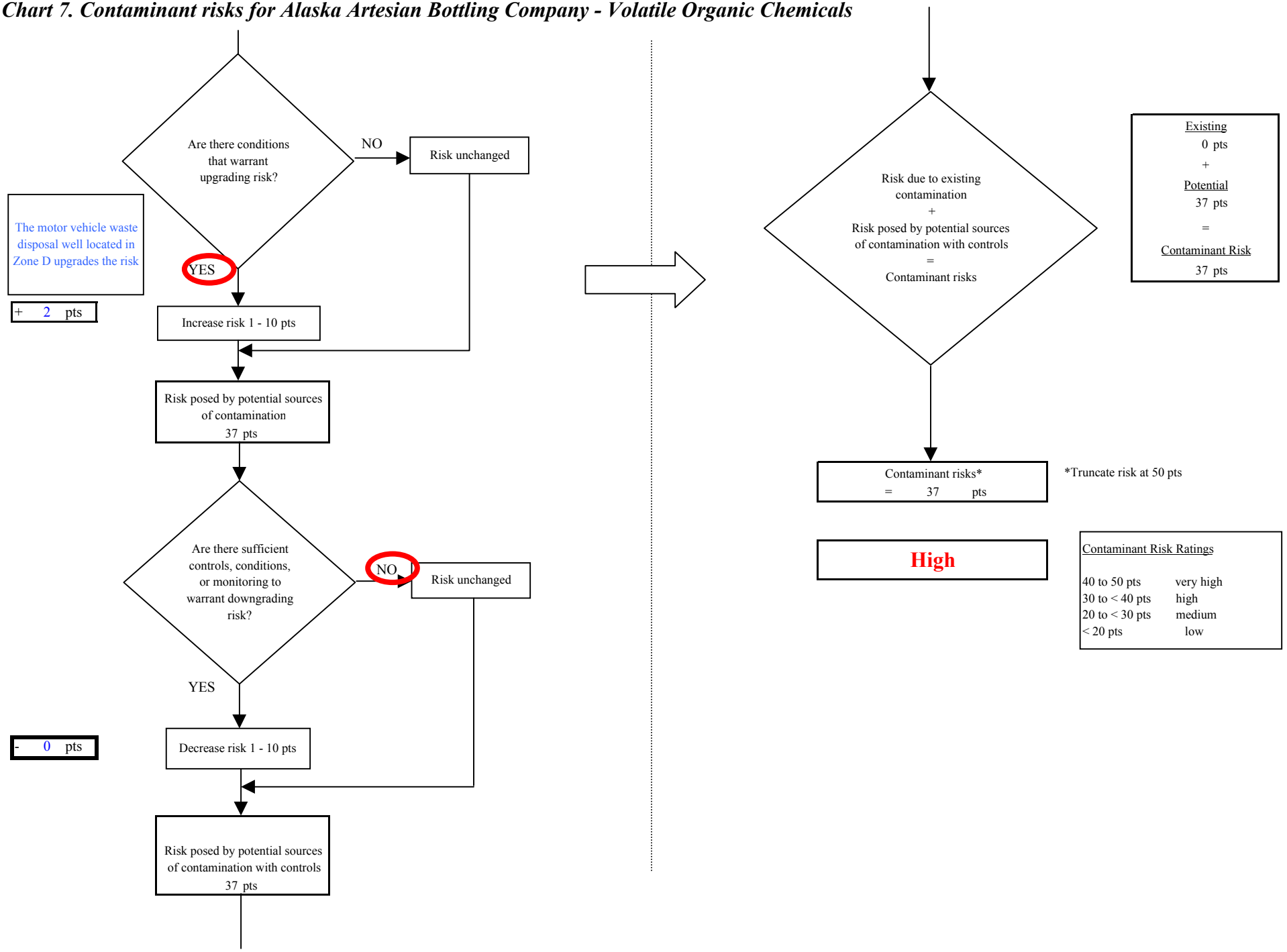


Chart 8. Vulnerability analysis for Alaska Artesian Bottling Company - Volatile Organic Chemicals

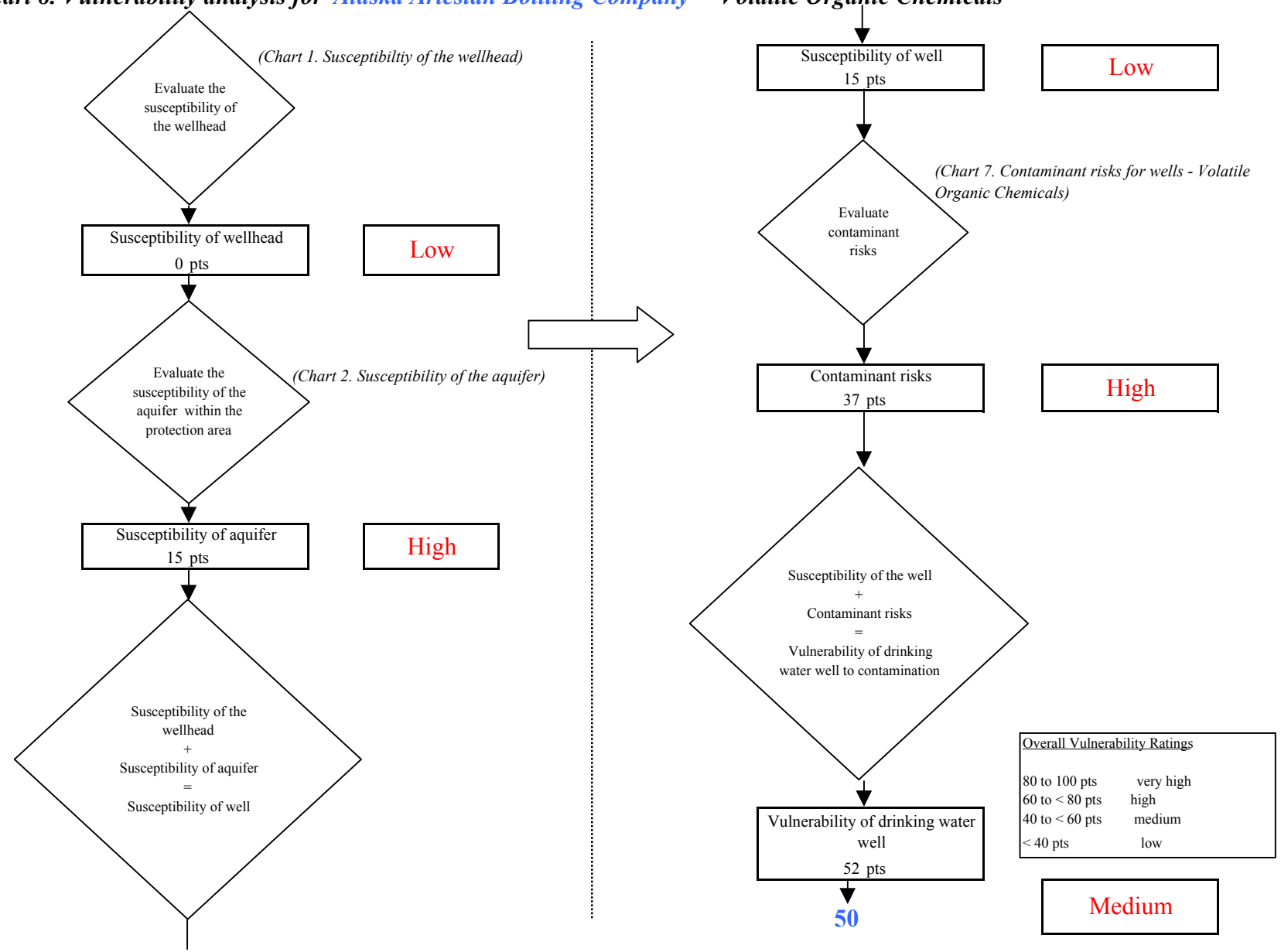


Chart 9. Contaminant risks for Alaska Artesian Bottling Company - Heavy Metals, Cyanide and Other Inorganic Chemicals

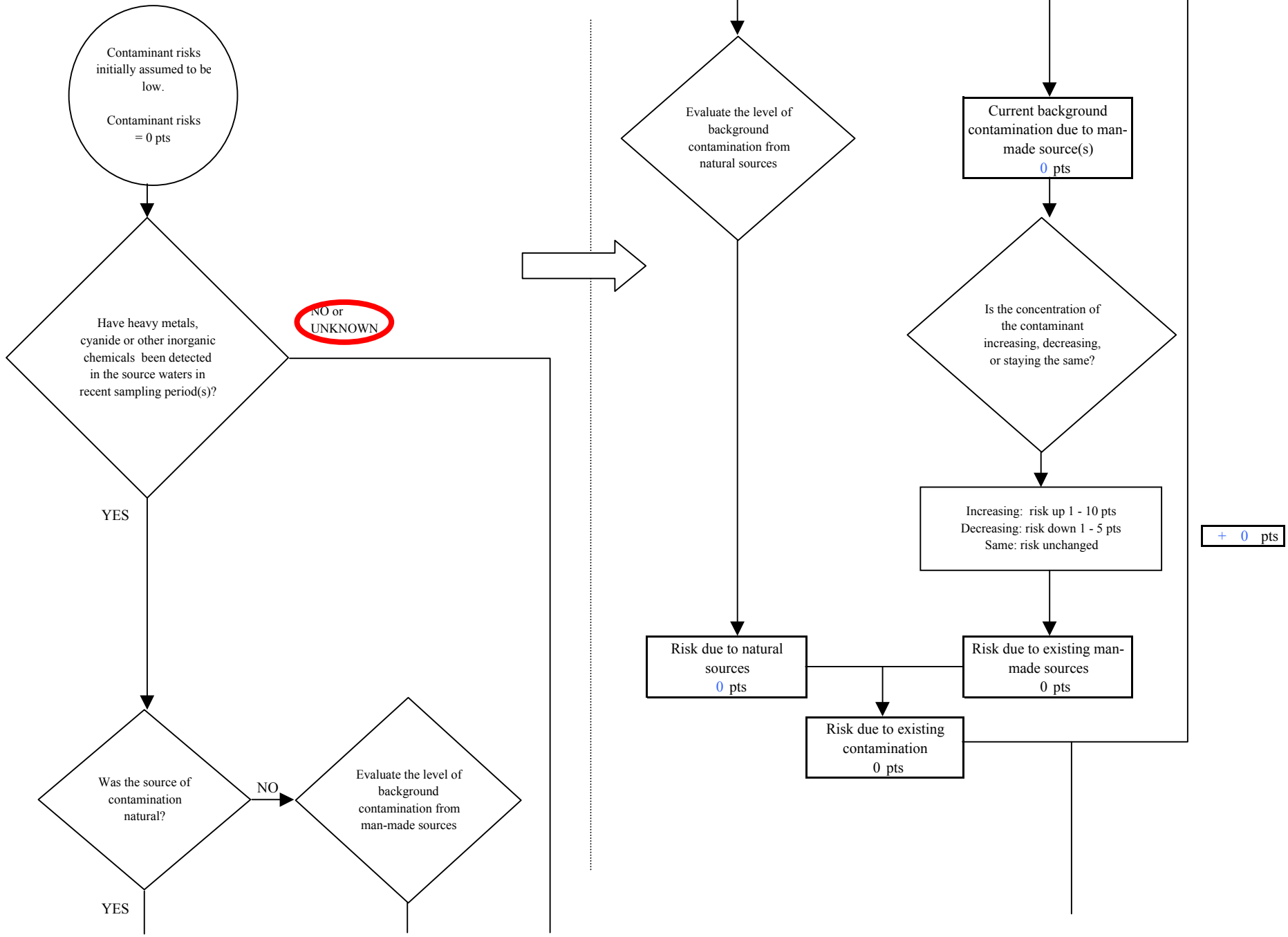


Chart 9. Contaminant risks for Alaska Artesian Bottling Company - Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 30 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

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)	9	8	17

	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.

Initial assessment of risk posed by potential sources of contamination = 30 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO → Risk unchanged

The motor vehicle waste disposal well is the highest risk source and it is located in Zone C

YES

Decrease risk 1 - 10 pts

- 2 pts

Are any significant sources within Zone A?

NO → Risk unchanged

The four large capacity septic systems are the most siginificant contaminant sources in Zone A

YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 9. Contaminant risks for Alaska Artesian Bottling Company - Heavy Metals, Cyanide and Other Inorganic Chemicals

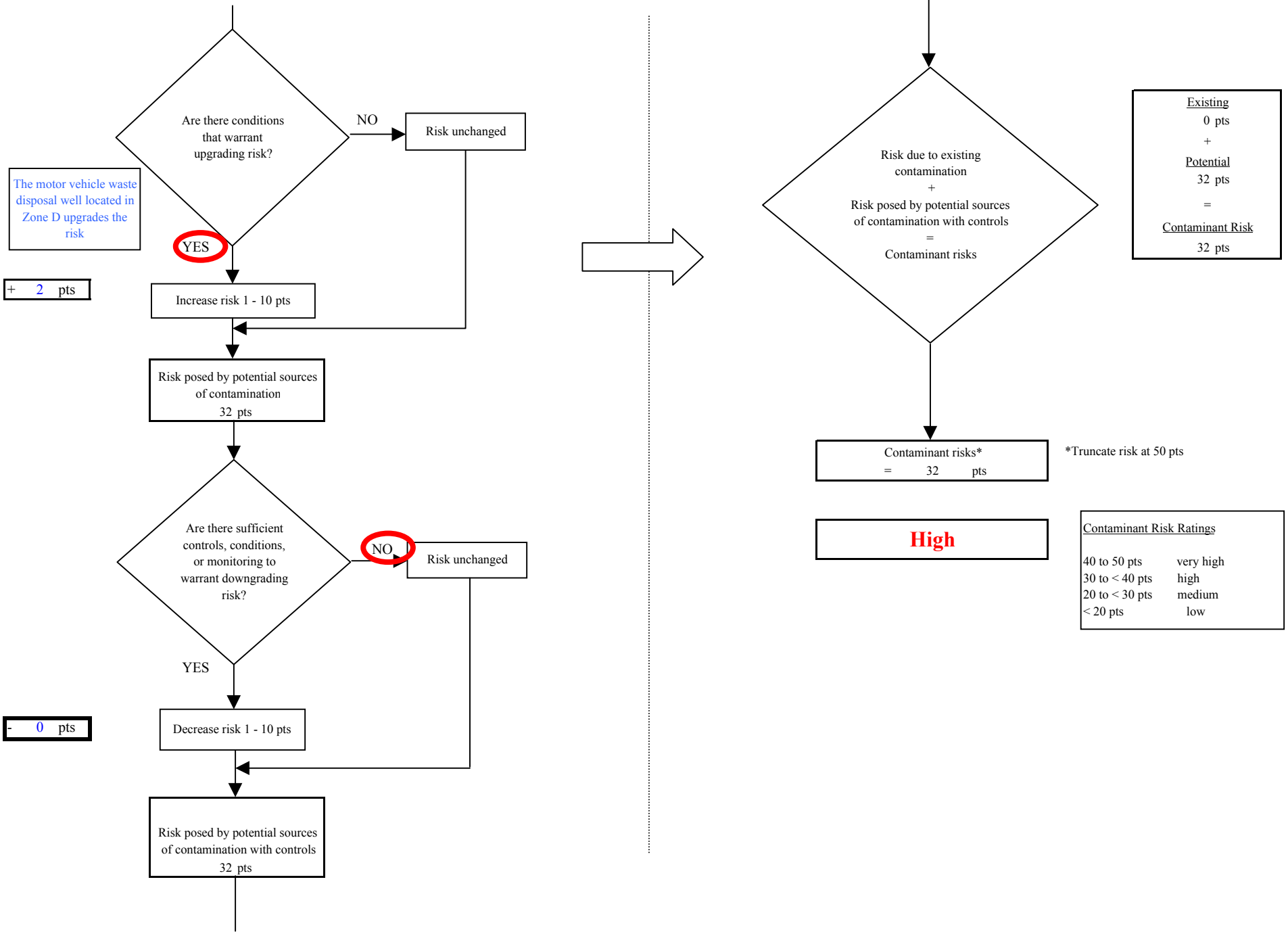


Chart 10. Vulnerability analysis for Alaska Artesian Bottling Company - Heavy Metals, Cyanide and Other Inorganic Chemicals

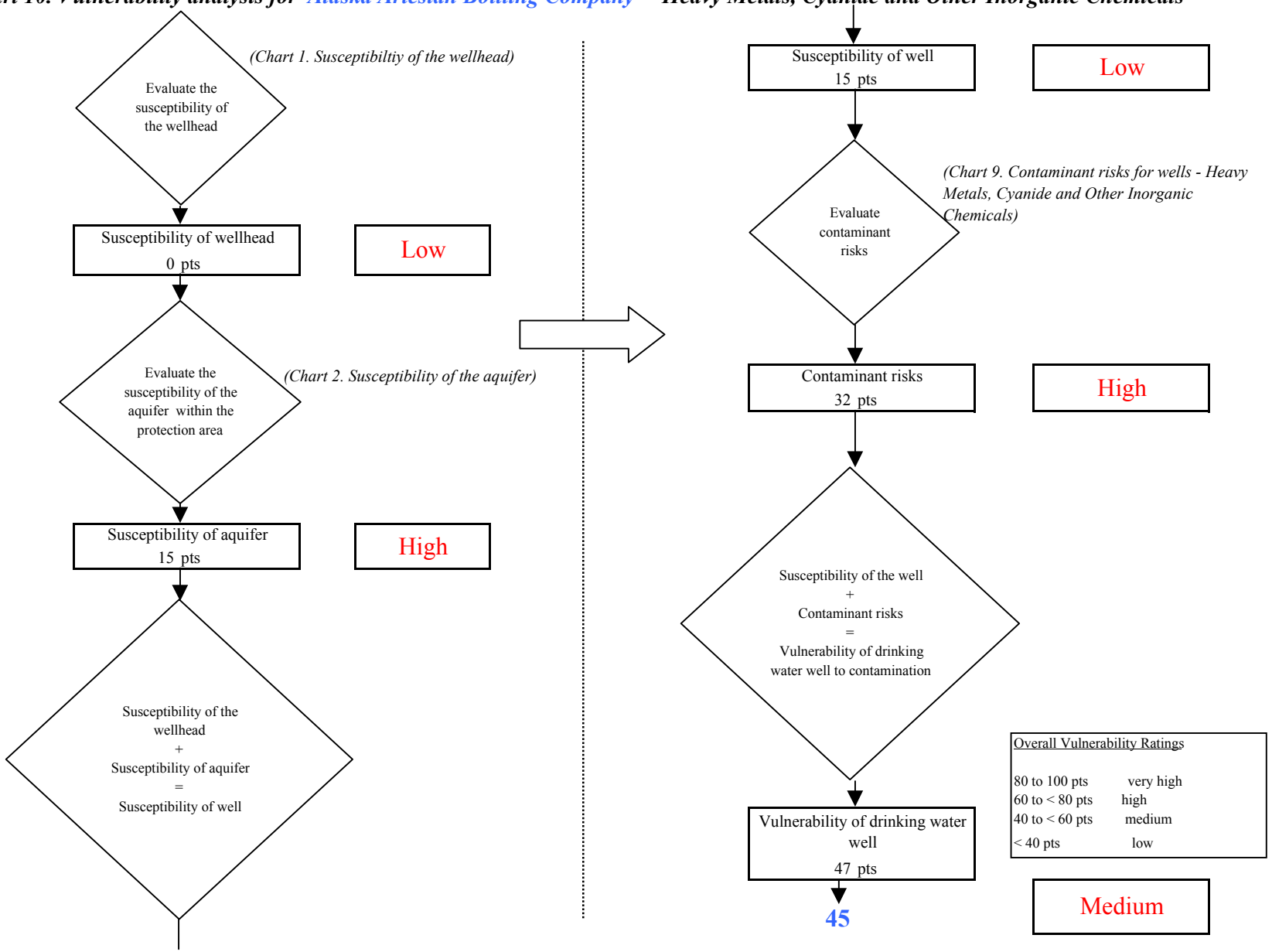


Chart 11. Contaminant risks for Alaska Artesian Bottling Company - Synthetic Organic Chemicals

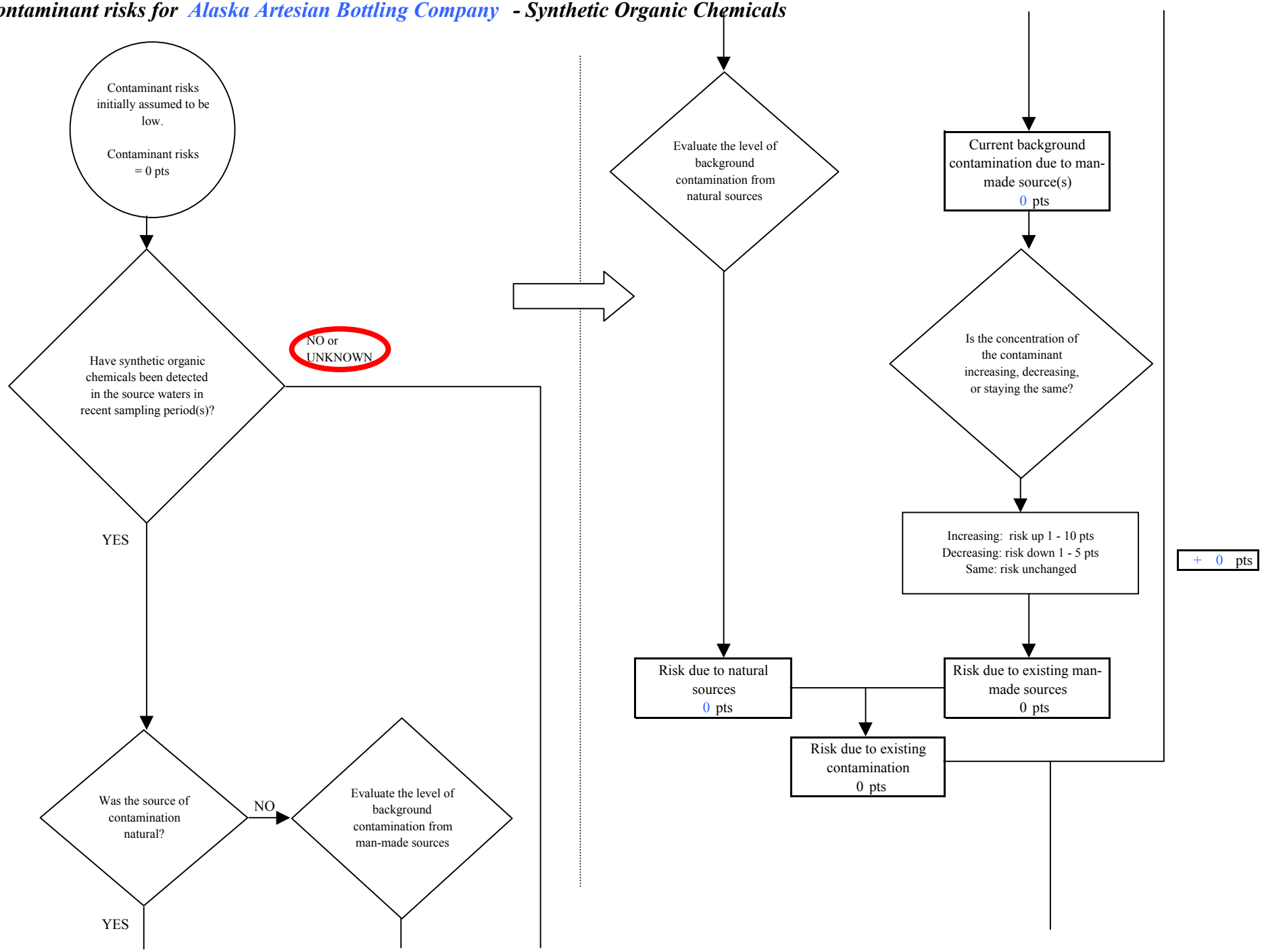


Chart 11. Contaminant risks for Alaska Artesian Bottling Company - Synthetic Organic Chemicals

+ 20 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

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	0	0
Medium(s)	0	0	0
Low(s)	7	7	14

	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 20

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.

Initial assessment of risk posed by potential sources of contamination = 20 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

YES

Increase risk 1 - 10 pts

+ 2 pts

The four large capacity septic systems are the most siginificant contaminant sources in Zone A

Chart 11. Contaminant risks for Alaska Artesian Bottling Company - Synthetic Organic Chemicals

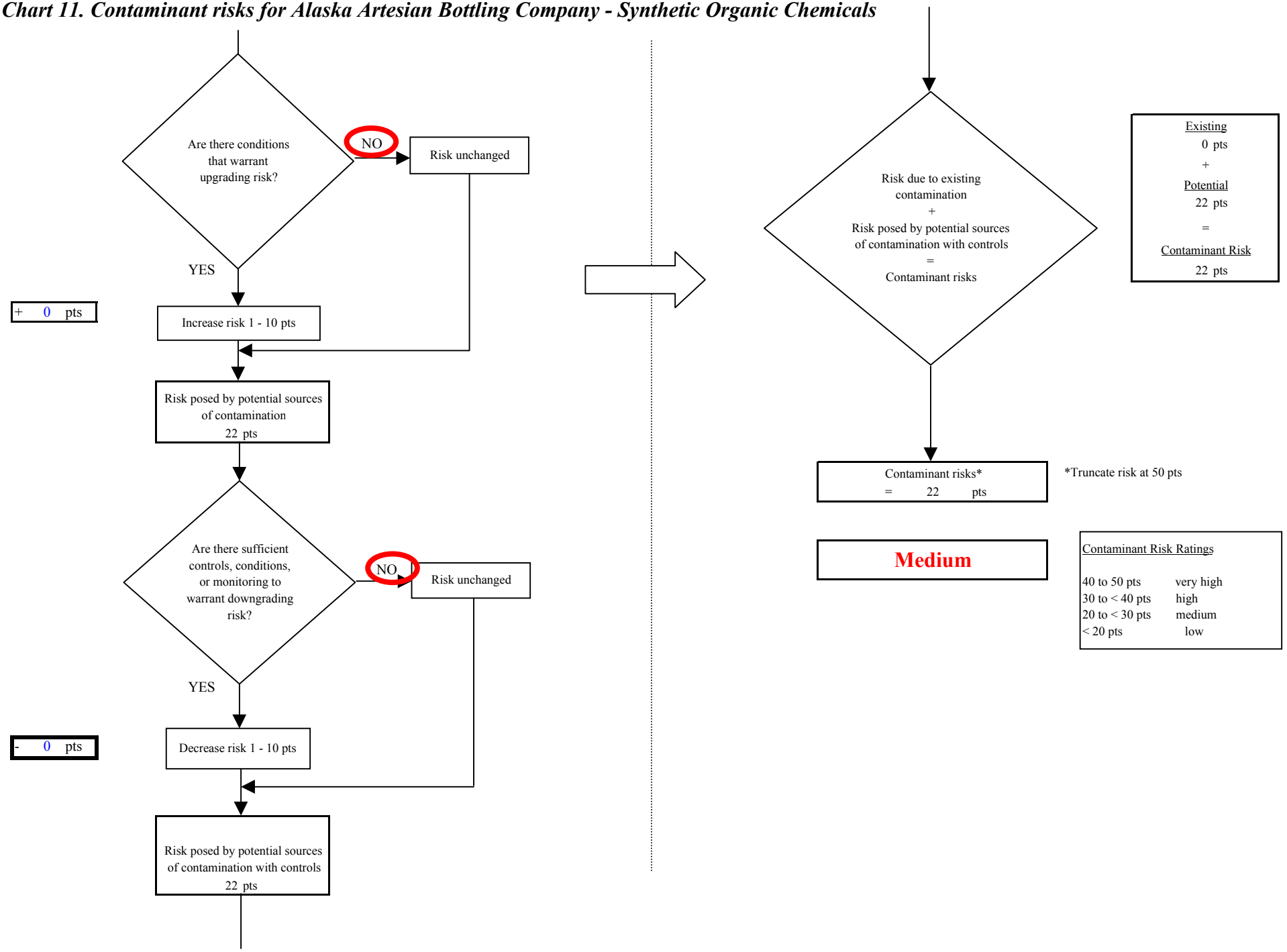


Chart 12. Vulnerability analysis for Alaska Artesian Bottling Company - Synthetic Organic Chemicals

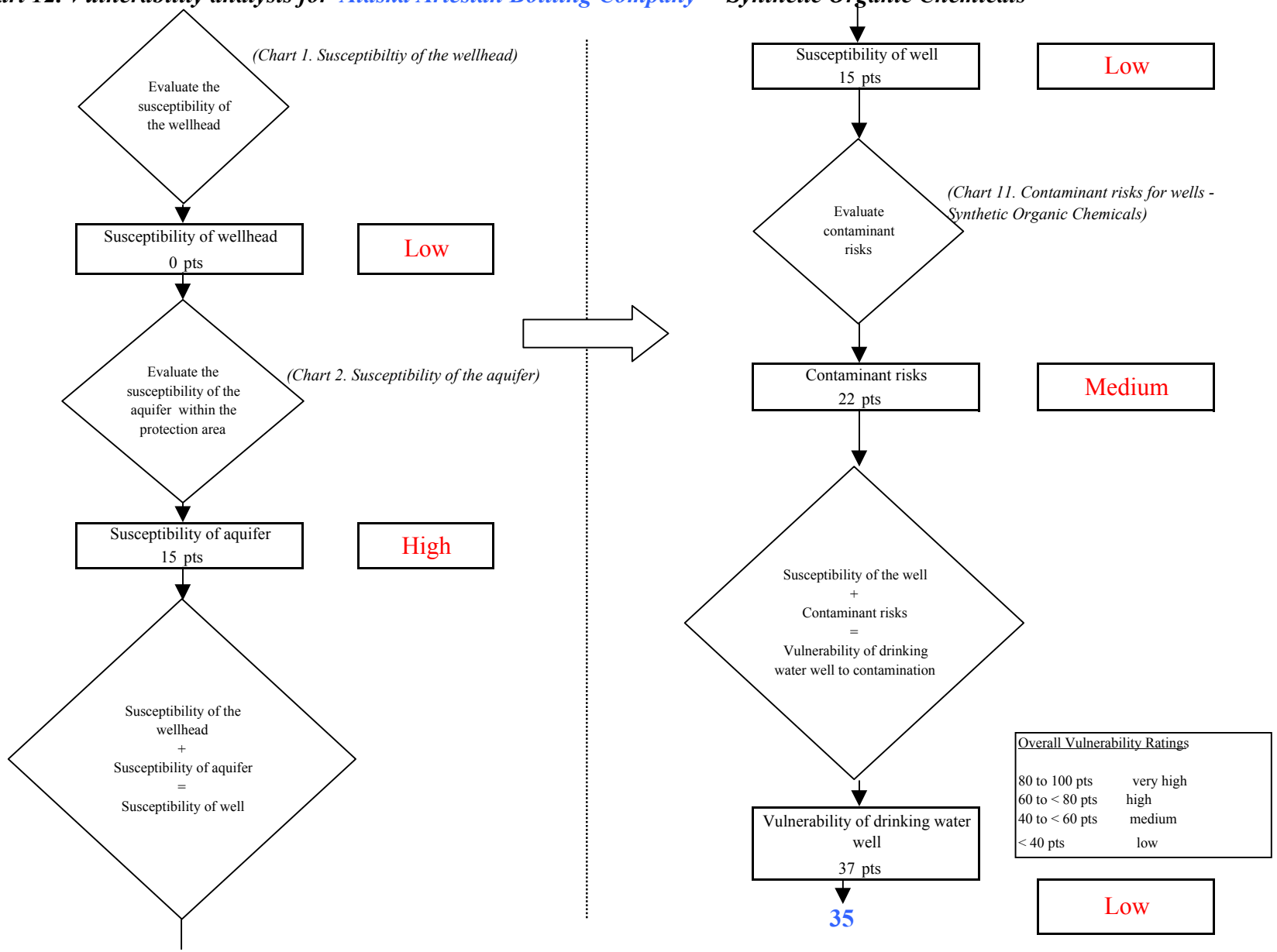


Chart 13. Contaminant risks for Alaska Artesian Bottling Company - Other Organic Chemicals

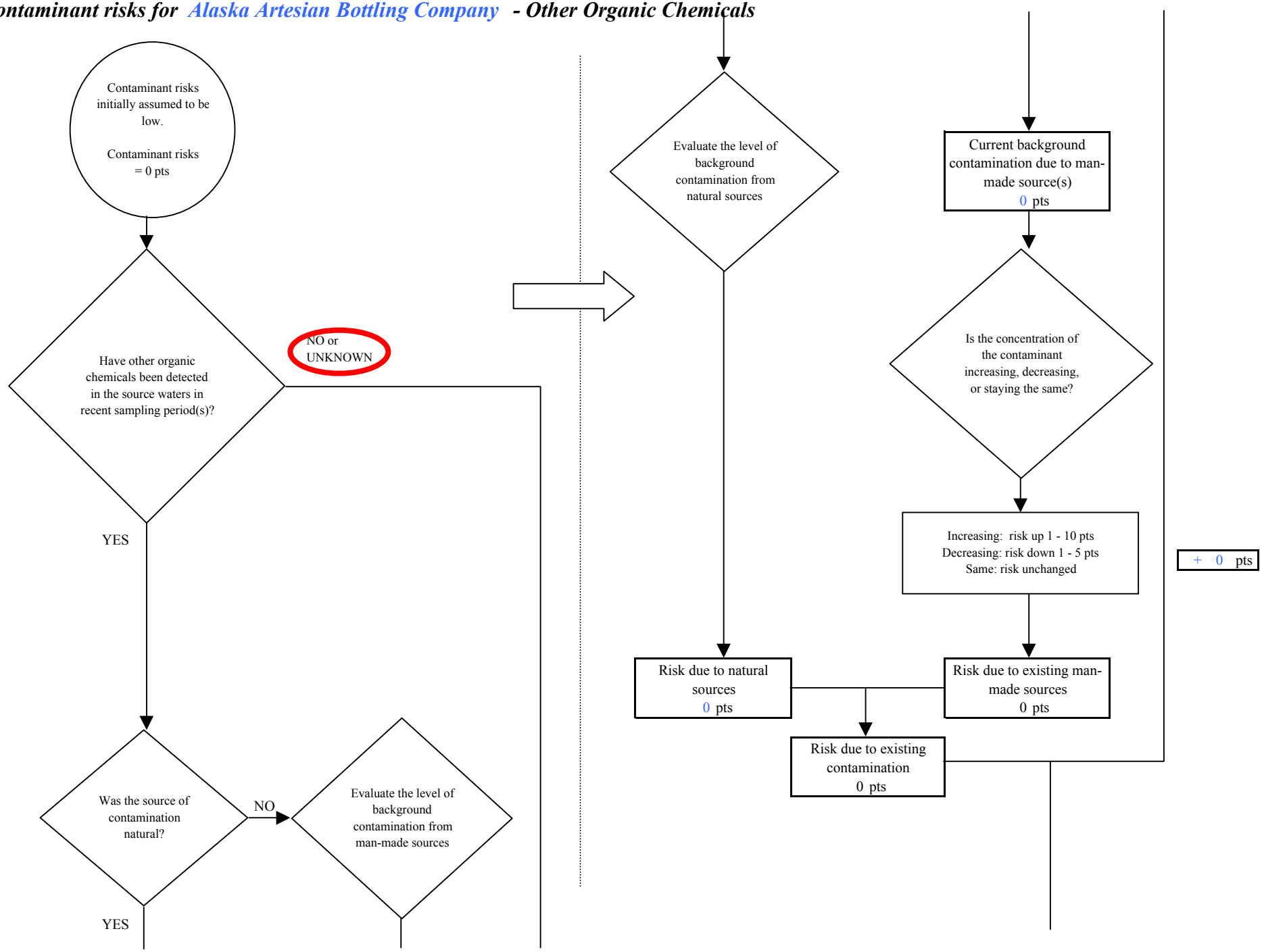


Chart 13. Contaminant risks for Alaska Artesian Bottling Company - Other Organic Chemicals

+ 20 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

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	0	0
Medium(s)	1	1	2
Low(s)	7	8	15

	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 20

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.

Initial assessment of risk posed by potential sources of contamination = 20 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

The heavy equipment storage located in Zone A increases the risk

YES

Increase risk 1 - 10 pts

+ 5 pts

Chart 13. Contaminant risks for Alaska Artesian Bottling Company - Other Organic Chemicals

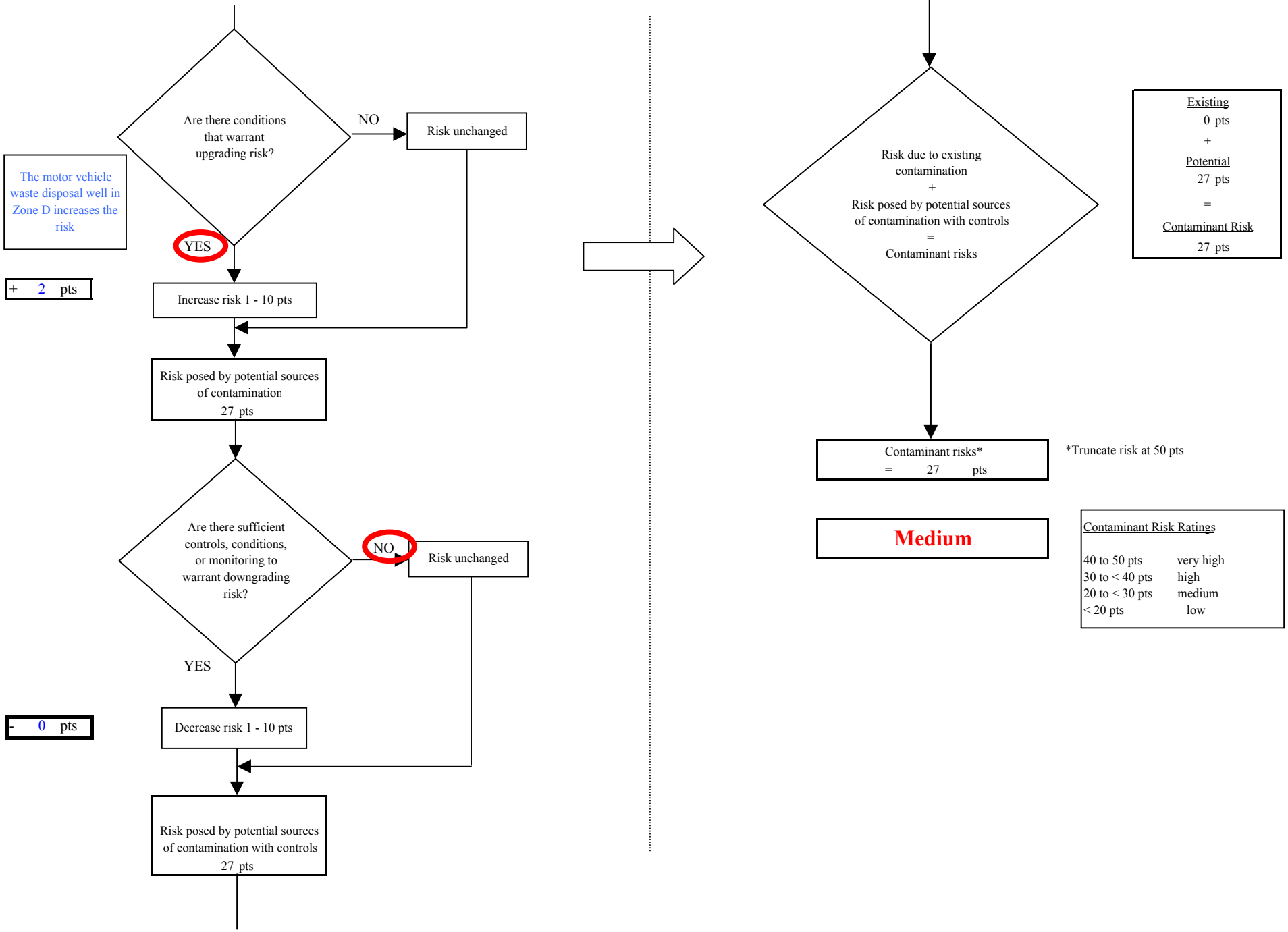


Chart 14. Vulnerability analysis for Alaska Artesian Bottling Company - Other Organic Chemicals