Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for the Rampart Washeteria Drinking Water System, Rampart, Alaska

PWSID # 360816.001

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DRINKING WATER PROTECTION PROGRAM REPORT 1350
Alaska Department of Environmental Conservation

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The Drinking Water Protection Program (DWPP) is producing Source Water Assessments in compliance with the Safe Drinking Water Act Amendments of 1996. Each assessment includes a delineation of the source water area, an inventory of potential and existing contaminant sources that may impact the water, a risk ranking for each of these contaminants, and an evaluation of the potential vulnerability of these drinking water sources.

These assessments are intended to provide public water systems owners/operators, communities, and local governments with the best available information that may be used to protect the quality of their drinking water. The assessments combine information obtained from various sources, including the U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation (ADEC), public water system owners/operators, and other public information sources. The results of this assessment are subject to change if additional data becomes available. It is anticipated this assessment will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of public drinking water source. If you have any additional information that may affect the results of this assessment, please contact the Program Coordinator of DWPP, (907) 269-7521.

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Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Rampart Washeteria Public Water System has one Public Water System (PWS) well. The well (PWS No. 360816.001) has been used as a drinking water source since it was drilled in July of 1991.

The well is a Class A (community and non-transient non-community) water system adjacent to the Yukon River in Rampart , Alaska. Available records indicate that there is secondary storage of drinking water, with a capacity of 35,000-gallons (ADCED 2003), and that the drinking water source is treated with potassium permanganate. This system operates year round and serves approximately 50 residents. The wellhead received a susceptibility rating of **Medium** and the aquifer received a susceptibility rating of **Low.** Combining these two ratings produce a **Low** rating for the natural susceptibility of the well.

Identified potential and current sources of contaminants for the public drinking water source include: landfills, domestic wastewater treatment processes, aboveground fuel storage tanks, ADEC recognized contaminated sites and petroleum product bulk storage stations and terminals. An inventory of potential or existing contamination sources can be found in Appendix B, Table 1. These identified potential and existing sources of contamination are considered sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals contaminant categories.

Overall, the well received a vulnerability rating of **High** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals and other organic chemicals, and synthetic organic chemicals.

PUBLIC DRINKING WATER SYSTEM

The Rampart Washeteria Public Water System well is a Class A (community/non-transient/non-community) public water system. The system is adjacent to the Yukon River in Rampart, Alaska. (Sec. 23, T008N, R013E, Fairbanks Meridian, see Map A of Appendix A). The community of Rampart is located on the south bank of the Yukon River, approximately 160 miles northwest of Fairbanks. The community has a population of 21 (ADCED, 2003). Average annual precipitation in Rampart is 6.5 inches, including approximately 43 inches of snowfall. Temperatures can be as extreme as -60 to 97°F.

The community of Rampart obtains most of their water supply from the well at the washeteria. The school uses their own well supply systems. The majority of the occupied households use honeybuckets or outhouses and all lack complete plumbing (ADCED, 2003). Rampart receives electrical power from Rampart Village Council; power-generating facilities are diesel powered. The local landfill is operated by Rampart Village Council (ADCED, 2003).

According to information supplied by ADEC for the Rampart Washeteria PWS, the depth of the well is 243 feet below the ground surface. Based on available well construction details, the well was completed in a confined aquifer and it is unscreened. The well is located within a suspected floodplain.

Information acquired from an April 1999 sanitary survey for the public water system indicated that the land surface was sloped away from the well. Generally, land surfaces that slope away from the wellhead promote surface water drainage, which reduces the potential of contaminant migration down the well casing annulus. The sanitary survey indicates that the well is grouted according to ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing annulus and into source waters.

Rampart is situated at the northern tip of the Rampart Trough physiographic subprovince. This structurally controlled depression has a gently rolling topography. The mountains and hills surrounding Rampart consist primarily of metamorphic and sedimentary rocks. Unconsolidated deposits mantle most bedrock in a wedge that thickens toward the Yukon River. Rampart is on the alluvial plain of the Yukon River.

The alluvial deposits are about 200 to 230 feet thick and generally consist of organic rich bog deposits underlain by silts and fine sands. The silts and sands contain occasional organic lenses and wood fragments (CH2M 1996).

The Rampart region is underlain by discontinuous permafrost. Permafrost is absent in some areas along the active channel of the Yukon River (CH2M 1996).

Surrounding the city in all directions are several small creeks, ponds, and marshes characteristic of areas underlain by permafrost. Surface runoff is toward the Yukon River (CH2M 1996).

DRINKING WATER PROTECTION AREA

In order to evaluate whether a drinking water source is at risk, we must first evaluate what are the most likely pathways for surface contamination to reach the groundwater. These areas are determined by looking at the characteristics of the soil, groundwater, aquifer, and well.

The most probable area for contamination to reach the drinking water well is the area that contributes water to the well, the groundwater recharge area. This area is designated as the drinking water protection area (DWPA). Because releases of contaminants within the protection area are most likely to impact the drinking water well, this area will serve as the focus for voluntary protection efforts. An analytical calculation was used to determine the size and shape of the DWPA for the Rampart Washeteria Public Water System PWS. The input parameters describing the attributes of the aquifer in this calculation were adopted from Groundwater (Freeze and Cherry, 1979). Available geology and groundwater contours were also considered to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful protection area.

The protection areas established for wells by the ADEC are usually separated into four zones, limited by the watershed. These zones correspond to differences in the time-of-travel (TOT) of the water moving through the aquifer to the well (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

The time of travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. The following is a summary of the four protection area zones for wells and the calculated time-of-travel for each:

Table 1. Definition of Zones

Zone	Definition
A	¼ the distance for the 2-yr. time-of-travel
B	Less than the 2 year time-of-travel
C	Less Than the 5 year time-of-travel
D	Less than the 10 year time-of-travel

The DWPA for the Rampart Washeteria PWS was determined using an analytical calculation and includes Zones A, B, and D (See Map A of Appendix A).

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 Rampart Washeteria DWPA. This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water aquifer include 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 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, and
- Other organic chemicals.

The sources are displayed on Map C of Appendix C and summarized in Table 1 of Appendix B.

RANKING OF CONTAMINANT RISKS

Once the potential and existing sources of contamination have been identified, they are assigned a ranking 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. Rankings include:

- Low,
- Medium,
- High, and
- Very High.

The time-of-travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. Bacteria and Viruses are only inventoried in Zones A and B because of their short life span. Only "Very High" and "High" rankings are inventoried within the outer Zone D due to the probability of contaminant dilution by the time the contaminants get to the well. Tables 2 through 4 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals.

VULNERABILITY OF THE DRINKING WATER SYSTEM

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

- Natural susceptibility, and
- Contaminant risks.

Appendix D contains fourteen charts, which together form the 'Vulnerability Analysis' for a source water assessment for a public drinking water source. 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. Chart 4 contains the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 14 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals, respectively.

A score for the Natural Susceptibility is reached by considering the properties of the well and the aquifer.

Susceptibility of the Wellhead (0 – 25 Points)
(Chart 1 of Appendix D)

+

Susceptibility of the Aquifer (0 – 25 Points)
(Chart 2 of Appendix D)

=

Natural Susceptibility (Susceptibility of the Well)
(0 – 50 Points)

A ranking is assigned for the Natural Susceptibility according to the point score:

Natural Susceptibility Ratings	
40 to 50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

The Rampart Washeteria System's water well is in an unconfined aquifer. Confined aquifers are less susceptible to potential groundwater quality impacts posed by the migration of surface water contaminants downward from the surface. Table 2 shows the susceptibility scores and ratings for this PWS.

Table 2. Susceptibility

	Score	**Rating**
Susceptibility of the Wellhead	10	Medium
Susceptibility of the Aquifer	8	Low
Natural Susceptibility	18	Low

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. This score has been derived from an examination of existing and historical contamination that has been detected at the drinking water source through routine sampling. It also evaluates potential sources of contamination. Flow charts are used to assign a point score, and ratings are assigned in the same way as for the natural susceptibility:

Contaminant Risk Ratings	
40 to 50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	50	Very High
Nitrates and/or Nitrites	50	Very High
Volatile Organic Chemicals	50	Very High
Heavy Metals, Cyanide and Other Inorganic Chemicals	42	Very High
Synthetic Organic Chemicals	50	Very High
Other Organic Chemicals	50	Very High

Finally, an overall vulnerability score is assigned for each water system by combining each of the contaminant risk scores with the natural susceptibility score:

Natural Susceptibility (0 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

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

Again, rankings are assigned according to a point score:

Overall Vulnerability Ratings	
80 to 100 pts	Very High
60 to < 80 pts	High
40 to < 60 pts	Medium
< 40 pts	Low

Table 4 contains the overall vulnerability scores (0 – 100) and ratings for each of the six categories of drinking water contaminants. Note: scores are rounded off to the nearest five.

Table 4. Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	70	High
Nitrates and Nitrites	70	High
Volatile Organic Chemicals	70	High
Heavy Metals, Cyanide and Other Inorganic Chemicals	60	High
Synthetic Organic Chemicals	70	High
Other Organic Chemicals	70	High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Very High**. The risk is primarily attributed to the presence of a domestic wastewater system in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 2 – Appendix B).

Coliforms (a bacteria) are found naturally in the environment and although they aren't necessarily a health threat, they are an indicator of other potentially harmful bacteria in the water, more specifically, fecal coliforms and E. coli, which only come from human and animal fecal waste. Harmful bacteria can cause diarrhea, cramps, nausea, headaches, or other symptoms (EPA, 2003). Positive samples increase the overall vulnerability of the drinking water source, indicating that the source is susceptible to bacteria and virus contamination.

No positive bacteria counts have been reported in recent (within five years) sampling events (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D). Only a small amount of bacteria and viruses are required to endanger public health.

After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Very High**. The risk to this source of public drinking water is primarily attributed to the presence of a landfill and a domestic wastewater treatment disposal pond in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 3 – Appendix B).

Nitrates are very mobile, moving at approximately the same rate as water. The sampling history for this well indicates that low levels of nitrates have been detected in recent sampling events. However, the reported concentrations of nitrates do not exceed the maximum contaminant level (MCL) of 10 mg/L. Nitrate concentrations in uncontaminated groundwater are typically less than 2 mg/L; therefore, nitrate concentrations above 2 mg/L may be indicative of man-made sources (See Chart 5 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D).

After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of the well to nitrate and nitrite contamination is **High.**

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Very High**. The risk is primarily attributed to the presence of petroleum product bulk stations and landfill in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 4 – Appendix B).

Detectable concentrations of toluene were reported in sampling events for the Rampart Washeteria PWS, however the detectable concentrations of toluene reported were blow the MCL of 0.005 mg/L (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D). Risk points were not retained for toluene as it is a possible laboratory contaminant and the MCL was not exceeded.

Possible sources of volatile organic chemicals include facilities with automobiles, residential areas, fuel tanks and roads. See Table 4 in Appendix B for a complete listing.

After combining the contaminant risk for volatile organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Heavy Metals, Cyanide and Other Inorganic Chemicals

The contaminant risk for heavy metals, cyanide and other inorganic chemicals is **Very High**. The risk is primarily attributed to the presence of a landfill in Zone A (see Table 5 – Appendix B).

Based on review of recent sampling records for this public water system, low levels of barium have been detected, however has not exceeded its MCL of 2.0 mg/L (see Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D). Moderate levels of copper have also been detected. The reported concentrations of copper are likely attributed to the water treatment/conveyance system. No risk point were assigned since the analyte did not exceed 100% of the MCL (1.3 mg/L) in the most recent sampling events.

Barium is a lustrous, machinable metal, which exists in nature only in ores containing mixtures of elements. It is used in making a wide variety of electronic components, in metal alloys, bleaches, dyes, fireworks, ceramics and glass. In particular, it is used in well drilling operations where it is directly released into the ground (EPA, 2002).

After combining the contaminant risk for heavy metals, cyanide and other inorganic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Synthetic Organic Chemicals

The contaminant risk for synthetic organic chemicals is **Very High**. The risk is primarily attributed to a landfill in Zone A (see Table 6 – Appendix B).

No recent sampling data was available in ADEC records for the Rampart Washeteria System (See Chart 11 – Contaminant Risks for Synthetic Organic Chemicals in Appendix D).

After combining the contaminant risk for synthetic organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Other Organic Chemicals

The contaminant risk for other organic chemicals is **Very High**. The risk is primarily attributed to the presence of a landfill in Zone A. Several other potential contaminant sources are also found within the protection area (see Table 7 – Appendix B).

No recent sampling data was available in ADEC records for the Rampart Washeteria System (See Chart 13 – Contaminant Risks for Other Organic Chemicals in Appendix D).

After combining the contaminant risk for other organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Using the Source Water Assessment

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 the community of Rampart 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 the drinking water source.

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Freeze, R. A., and Cherry, J.A. 1979, Groundwater, Prentice-Hall, Englewood Cliffs, New Jersey

Information from Geotechnical Investigation Report, New Water Treatment Plant/Washeteria, Rampart, Alaska, by CH2M Hill, dated October 1996.

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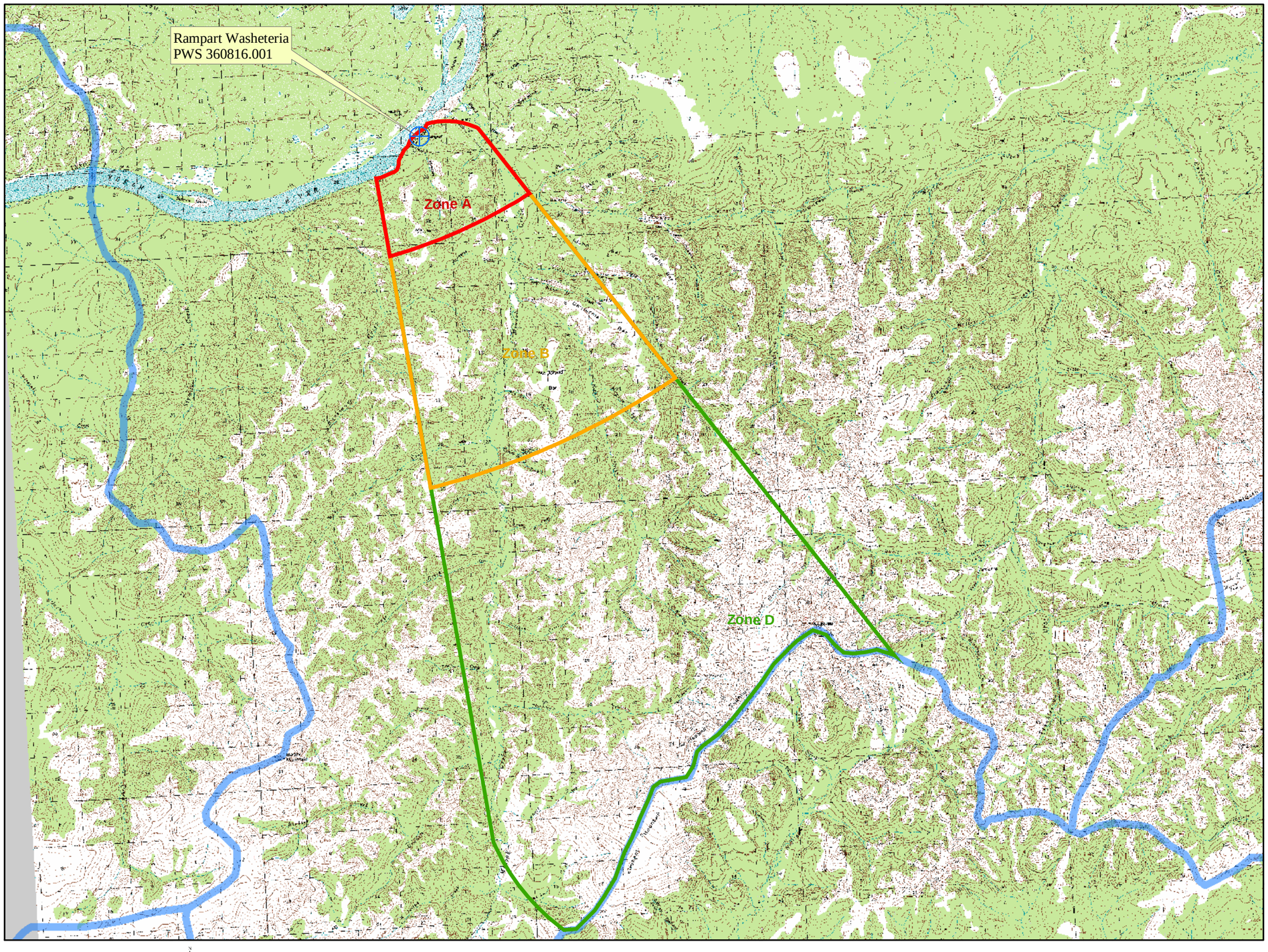
APPENDIX A

Drinking Water Protection Area Location Map
(Map A)

Public Water Well System for PWS #360816.001 Rampart Washeteria



LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours
- Watershed Boundary

Transportation

- Primary Route (Class 1)
- Secondary Route (Class 2)
- Road (Class 3)
- Road (Class 4)
- Road (Class 5, Four-wheel drive)

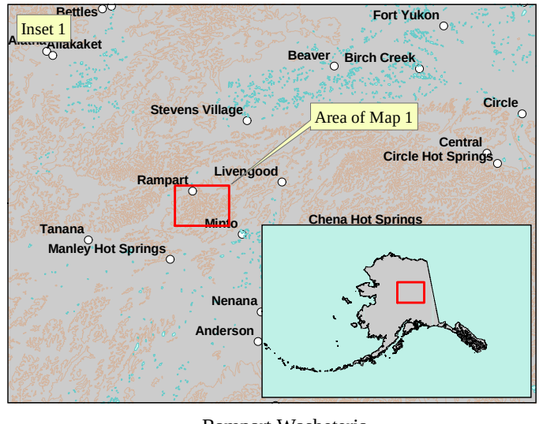
Groundwater Protection Zones

- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time or watershed boundary

Data Sources:
- Contaminant Sources, Public Water System Wells, Contours Alaska Department of Environmental Conservation (ADEC)
- Critical Facilities, Federal Emergency Management Agency (FEMA)

All other data:
- United States Geological Survey (USGS)
- Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class A Public Water Systems" published by ADEC

URS Corporation does not guarantee the accuracy or validity of the data provided.



0 0.5 1 2 3 4 Miles

Rampart Washeteria
PWS 360816.001

Appendix A Map A

APPENDIX B

Contaminant Source Inventory and Risk Ranking (Tables 1-7)

Table 1

Contaminant Source Inventory for ***Rampart Washeteria***

PWSID 360816.00

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Laundromats without dry cleaning	C22	C22-01	A	C	Washeteria
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	C	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	C	Waste Water Treatment Facility
Landfills (municipal; Class III)	D51	D51-01	A	C	Landfill/Incinerator
Quarries (sand, gravel, rock, other?)	E10	E10-01	A	C	HUNTER
Quarries (sand, gravel, rock, other?)	E10	E10-02	A	C	LODE KYANITE
Quarries (sand, gravel, rock, other?)	E10	E10-03	A	C	RAMPART
Quarries (sand, gravel, rock, other?)	E10	E10-04	A	C	TIM
Tanks, heating oil, residential (above ground)	R08	R08-01	A	C	Assume 3 or less residential aboveground heating oil tanks in Zone A
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	C	Power Generation Facility
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	C	Rampart Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	C	Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	C	Alascom Building & Antenna
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	C	Community Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	C	Teen Center
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	C	Village Council Storage Shed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	C	Emergency Shelter(s)
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	C	Offices
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	C	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	C	Clinic Satellite
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	C	Village Council Office Satellite

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	C	School
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	C	Rampart School
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	A	C	Rampart School
Cemeteries	X01	X01-01	A	C	Cemetery
Petroleum product bulk station/terminals	X11	X11-01	A	C	Fuel Storage Tanks (>500gal)
Airports	X14	X14-01	A	C	Airport
Highways and roads, dirt/gravel	X24	X24-01	A	C	Assume 20 or fewer roads in Zone A
Highways and roads (winter)	X26	X26-01	A	C	
Electric power generation (fossil fuels)	X36	X36-01	A	C	Power Generation Facility
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	C	Rampart Health Clinic
Metals mining, placer (active or inactive?)	E04	E04-01	B	C	FLORIDA CREEK
Metals mining, placer (active or inactive?)	E04	E04-02	B	C	HOOSIER CREEK
Metals mining, placer (active or inactive?)	E04	E04-03	B	C	IDAHO BAR
Metals mining, placer (active or inactive?)	E04	E04-04	B	C	LITTLE MINOOK JR CREEK
Metals mining, placer (active or inactive?)	E04	E04-05	B	C	MCDONALD BAR
Metals mining, placer (active or inactive?)	E04	E04-06	B	C	RUBY CREEK
Quarries (sand, gravel, rock, other?)	E10	E10-05	B	C	QUAM
Metals mining, placer (active or inactive?)	E04	E04-07	D	C	CHAPMAN CREEK
Metals mining, placer (active or inactive?)	E04	E04-08	D	C	MINOOK CREEK
Metals mining, placer (active or inactive?)	E04	E04-09	D	C	SLATE CREEK
Quarries (sand, gravel, rock, other?)	E10	E10-06	D	C	WOLVERINE MOUNTAIN

Table 2

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria
Sources of Bacteria and Viruses

PWSID 360816.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Laundromats without dry cleaning	C22	C22-01	A	Low	C	Washeteria
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	High	C	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Medium	C	Waste Water Treatment Facility
Landfills (municipal; Class III)	D51	D51-01	A	High	C	Landfill/Incinerator
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 20 or fewer roads in Zone A
Highways and roads (winter)	X26	X26-01	A	Low	C	
Highways and roads (winter)	X26	X26-01	A	Low	C	
Medical/veterinary facilities (doctor or dentist offi hospitals, nursing homes)	X40	X40-01	A	Medium	C	Rampart Health Clinic

Table 3

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria
Sources of Nitrates/Nitrites

PWSID 360816.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Laundromats without dry cleaning	C22	C22-01	A	Low	C	Washeteria
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	High	C	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Medium	C	Waste Water Treatment Facility
Landfills (municipal; Class III)	D51	D51-01	A	Very High	C	Landfill/Incinerator
Quarries (sand, gravel, rock, other?)	E10	E10-01	A	Low	C	HUNTER
Quarries (sand, gravel, rock, other?)	E10	E10-02	A	Low	C	LODE KYANITE
Quarries (sand, gravel, rock, other?)	E10	E10-03	A	Low	C	RAMPART
Quarries (sand, gravel, rock, other?)	E10	E10-04	A	Low	C	TIM
Cemeteries	X01	X01-01	A	Medium	C	Cemetery
Airports	X14	X14-01	A	Low	C	Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 20 or fewer roads in Zone A
Highways and roads (winter)	X26	X26-01	A	Low	C	
Highways and roads (winter)	X26	X26-01	A	Low	C	
Medical/veterinary facilities (doctor or dentist offi hospitals, nursing homes)	X40	X40-01	A	Low	C	Rampart Health Clinic
Quarries (sand, gravel, rock, other?)	E10	E10-05	B	Low	C	QUAM
Quarries (sand, gravel, rock, other?)	E10	E10-06	D	Low	C	WOLVERINE MOUNTAIN

Table 4

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria
Sources of Volatile Organic Chemicals

PWSID 360816.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Laundromats without dry cleaning	C22	C22-01	A	Low	C	Washeteria
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Waste Water Treatment Facility
Landfills (municipal; Class III)	D51	D51-01	A	High	C	Landfill/Incinerator
Quarries (sand, gravel, rock, other?)	E10	E10-01	A	Low	C	HUNTER
Quarries (sand, gravel, rock, other?)	E10	E10-02	A	Low	C	LODE KYANITE
Quarries (sand, gravel, rock, other?)	E10	E10-03	A	Low	C	RAMPART
Quarries (sand, gravel, rock, other?)	E10	E10-04	A	Low	C	TIM
Tanks, heating oil, residential (above ground)	R08	R08-01	A	Medium	C	Assume 3 or less residential aboveground heating oil tanks in Zone A
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	Low	C	Power Generation Facility
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	Low	C	Rampart Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	Low	C	Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	Low	C	Alascom Building & Antenna
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	Low	C	Community Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	Low	C	Teen Center
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	Village Council Storage Shed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	Emergency Shelter(s)
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	Low	C	Offices
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	Low	C	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	Low	C	Clinic Satellite

Table 4 (continued)

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria

Sources of Volatile Organic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	Low	C	Village Council Office Satellite
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	Low	C	School
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-01	A	High	C	Rampart School
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-02	A	High	C	Rampart School
Petroleum product bulk station/terminals	X11	X11-01	A	Very High	C	Fuel Storage Tanks (>500gal)
Airports	X14	X14-01	A	High	C	Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 20 or fewer roads in Zone A
Highways and roads (winter)	X26	X26-01	A	Low	C	
Highways and roads (winter)	X26	X26-01	A	Low	C	
Electric power generation (fossil fuels)	X36	X36-01	A	Medium	C	Power Generation Facility
Medical/veterinary facilities (doctor or dentist offi hospitals, nursing homes)	X40	X40-01	A	Low	C	Rampart Health Clinic
Quarries (sand, gravel, rock, other?)	E10	E10-05	B	Low	C	QUAM
Quarries (sand, gravel, rock, other?)	E10	E10-06	D	Low	C	WOLVERINE MOUNTAIN

Table 5

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 360816.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Waste Water Treatment Facility
Landfills (municipal; Class III)	D51	D51-01	A	High	C	Landfill/Incinerator
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	Low	C	Power Generation Facility
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	Low	C	Rampart Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	Low	C	Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	Low	C	Alascom Building & Antenna
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	Low	C	Community Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	Low	C	Teen Center
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	Village Council Storage Shed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	Emergency Shelter(s)
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	Low	C	Offices
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	Low	C	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	Low	C	Clinic Satellite
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	Low	C	Village Council Office Satellite
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	Low	C	School
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-01	A	Low	C	Rampart School
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-02	A	Low	C	Rampart School
Cemeteries	X01	X01-01	A	Low	C	Cemetery

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Petroleum product bulk station/terminals	X11	X11-01	A	Low	C	Fuel Storage Tanks (>500gal)
Airports	X14	X14-01	A	Low	C	Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 20 or fewer roads in Zone A
Highways and roads (winter)	X26	X26-01	A	Low	C	
Highways and roads (winter)	X26	X26-01	A	Low	C	
Electric power generation (fossil fuels)	X36	X36-01	A	Medium	C	Power Generation Facility
Medical/veterinary facilities (doctor or dentist offi hospitals, nursing homes)	X40	X40-01	A	Low	C	Rampart Health Clinic
Metals mining, placer (active or inactive?)	E04	E04-01	B	Low	C	FLORIDA CREEK
Metals mining, placer (active or inactive?)	E04	E04-02	B	Low	C	HOOSIER CREEK
Metals mining, placer (active or inactive?)	E04	E04-03	B	Low	C	IDAHO BAR
Metals mining, placer (active or inactive?)	E04	E04-04	B	Low	C	LITTLE MINOOK JR CREEK
Metals mining, placer (active or inactive?)	E04	E04-05	B	Low	C	MCDONALD BAR
Metals mining, placer (active or inactive?)	E04	E04-06	B	Low	C	RUBY CREEK
Metals mining, placer (active or inactive?)	E04	E04-07	D	Low	C	CHAPMAN CREEK
Metals mining, placer (active or inactive?)	E04	E04-08	D	Low	C	MINOOK CREEK
Metals mining, placer (active or inactive?)	E04	E04-09	D	Low	C	SLATE CREEK

Table 6

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria
Sources of Synthetic Organic Chemicals

PWSID 360816.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Waste Water Treatment Facility
Landfills (municipal; Class III)	D51	D51-01	A	Very High	C	Landfill/Incinerator
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-01	A	Low	C	Rampart School
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-02	A	Low	C	Rampart School
Cemeteries	X01	X01-01	A	Medium	C	Cemetery
Petroleum product bulk station/terminals	X11	X11-01	A	Low	C	Fuel Storage Tanks (>500gal)
Airports	X14	X14-01	A	Medium	C	Airport
Medical/veterinary facilities (doctor or dentist offi hospitals, nursing homes)	X40	X40-01	A	Low	C	Rampart Health Clinic

Table 7

Contaminant Source Inventory and Risk Ranking for Rampart Washeteria
Sources of Other Organic Chemicals

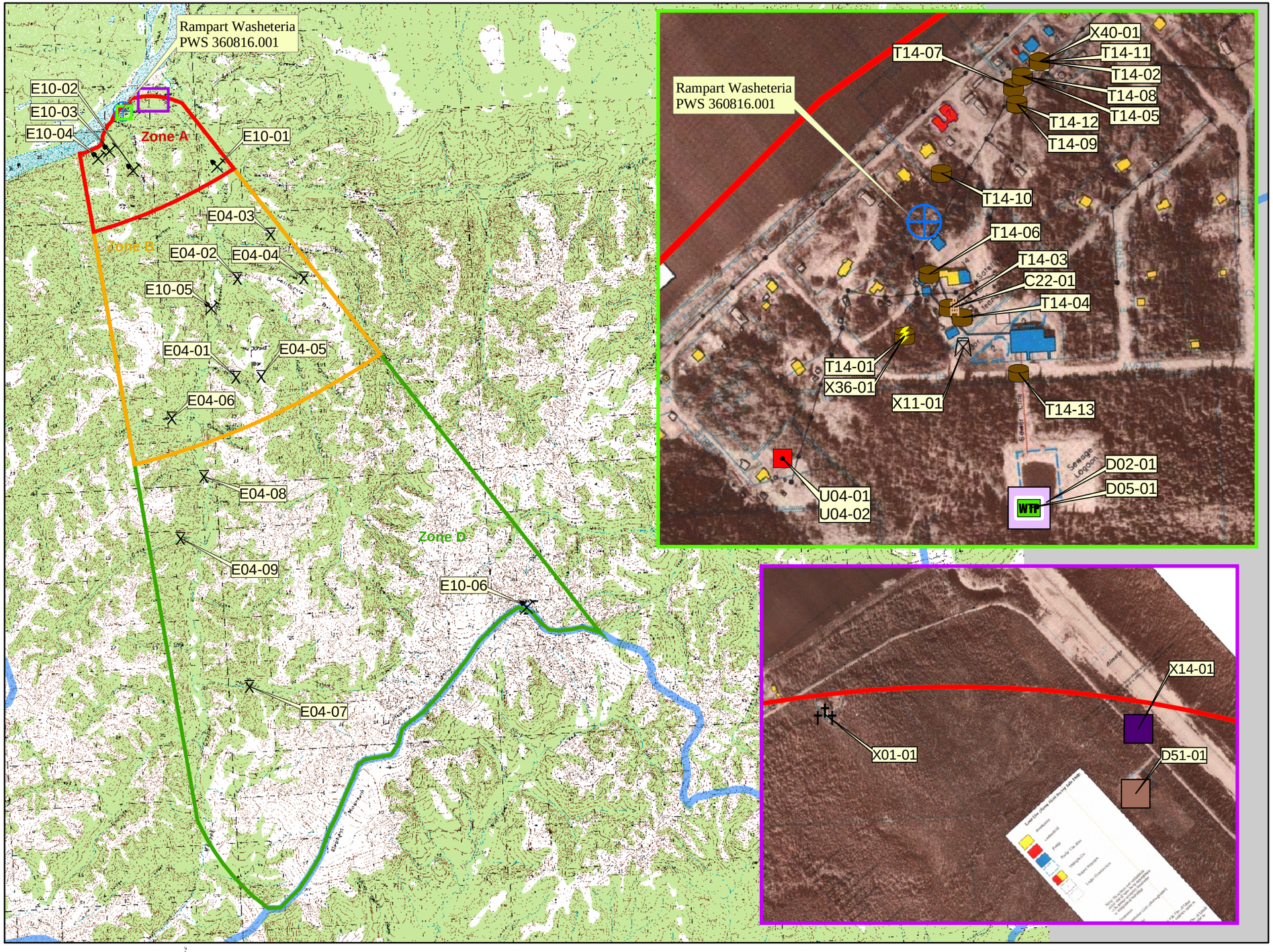
PWSID 360816.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	A	Low	C	Sewage Lagoon
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Waste Water Treatment Facility
Landfills (municipal; Class III)	D51	D51-01	A	Very High	C	Landfill/Incinerator
Quarries (sand, gravel, rock, other?)	E10	E10-01	A	Low	C	HUNTER
Quarries (sand, gravel, rock, other?)	E10	E10-02	A	Low	C	LODE KYANITE
Quarries (sand, gravel, rock, other?)	E10	E10-03	A	Low	C	RAMPART
Quarries (sand, gravel, rock, other?)	E10	E10-04	A	Low	C	TIM
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-01	A	Low	C	Rampart School
Contaminated sites, DEC recognized, non-Superfun non-RCRA	U04	U04-02	A	Low	C	Rampart School
Petroleum product bulk station/terminals	X11	X11-01	A	High	C	Fuel Storage Tanks (>500gal)
Airports	X14	X14-01	A	Medium	C	Airport
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 20 or fewer roads in Zone A
Highways and roads (winter)	X26	X26-01	A	Low	C	
Electric power generation (fossil fuels)	X36	X36-01	A	High	C	Power Generation Facility
Quarries (sand, gravel, rock, other?)	E10	E10-05	B	Low	C	QUAM
Quarries (sand, gravel, rock, other?)	E10	E10-06	D	Low	C	WOLVERINE MOUNTAIN

APPENDIX C

Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Map C)

Public Water Well System for PWS #360816.001 Rampart Washeteria
Potential and Existing Sources of Contamination



LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours
- Watershed Boundary

Transportation

- Primary Route (Class 1)
- Secondary Route (Class 2)
- Road (Class 3)
- Road (Class 4)
- Road (Class 5, Four-wheel drive)

Groundwater Protection Zones

- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time or watershed boundary

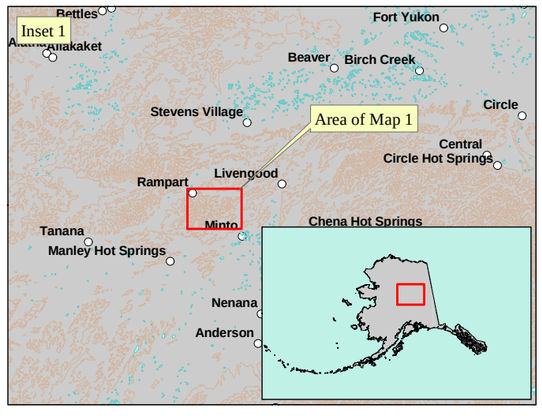
Existing or Potential Contaminant Sources

- Laundromats without dry cleaning (C22)
- Domestic wastewater treatment plant (D05)
- Placer Mine (E04)
- Other Mine or Quarry (E10)
- Tanks, heating oil, nonresidential (aboveground) (T14)
- Contaminated sites, DEC recognized, non-Superfund, non-RCRA (U04)
- Cemetery (X01)
- Petroleum product bulk station/terminals (X11)
- Electric Power Generation (fossil fuels) (X36)
- Medical/veterinary facilities (X40)
- Domestic Wastewater Treatment pond or lagoon (D02)
- Landfill, municipal, Class III (D51)
- Airport or landing strip (X14)

Data Sources:
- Contaminant Sources, Public Water System Wells, Contours Alaska Department of Environmental Conservation (ADEC)
- Critical Facilities, Federal Emergency Management Agency (FEMA)

All other data:
- United States Geological Survey (USGS)
- Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class A Public Water Systems" published by ADEC

URS Corporation does not guarantee the accuracy or validity of the data provided.



0 0.5 1 2 3 4 Miles

Rampart Washeteria
PWS 360816.001

Appendix C Map C

APPENDIX D

Vulnerability Analysis for Public Drinking Water Source (Charts 1-14)

Chart 1. Susceptibility of the wellhead - Rampart Washeteria (PWS No. 360816.001)

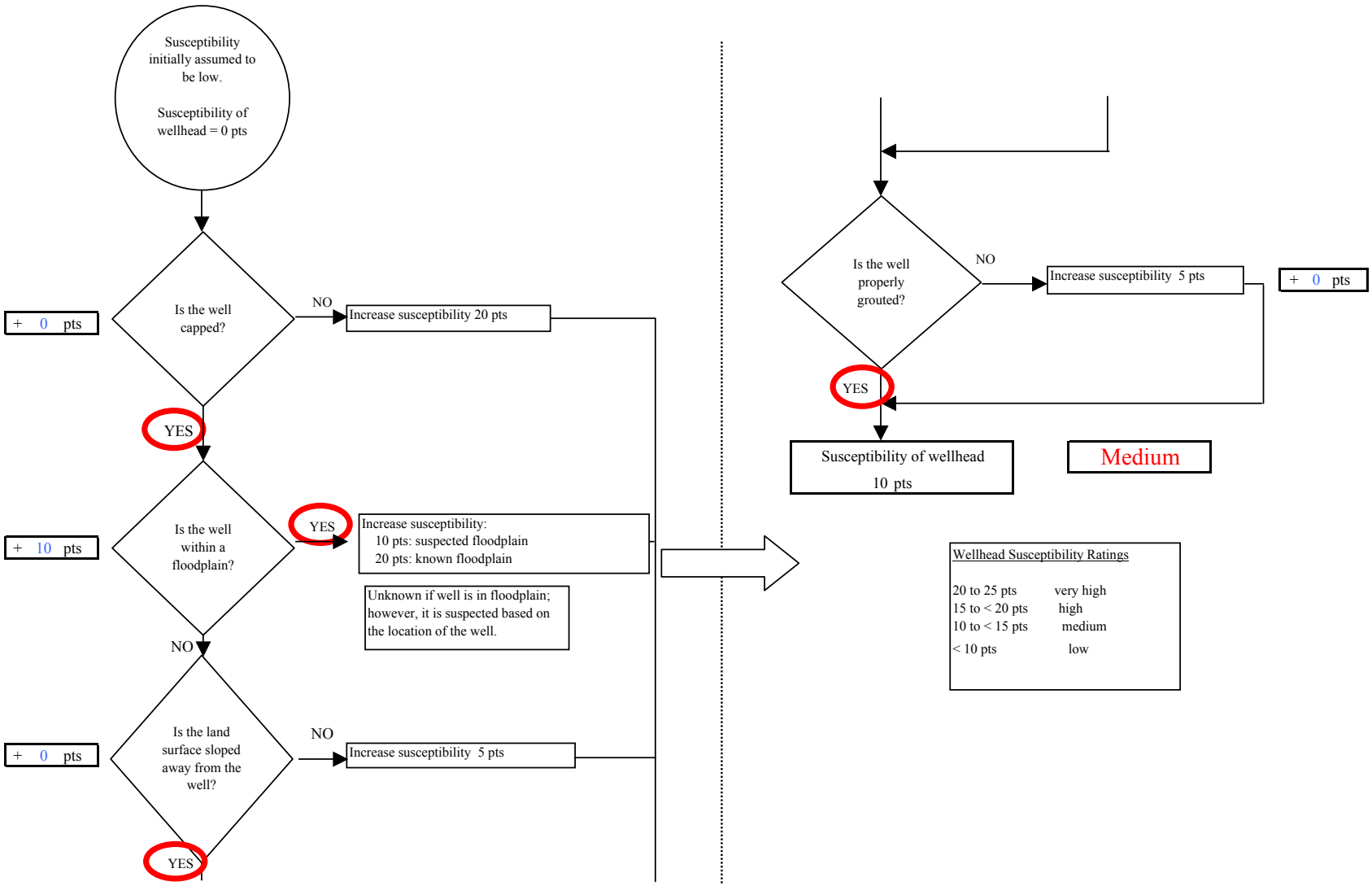


Chart 2. Susceptibility of the aquifer Rampart Washeteria (PWS No. 360816.001)

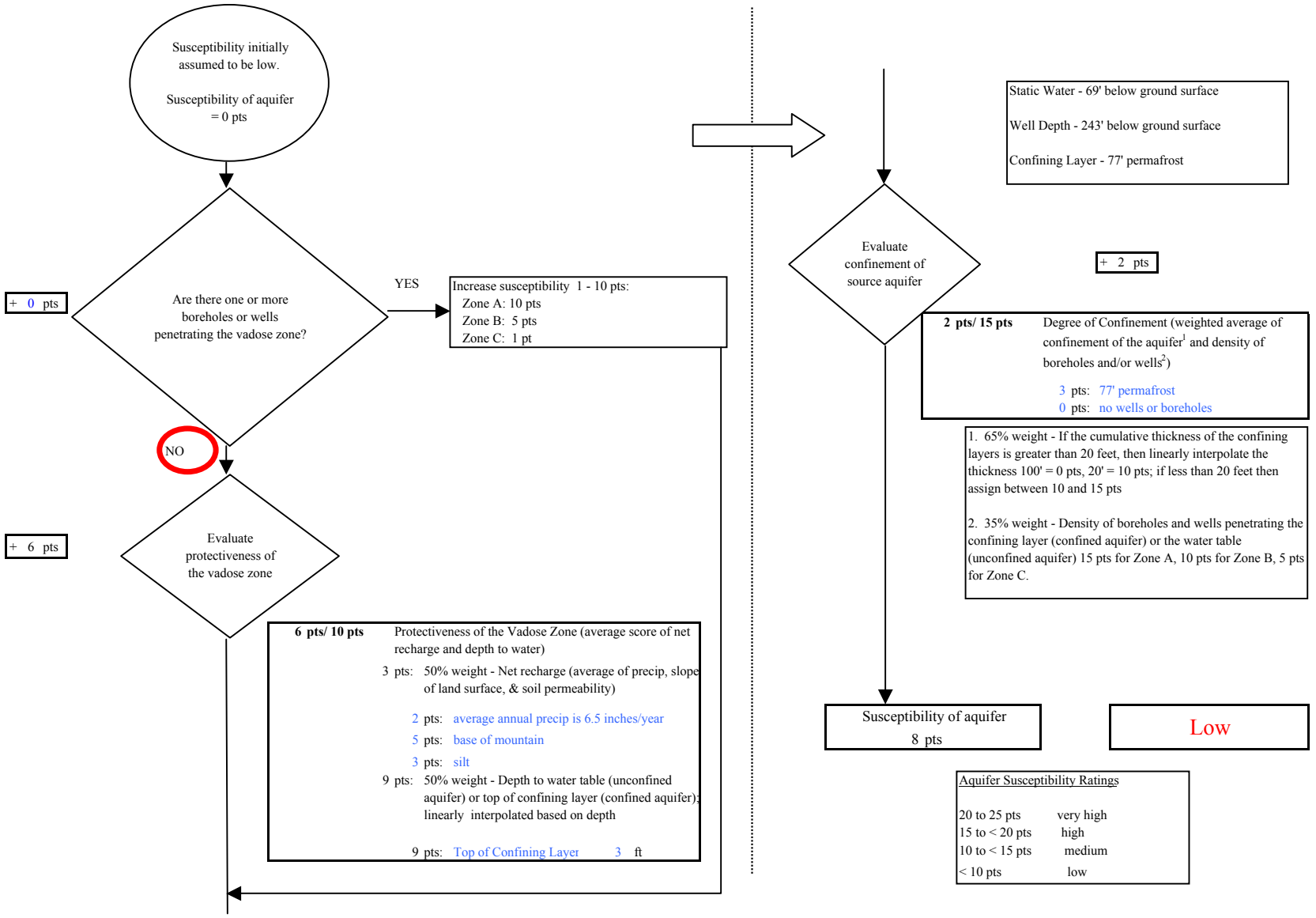
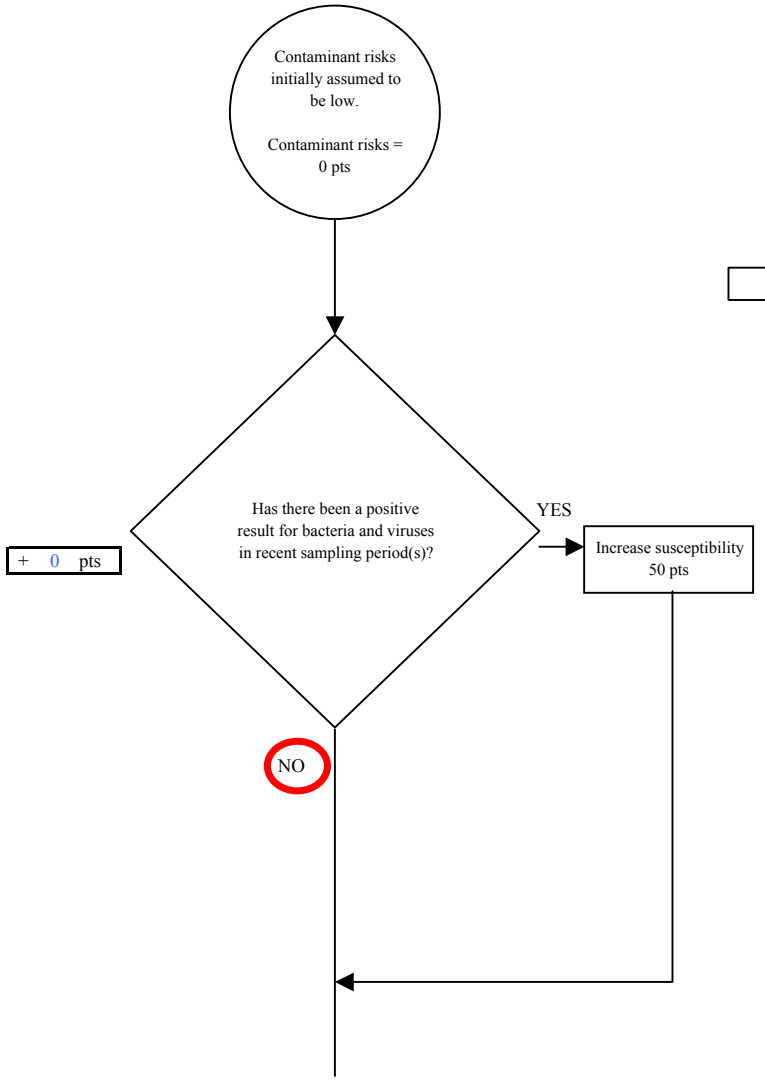
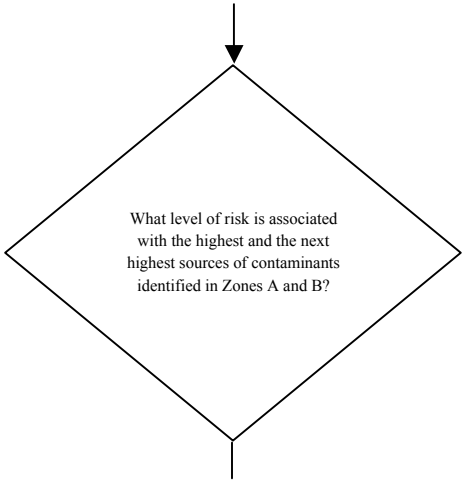


Chart 3. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Bacteria & Viruses





+ 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)	2	0	2
Medium(s)	2	0	2
Low(s)	2	0	2

	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 Rampart Washeteria (PWS No. 360816.001) - Bacteria & Viruses

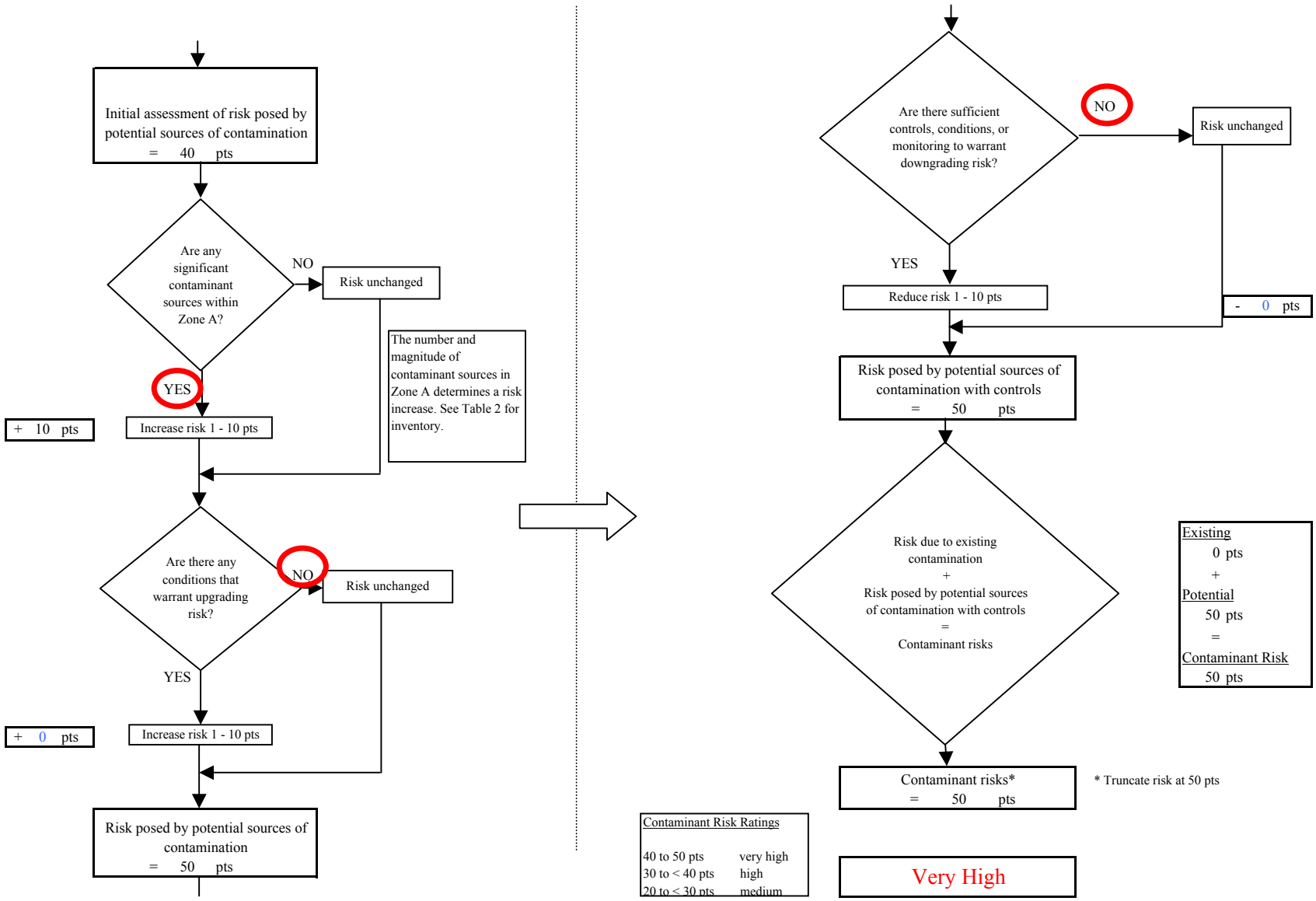


Chart 4. Vulnerability analysis for Rampart Washeteria (PWS No. 360816.001) - Bacteria & Viruses

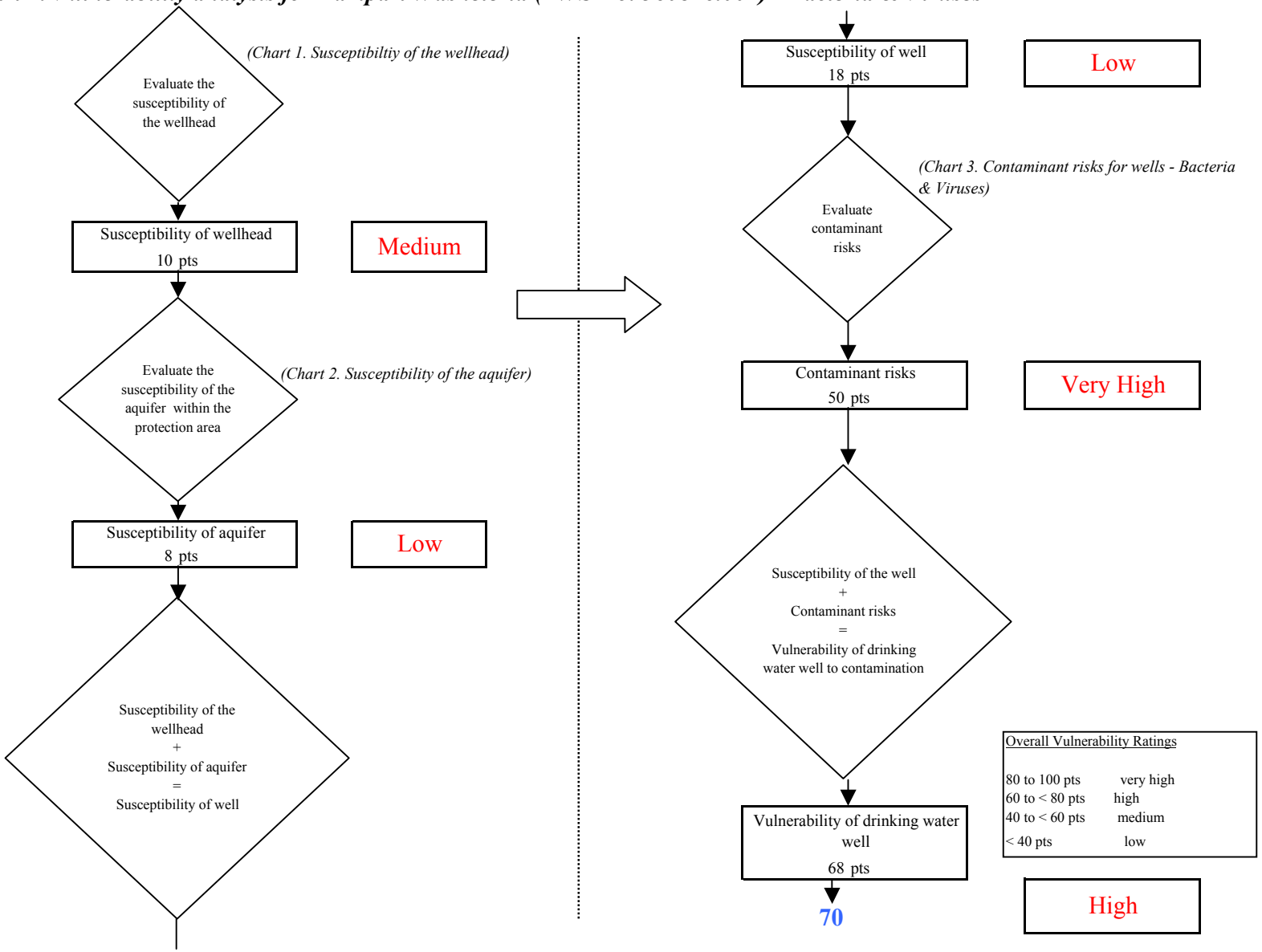


Chart 5. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Nitrates and Nitrites

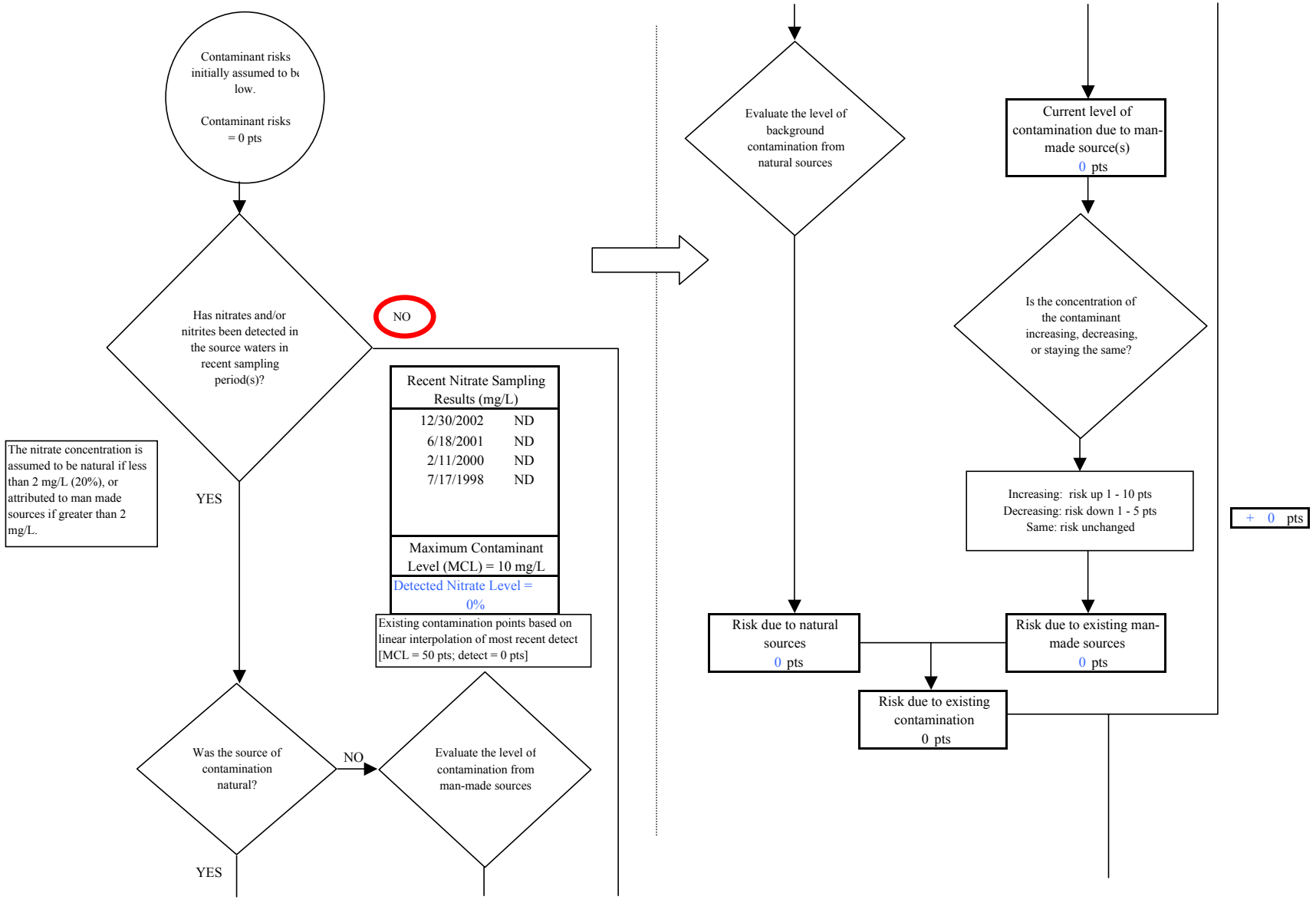
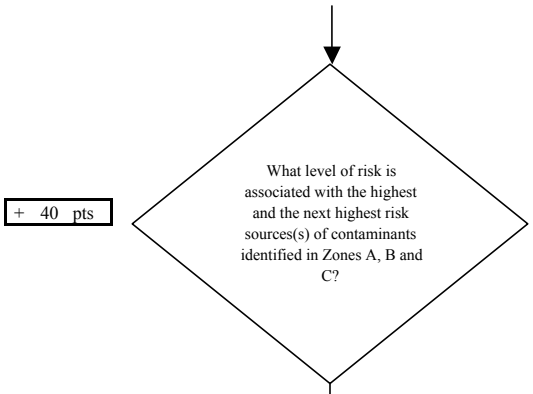


Chart 5. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Nitrates and Nitrites



+ 40 pts

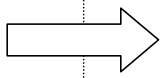
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	1	0	1
High(s)	1	0	1
Medium(s)	2	0	2
Low(s)	8	1	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 individua 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.



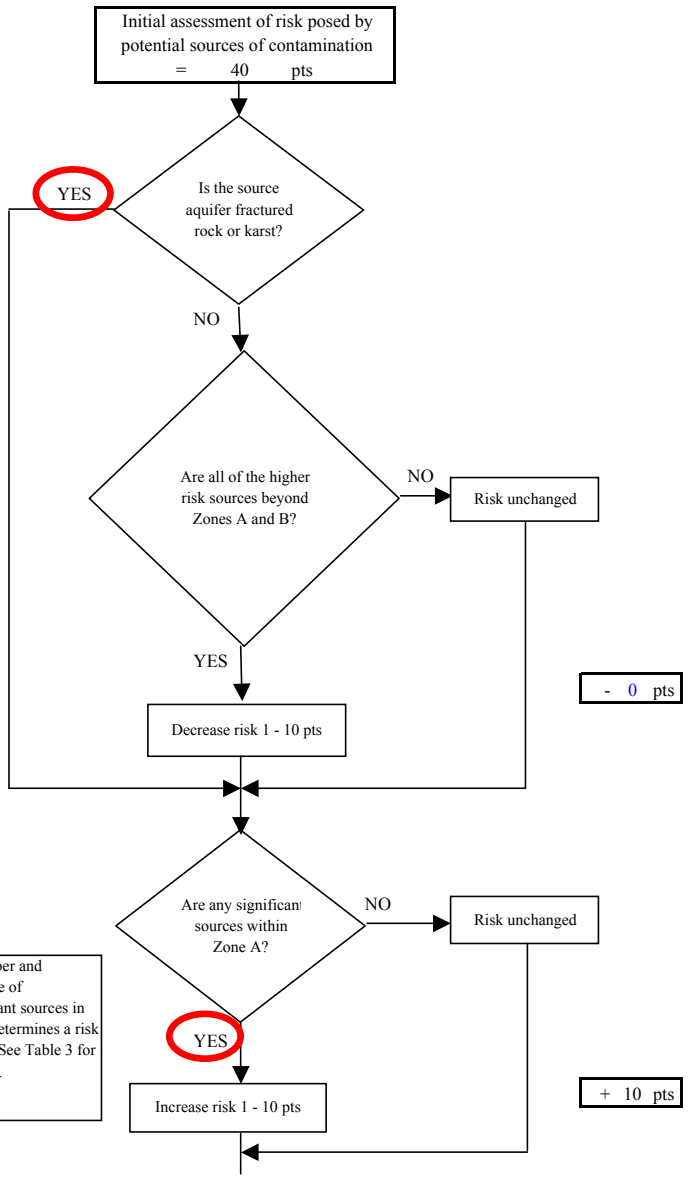


Chart 5. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Nitrates and Nitrites

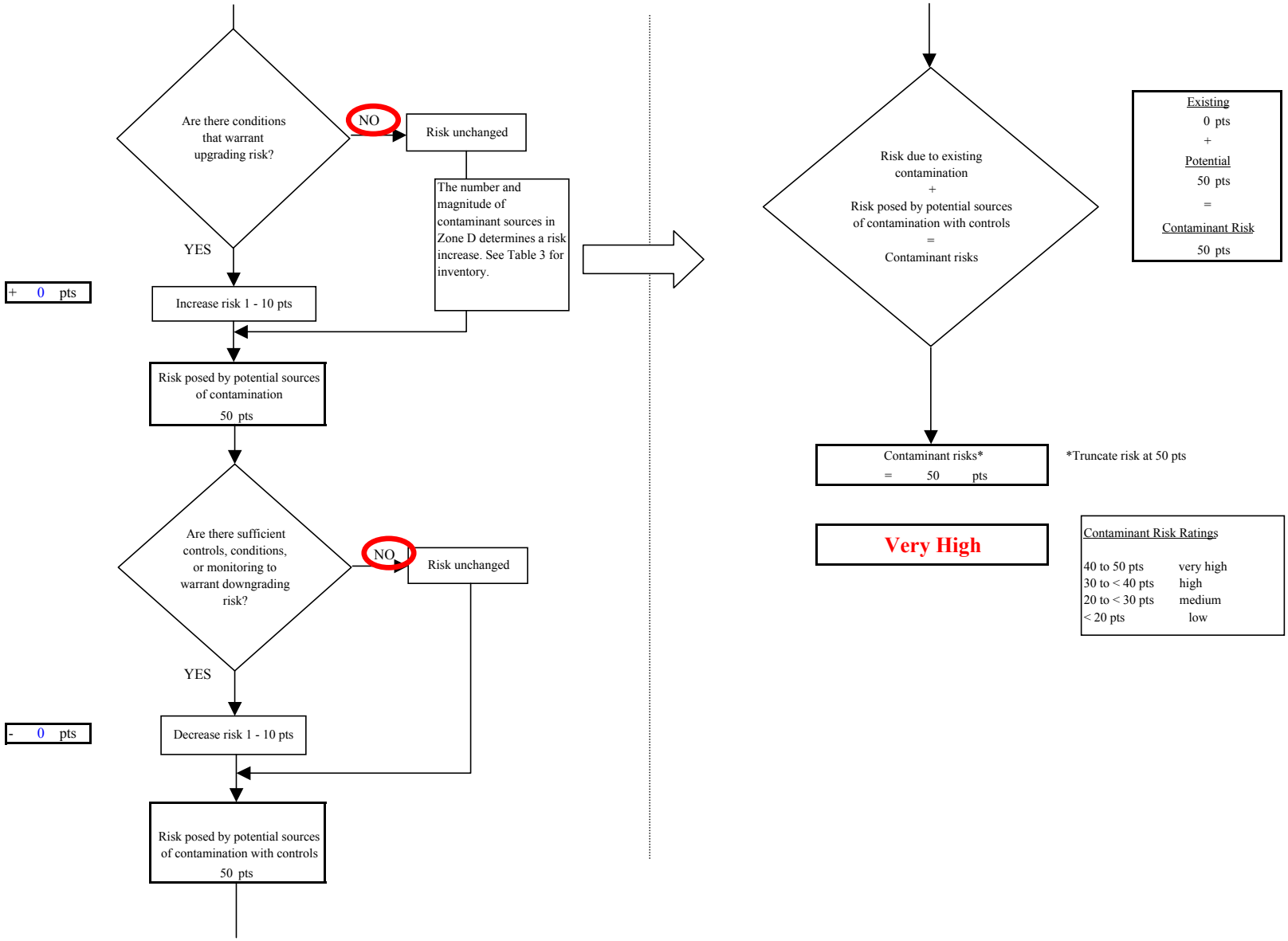


Chart 6. Vulnerability analysis for Rampart Washeteria (PWS No. 360816.001) - Nitrates and Nitrites

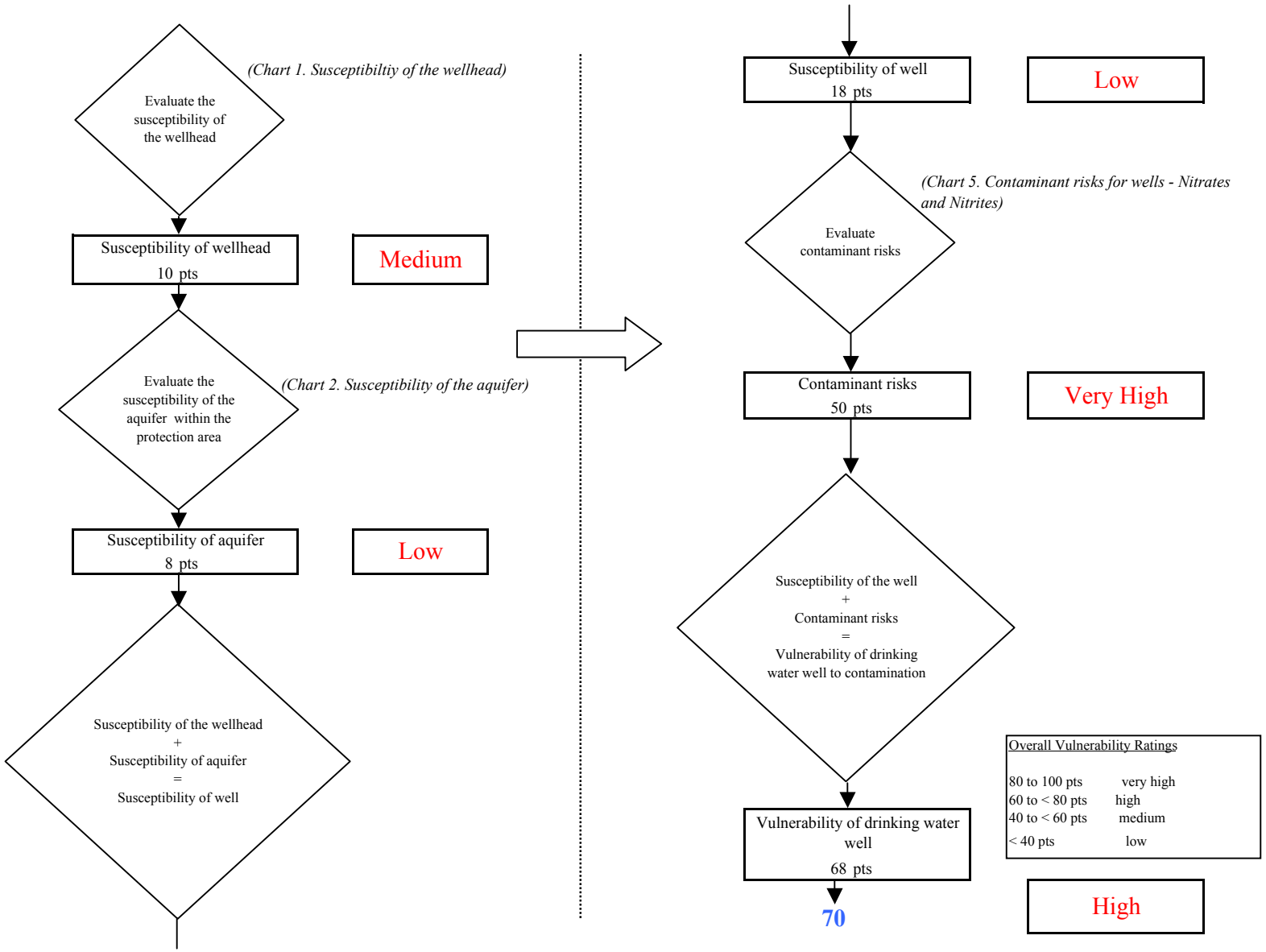


Chart 7. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Volatile Organic Chemicals

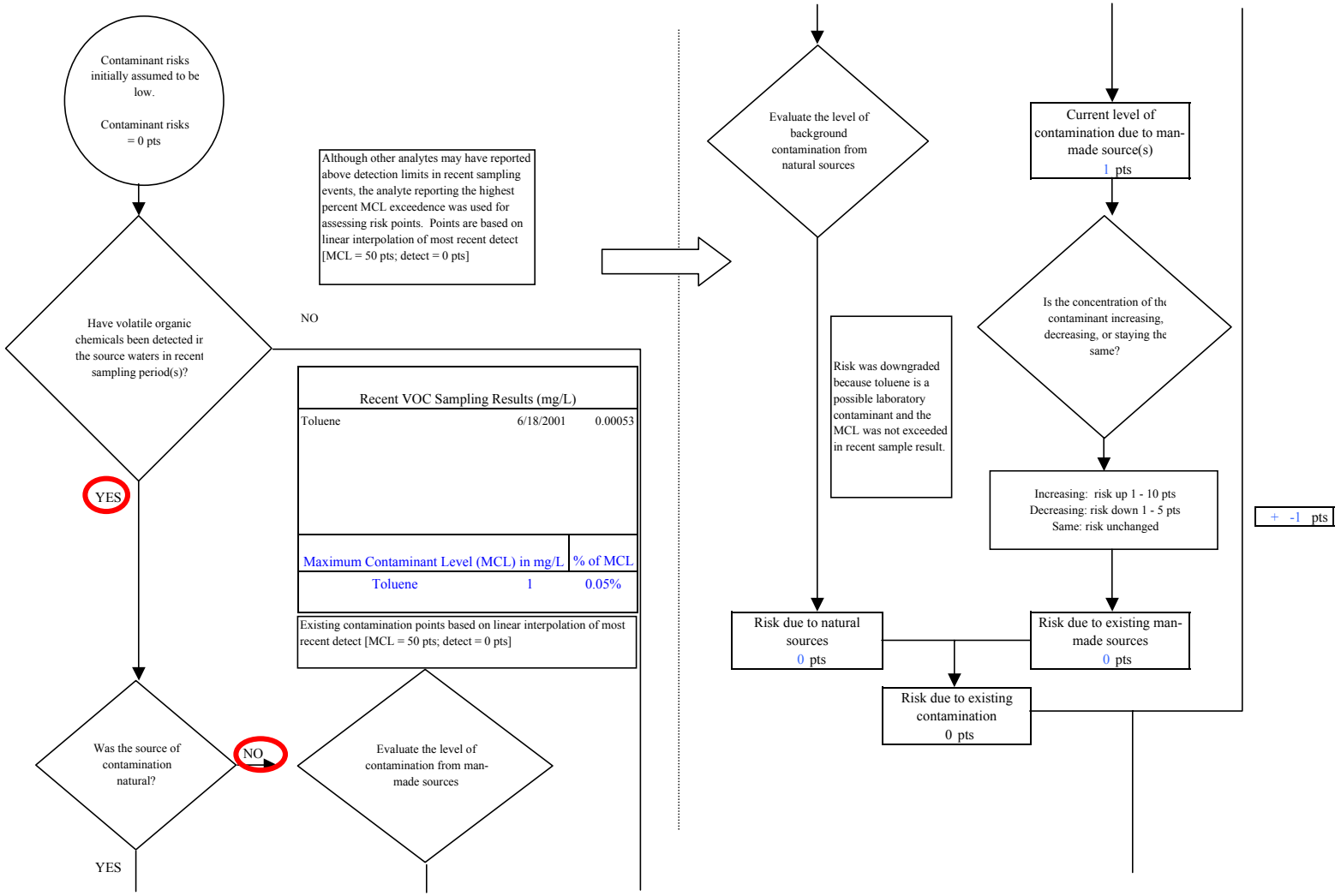
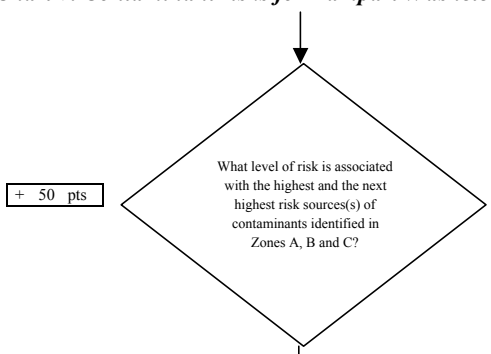


Chart 7. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Volatile Organic Chemicals



+ 50 pts

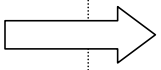
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	1	0	1
High(s)	4	0	4
Medium(s)	5	0	5
Low(s)	22	1	23

	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 50

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in tl 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.



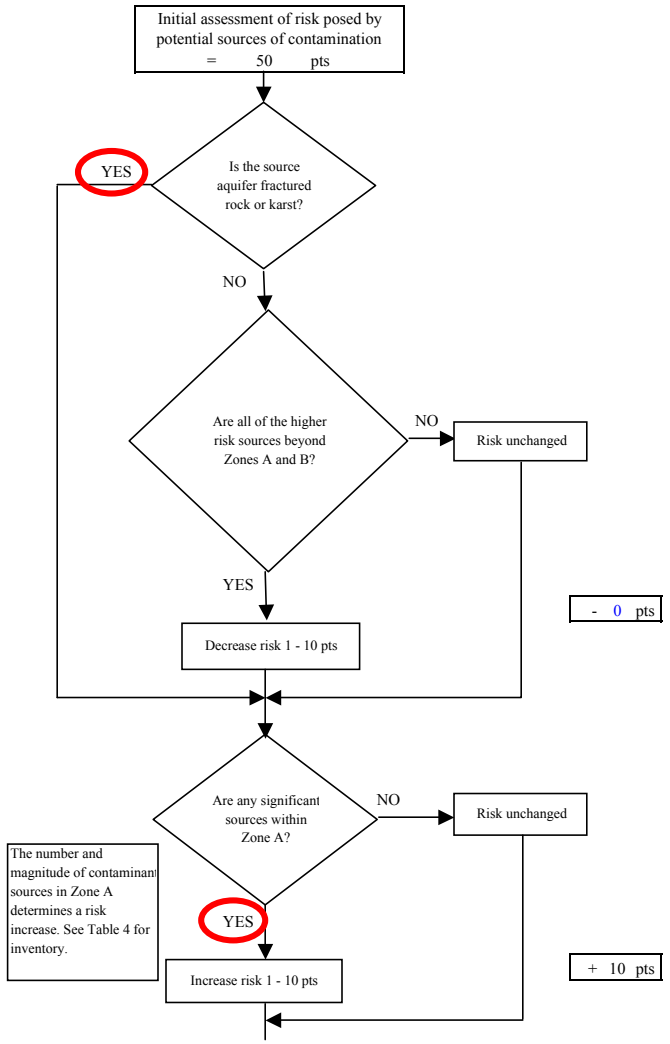


Chart 7. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Volatile Organic Chemicals

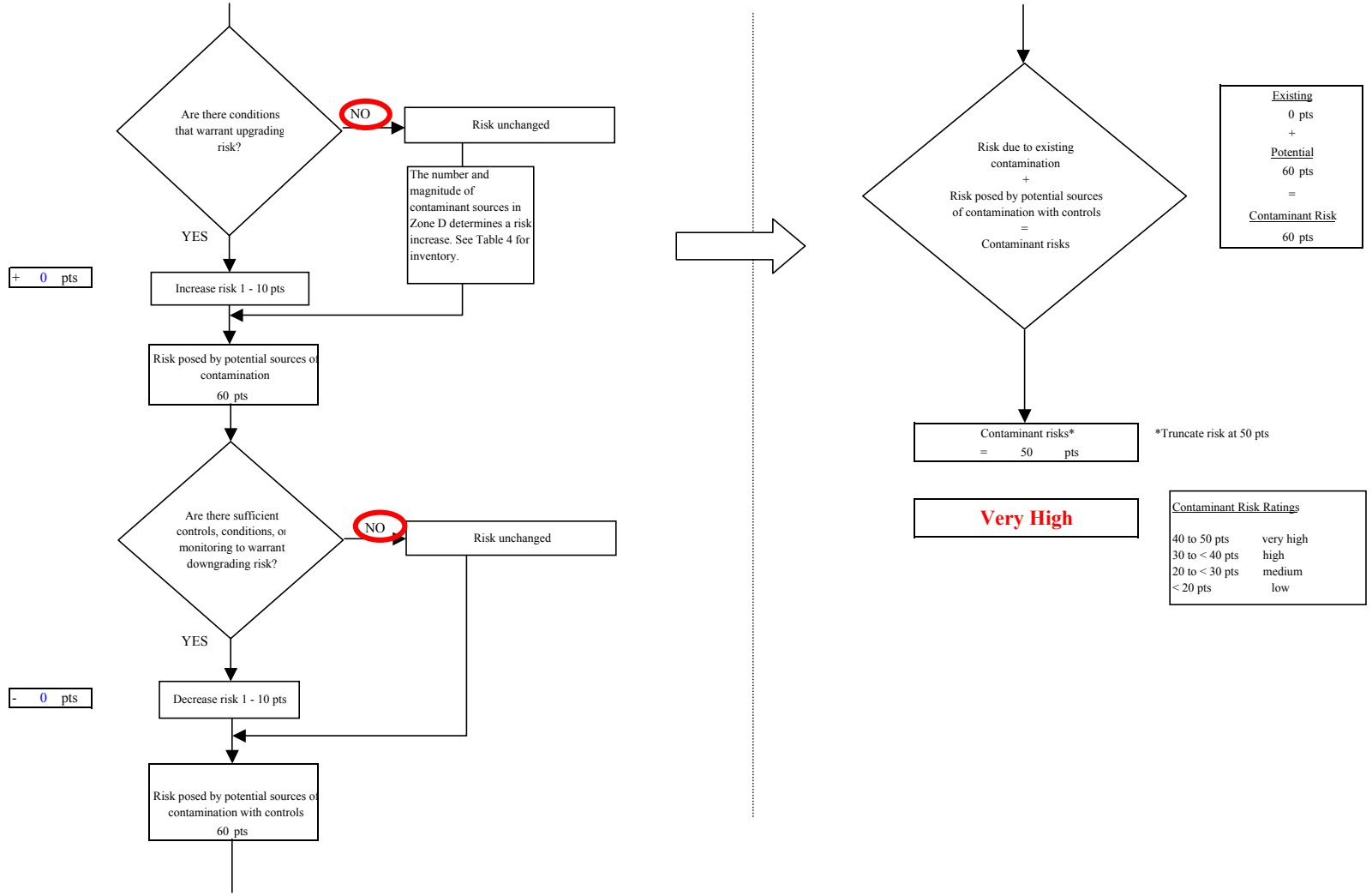


Chart 8. Vulnerability analysis for Rampart Washeteria (PWS No. 360816.001) - Volatile Organic Chemicals

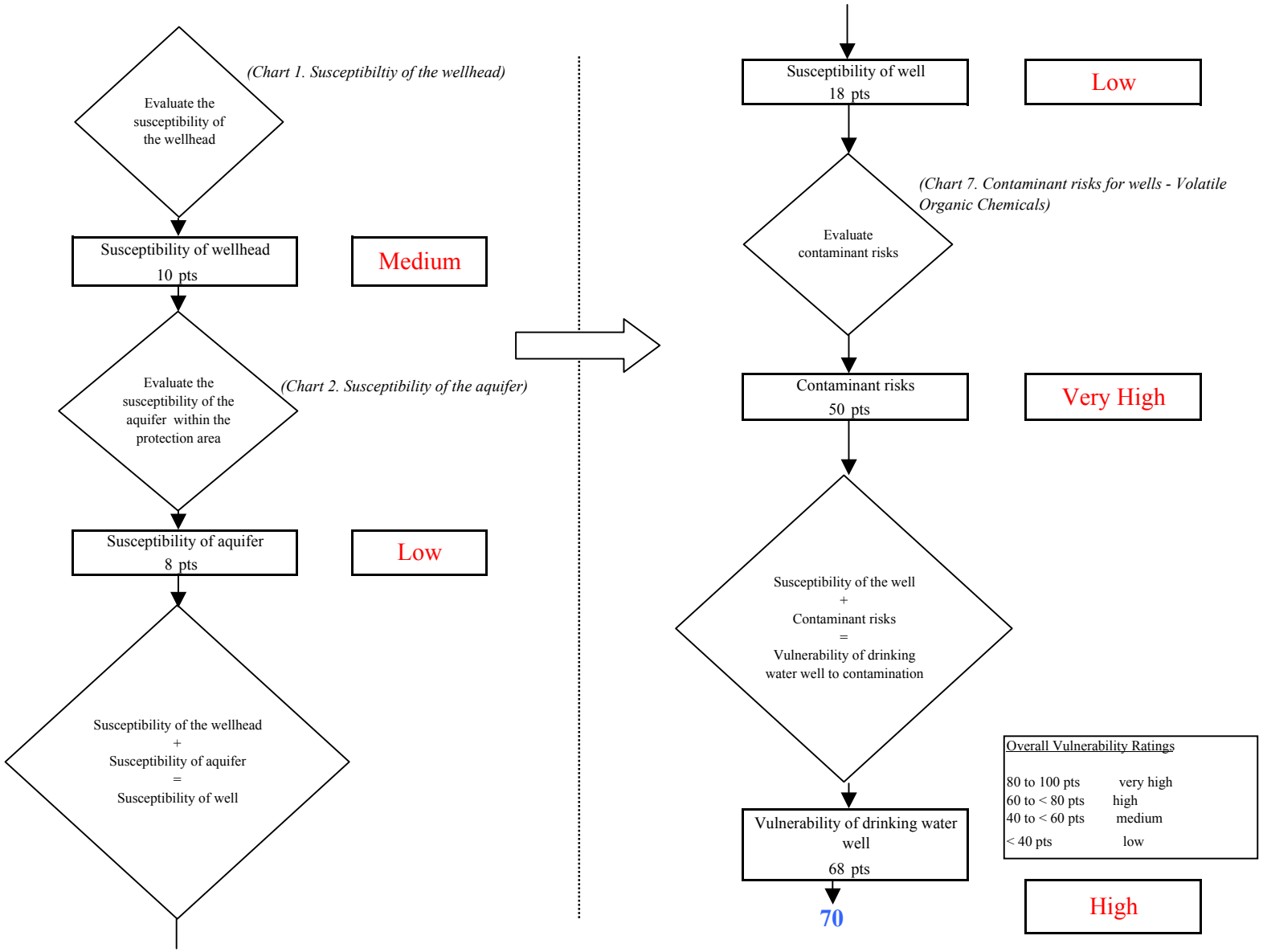


Chart 9. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

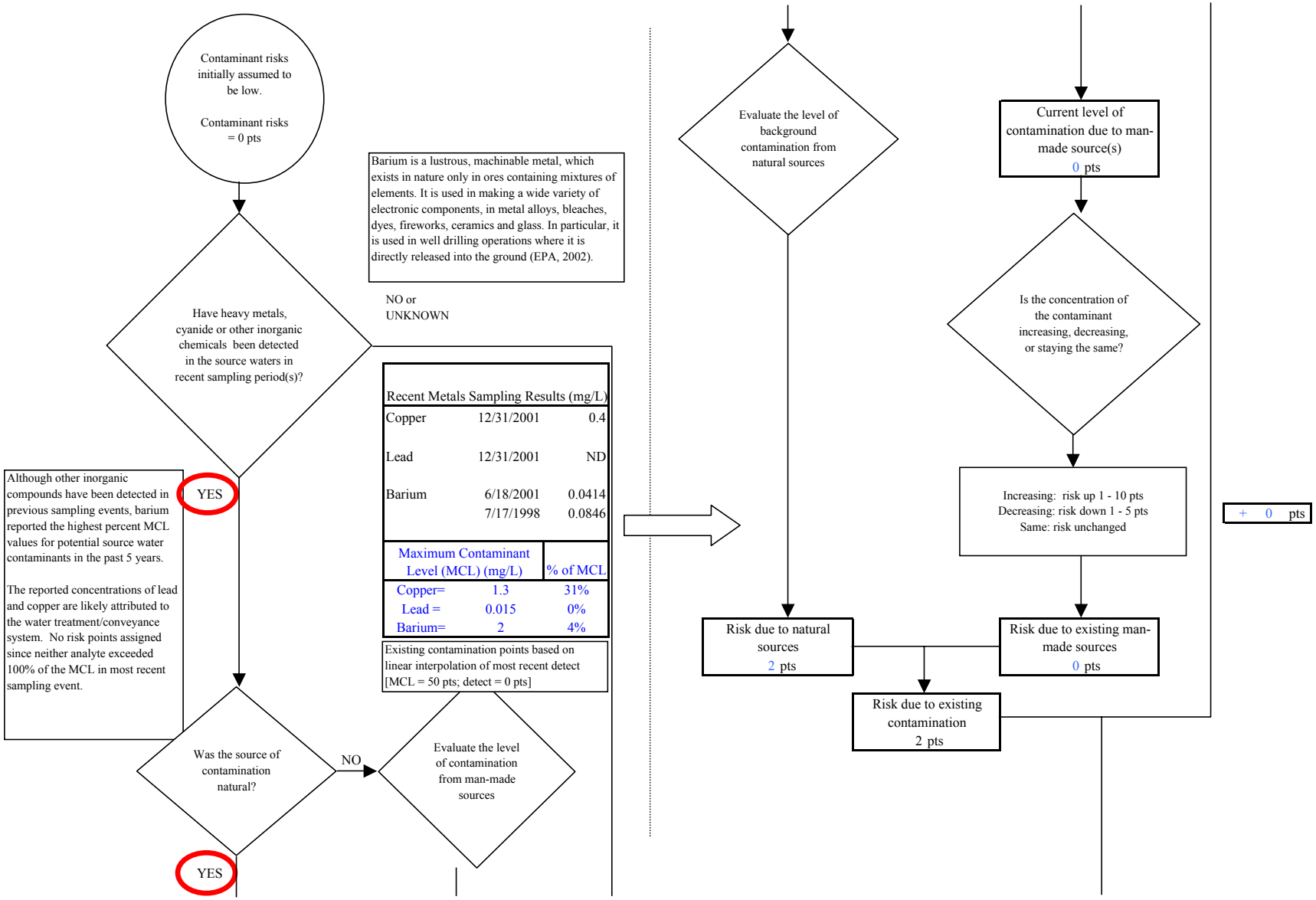
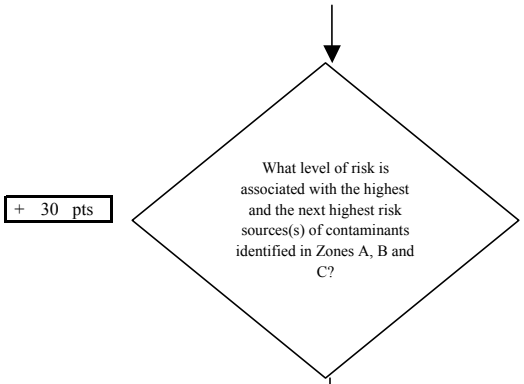


Chart 9. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals



+ 30 pts

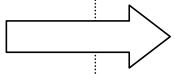
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	1	0	1
Medium(s)	1	0	1
Low(s)	22	6	28

	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.



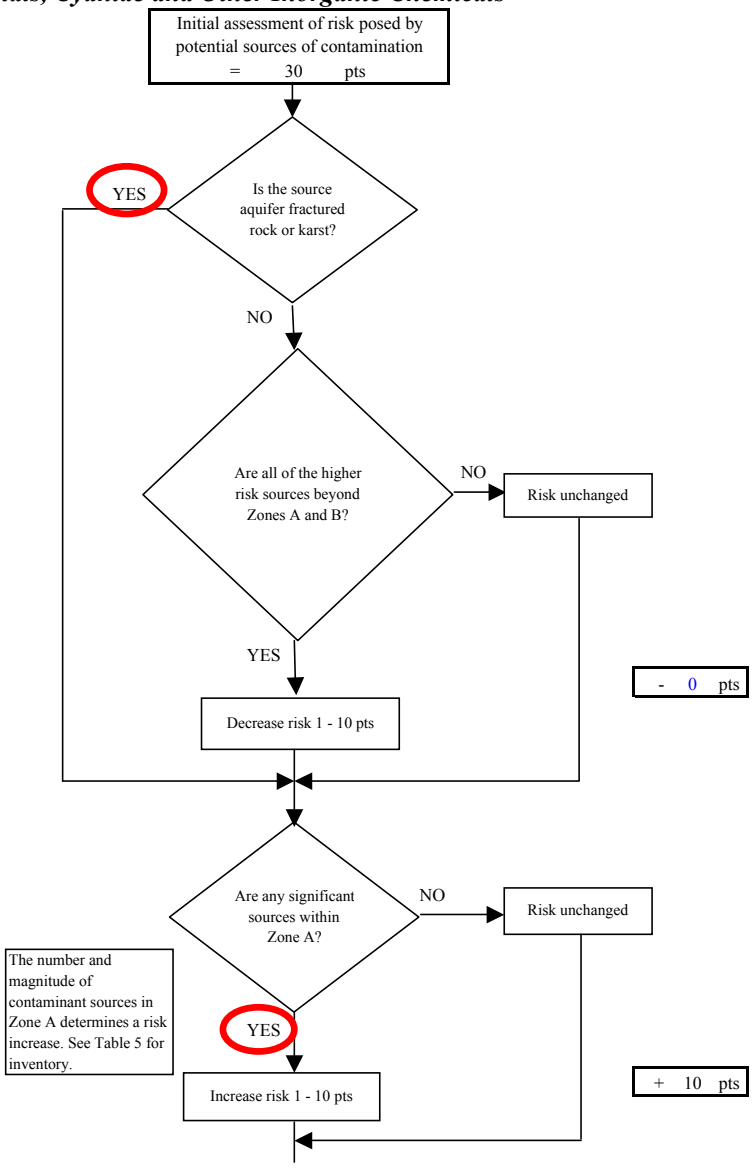


Chart 9. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

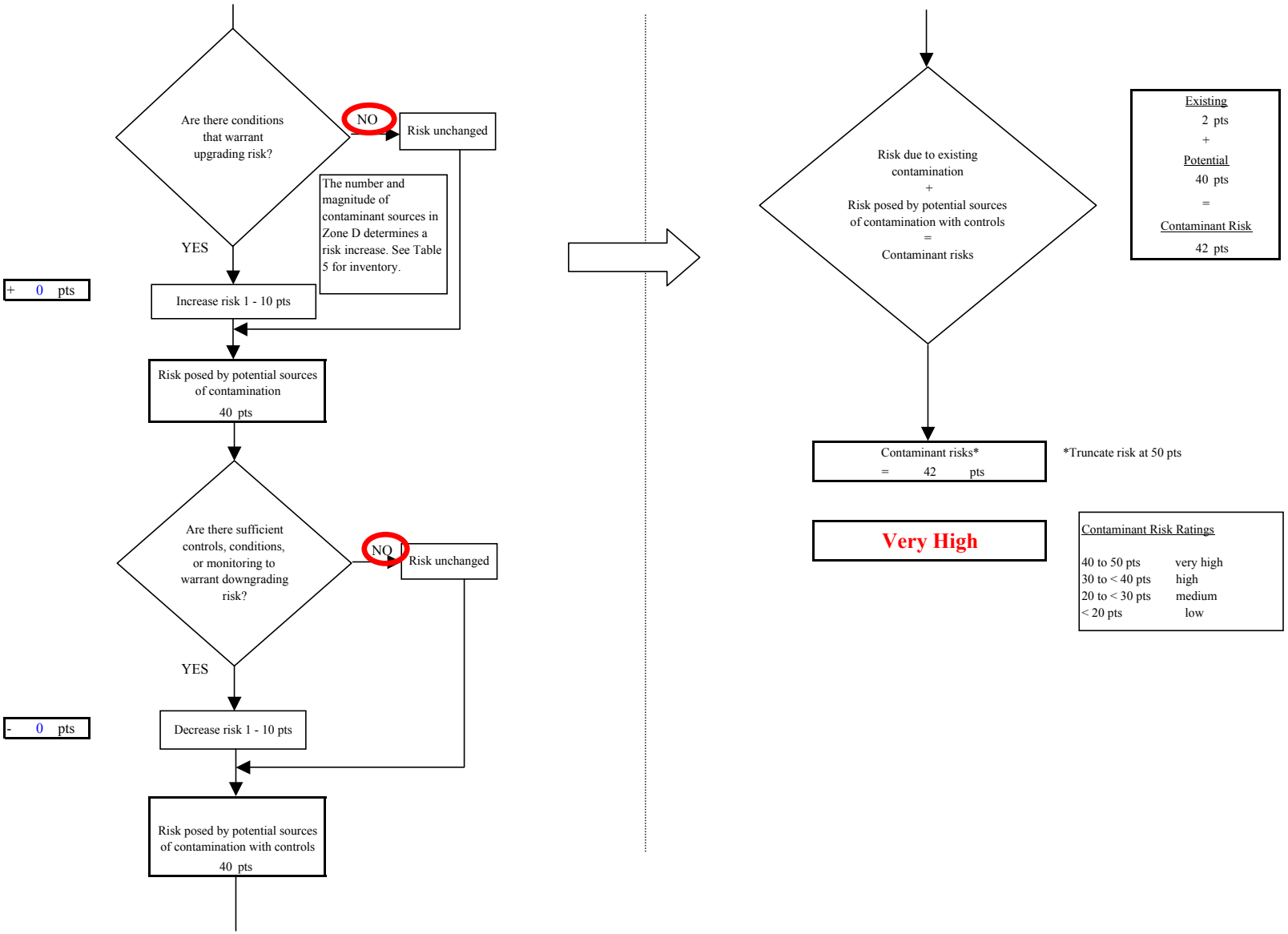


Chart 10. Vulnerability analysis for Rampart Washeteria (PWS No. 360816.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

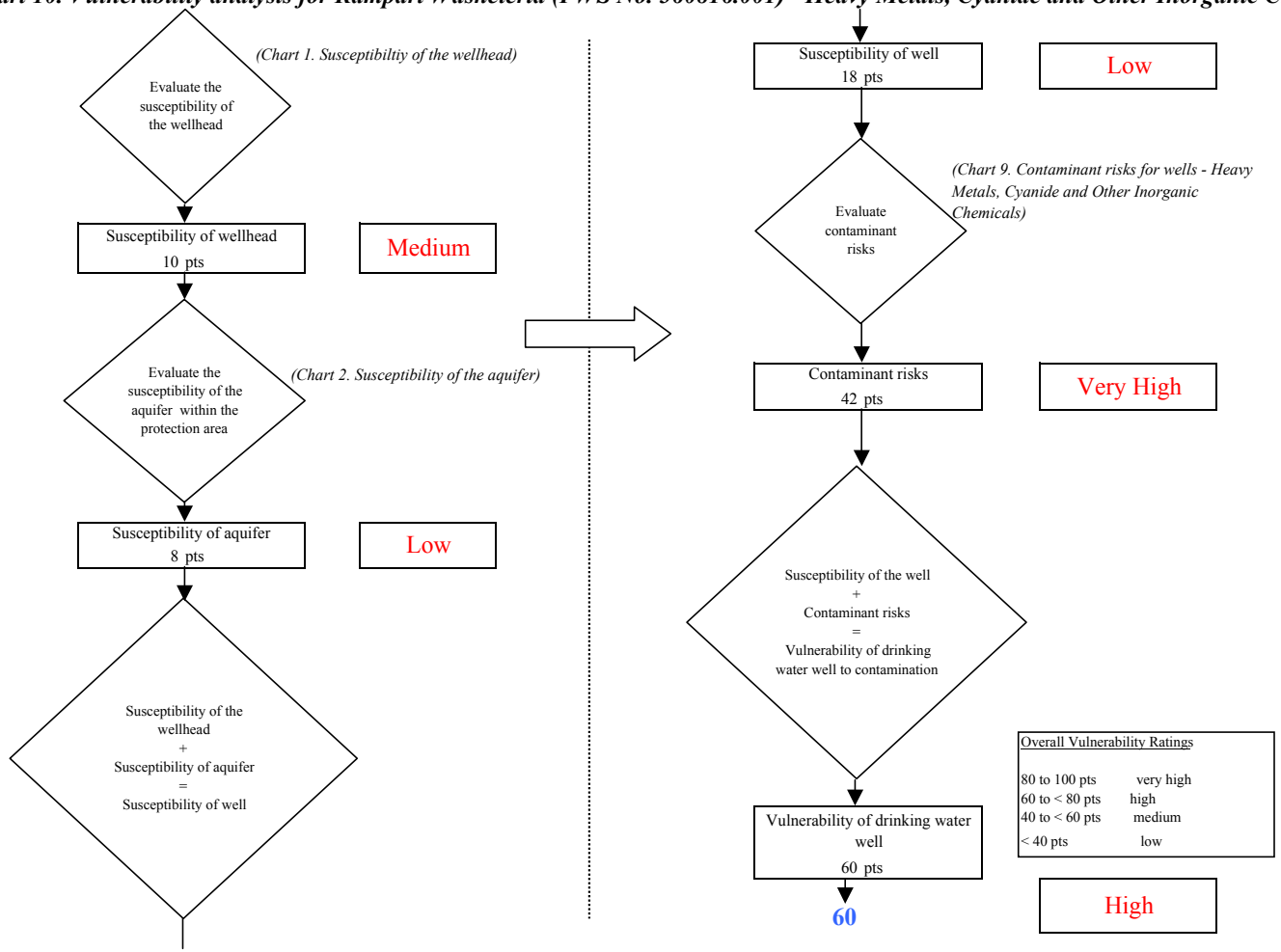


Chart 11. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Synthetic Organic Chemicals

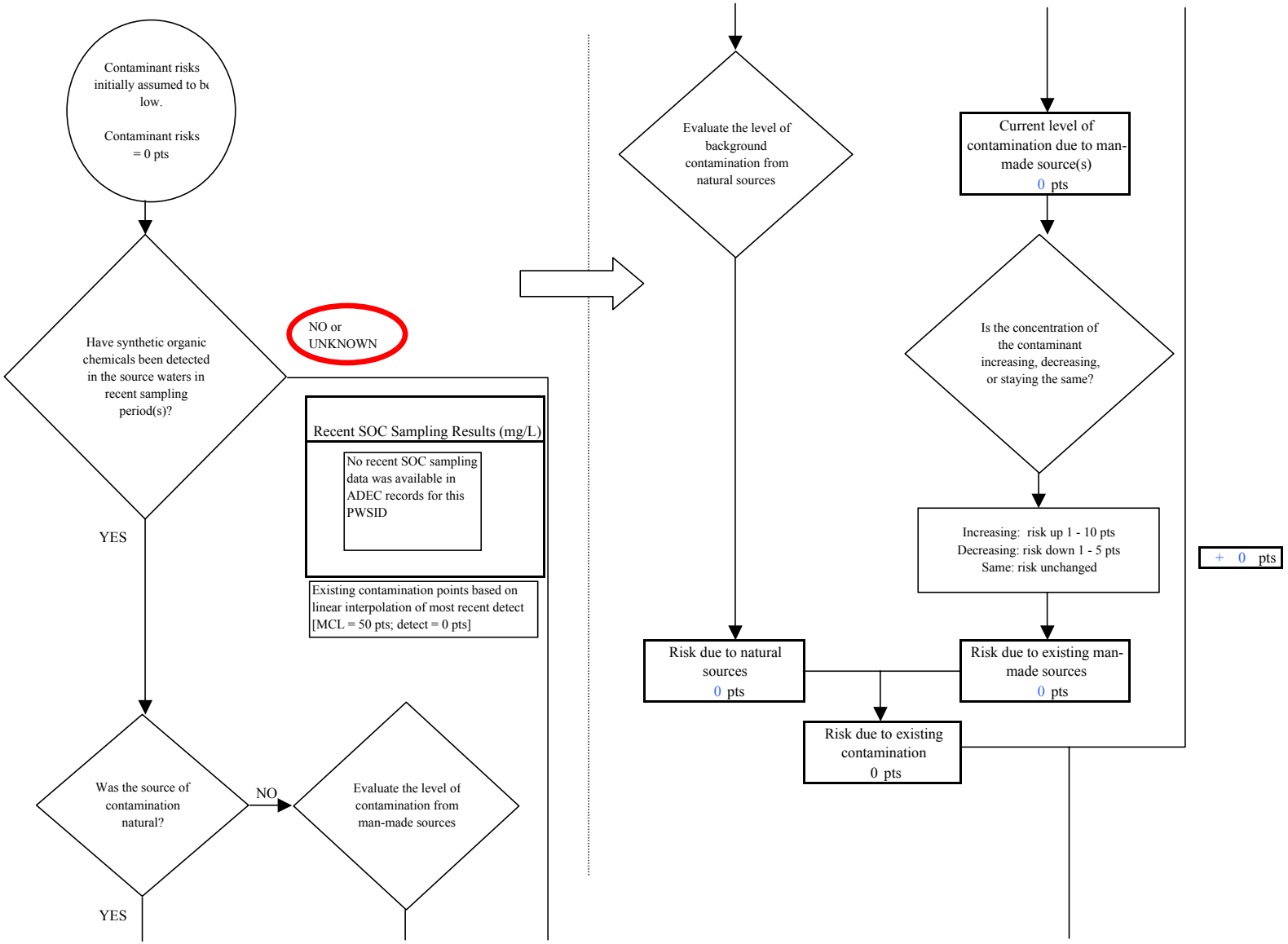
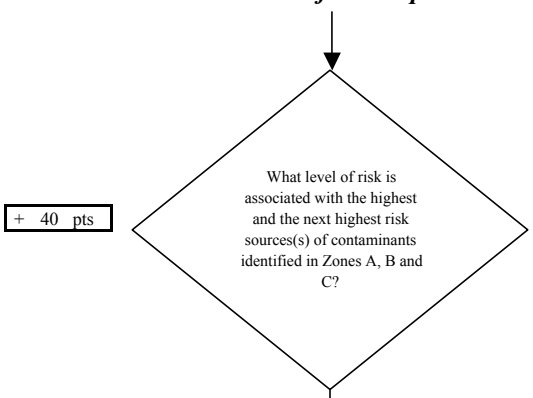


Chart 11. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Synthetic Organic Chemicals



+ 40 pts

Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	1	0	1
High(s)	0	0	0
Medium(s)	2	0	2
Low(s)	6	0	6

	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 individua 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.

The number and magnitude of contaminant sources in Zone A determines a risk increase. See Table 6 for inventory.

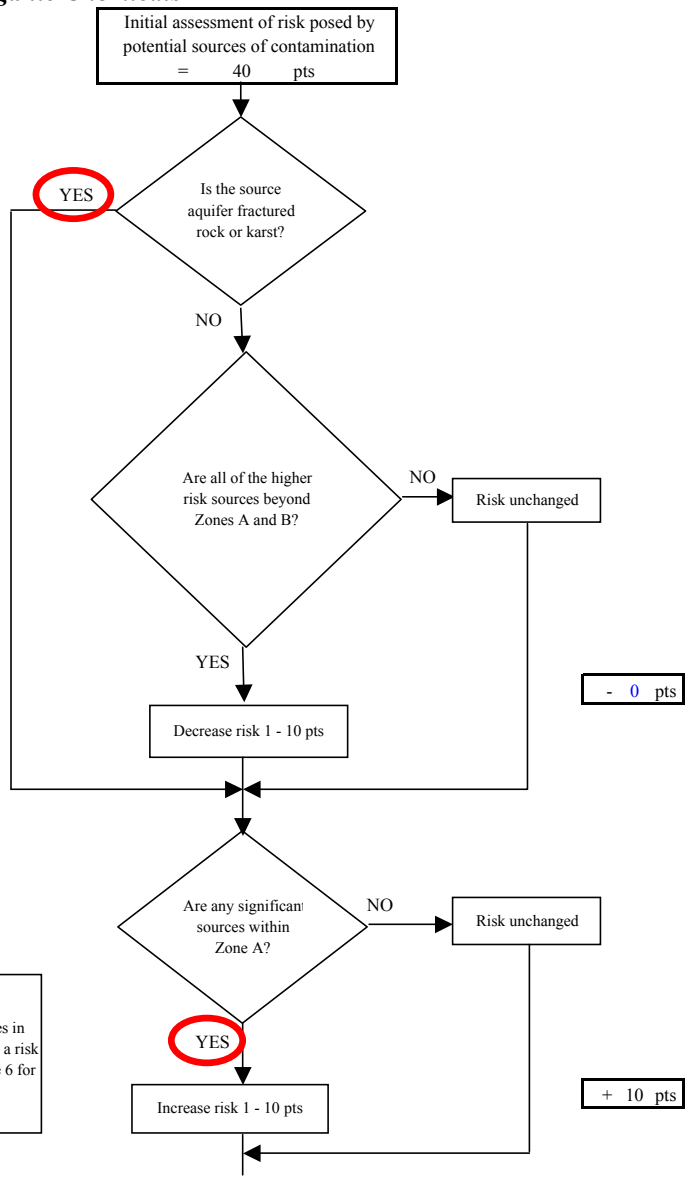


Chart 11. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Synthetic Organic Chemicals

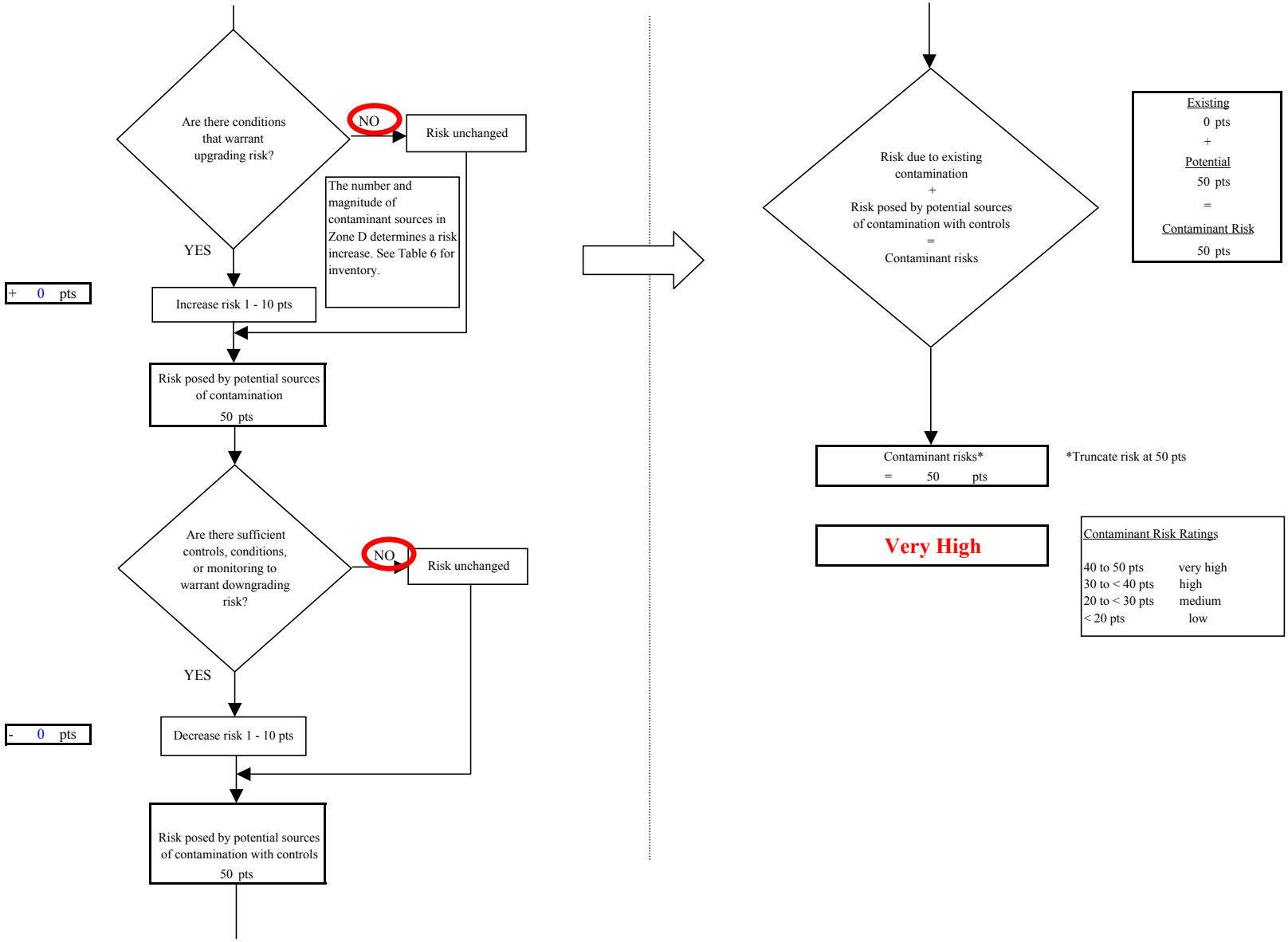


Chart 12. Vulnerability analysis for Rampart Washeteria (PWS No. 360816.001) - Synthetic Organic Chemicals

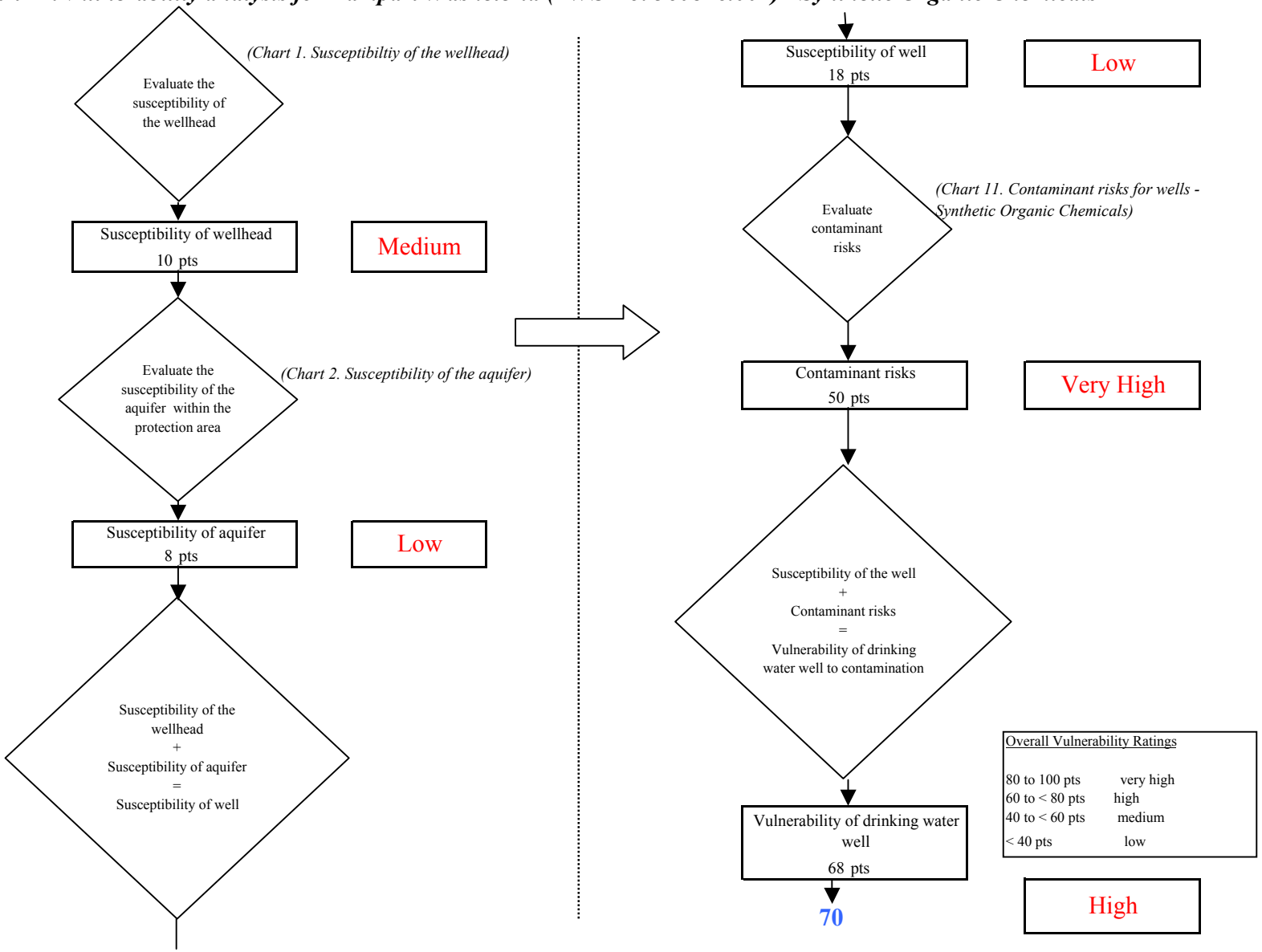


Chart 13. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Other Organic Chemicals

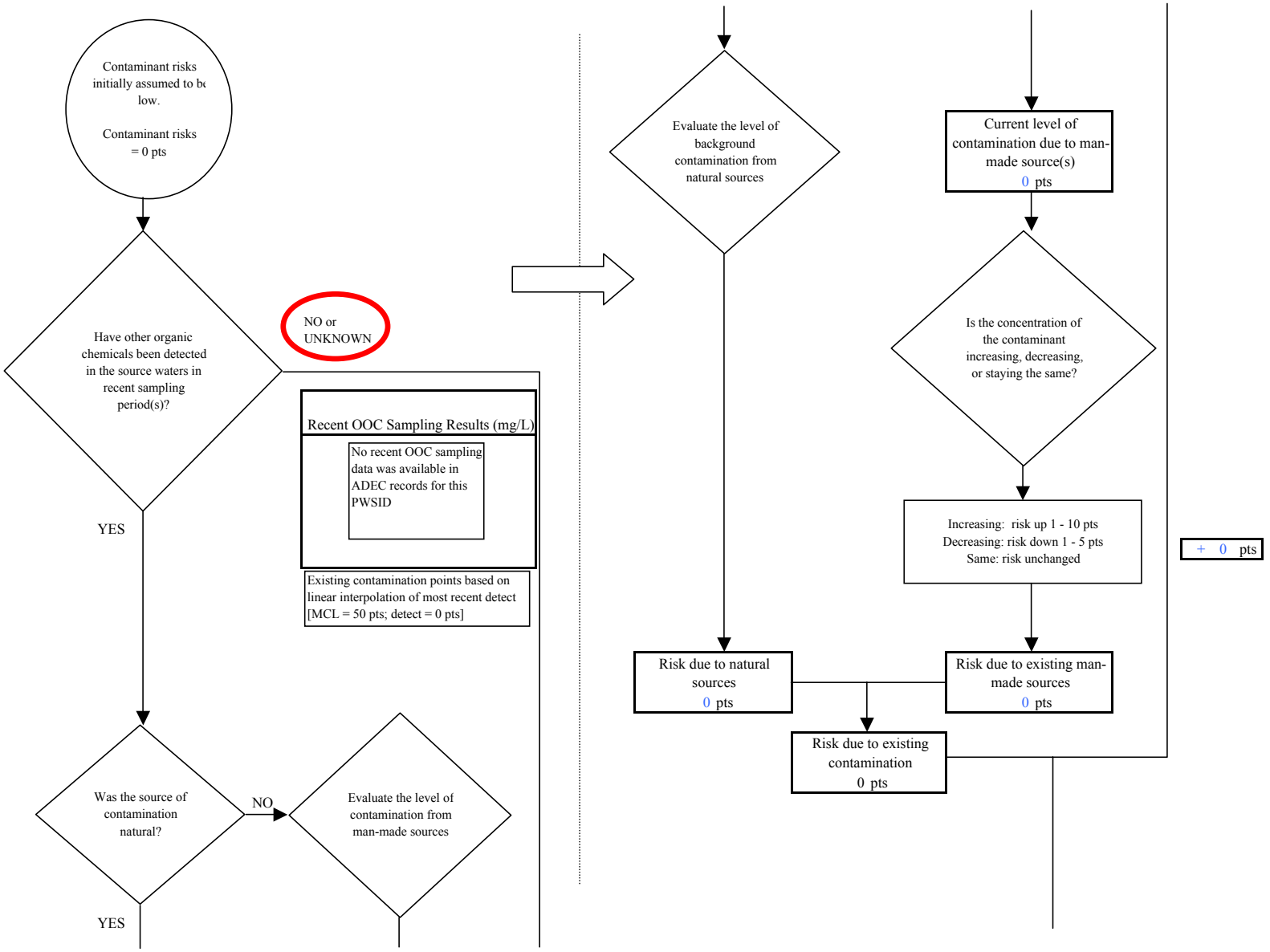
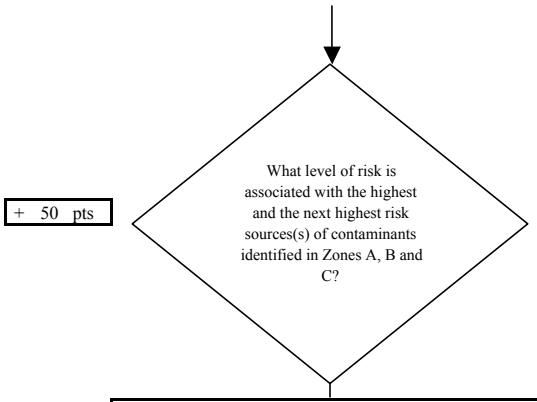


Chart 13. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Other Organic Chemicals



+ 50 pts

Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	1	0	1
High(s)	2	0	2
Medium(s)	1	0	1
Low(s)	9	1	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 50

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individua 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.

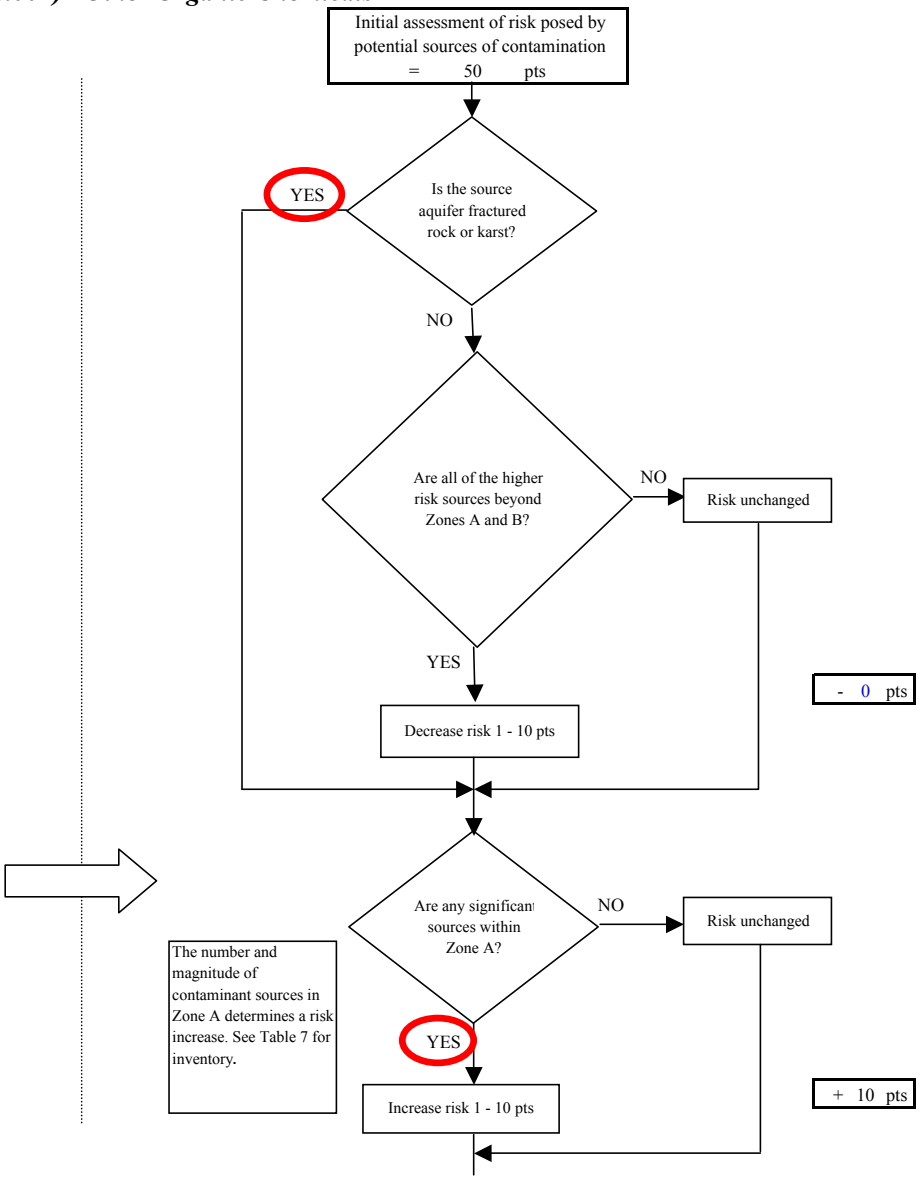


Chart 13. Contaminant risks for Rampart Washeteria (PWS No. 360816.001) - Other Organic Chemicals

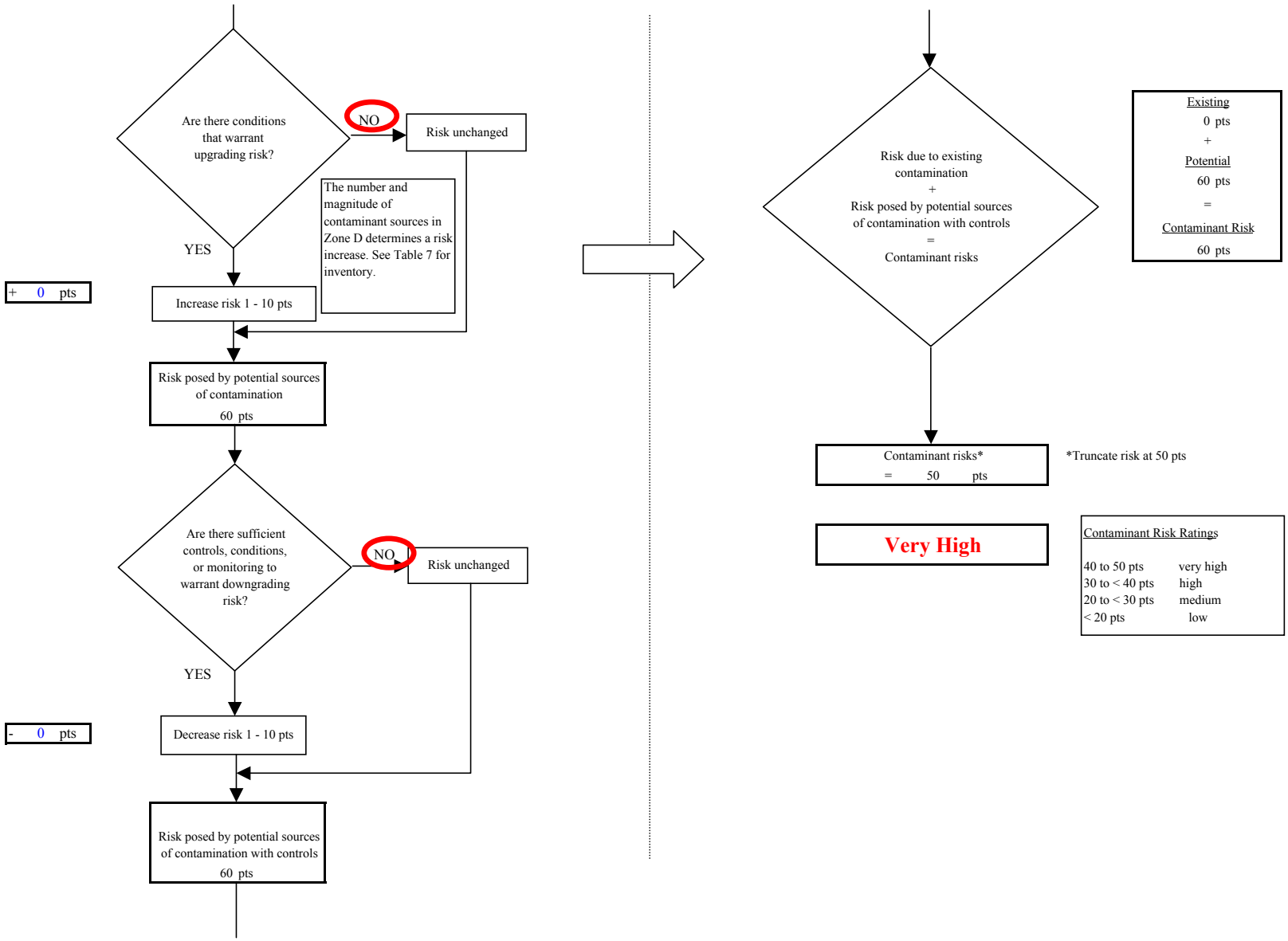


Chart 14. Vulnerability analysis for Rampart Washeteria (PWS No. 360816.001) - Other Organic Chemicals