Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Bay View Trailer Court Drinking Water System, Seward area, Alaska PWSID 241101.001

March 2004

DRINKING WATER PROTECTION PROGRAM REPORT 1475
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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APPENDICES

Source Water Assessment for Bay View Trailer Court Source of Public Drinking Water, Seward area, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The public water system for Bay View Trailer Court is a Class A (community) water system consisting of one well. The well is located off of Nash Road. The wellhead received a susceptibility rating of **Low** and the aquifer received a susceptibility rating of **High**. Combining these two ratings produces a **Medium** rating for the natural susceptibility of the well. Identified potential sources of contaminants for the Bay View Trailer Court include: roads, residential septic systems, residential area and logging areas. These identified potential sources of contamination are considered as sources of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals, inorganic chemicals, synthetic organic chemicals and other organic chemicals. Overall, the public water source for the Bay View Trailer Court received a vulnerability rating of **Medium** for bacteria/viruses and nitrates/nitrites and **Low** for volatile organic chemicals, inorganic chemicals, synthetic organic chemicals and other organic chemical

BAY VIEW TRAILER COURT PUBLIC DRINKING WATER SYSTEM

The Bay View Trailer Court public water system (PWS) is a Class A (community) water system. The system consists of one well located off of Nash Road (See Map 1 of Appendix A). The Bay View Trailer Court is part of the Kenai Peninsula Borough, which is located directly south of the city of Anchorage The borough encompasses 25,600 square miles, of which only 15,700 square miles is land.

The Kenai Peninsula is broken into two distinct geographic areas; the Kenai Mountains and the Kenai Lowlands**.** Kenai and its surrounding communities are located in the Kenai Lowlands. Communities located within the Kenai Lowlands include Sterling, Soldotna, Kenai, Nikiski, Clam Gulch, Ninilchik, and Homer. Communities located in the Kenai Mountains include: Cooper Landing, Moose Pass and Seward.

The Kenai Peninsula area topography varies from about 3,000 feet to 5,000 feet above sea level in the Kenai Mountains, the highest point being about 6,400 feet above sea level. The Kenai Peninsula is dotted with many lakes and small streams, including three large lakes (Kenai Lake, Skilak Lake, and Tustemena Lake) and two substantial rivers (Kenai River, and Kasilof River) (USGS 1915).

The Bay View Trailer Court water system is located within the Kenai Mountains, in the town of Seward Alaska. Seward lies at the mouth of the Resurrection River at the head of Resurrection Bay, in a valley surrounded by steep mountains to the east and west. Drainage is typically off the mountains towards the Bay

The surface geology of the Seward area is predominantly composed of unconsolidated surficial deposits. These deposits are chiefly of glaciofluvial origin. This alluvium comprises an unconfined aquifer. The exposed rock surrounding Seward is predominantly the Jurassic or Cretaceous Valdez Group. The Valdez Group is comprised of weakly metamorphosed metagraywacke, metasiltstone, and argillite (Tysdal and Case 1979).

The Seward area has a central water system, supplied by nine municipal wells. However, many homes and businesses in the area rely on individual wells for their water supply. Sewage is collected and piped to a secondary treatment lagoon. Almost all homes are fully plumbed (ADCED 2002

The well log indicates that the well is. 60 feet deep. Records indicate that the well is properly sealed. A properly installed sanitary seal may provide protection against contaminant from entering the source waters at the casing. The well is not located in a known floodplain. Records indicate that the surface is not sloped away from the wellhead, which may lead to the pooling of water around the wellhead. The well is grouted. Proper grouting provides added protection against contaminants traveling along the well casing and into source waters.

This system operates year round and serves up to 51 residents through 25 service connections.
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BAY VIEW TRAILER COURT 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 Bay View Trailer Court. 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 2 years time-of-travel
C	Less than 5 years time-of-travel
D	Less than 10 years time-of-travel

The DWPA for the Bay View Trailer Court was determined using an analytical calculation and includes Zone A, B, C, and D (See Map 1 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 Bay View Trailer Court 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 1 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, and volatile organic chemicals.

VULNERABILITY OF BAY VIEW TRAILER COURT 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 eight 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. Lastly, Chart 4 contains the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 8 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites and volatile 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

Bay View Trailer Court well is completed in a confined aquifer setting. The well log indicates that the well is 60 feet deep and has artesian characteristics. The well is screened from 56-60 feet bgs. A confining layer is present from 44-51 feet silt and 51-54 brown shale. This layer may provide a protective barrier from the movement of contaminants in the subsurface. However, well logs in the area indicate that the confining layer disappears as it approaches the mountains. The lack of a confining layer along the mountains provides a path for potential contaminants to enter the confined aquifer.

Table 2 shows the Susceptibility scores and ratings for the Bay View Trailer Court .

Table 2. Susceptibility

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	17	High
Natural Susceptibility	23	Medium

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	25	Low
Nitrates and/or Nitrites	26	Low
Volatile Organic Chemicals	12	Low
Heavy Metals, Cyanide, and Other Inorganic Chemicals	12	Low
Synthetic Organic Chemicals	12	Low
Other Organic Chemicals	12	Low

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 three categories of drinking water contaminants. Note: scores are rounded off to the nearest five.

Table 4. Overall Vulnerability

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

Bacteria and Viruses

Roads, residential area, residential septic systems represent the greatest risk for bacteria and viruses to this drinkingwater well.

Only a small amount of bacteria and viruses are required to endanger public health. Coli forms are found naturally in the environment and although they aren't necessarily a health threat, it is an indicator of other potentially harmful bacteria in the water, more specifically, fecal coli forms and E. coli which only come from human and animal fecal waste (EPA, 2002). Harmful bacteria can cause diarrhea, cramps, nausea, headaches, or other symptoms (EPA, 2002). Sampling has not detected bacteria or viruses within source waters.

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 medium**.**

Nitrates and Nitrites

Roads, residential area and residential septic systems represent the greatest risk to nitrates and nitrites for this source of public drinking water.

Nitrates are very mobile, moving at approximately the same rate as water. The sampling history for the Bay View Trailer Court well indicates that nitrate concentrations have ranged from 0.14 mg/l to 0.16 mg/l. The reported nitrate concentrations suggest that the nitrate concentrations are attributed to natural sources. 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. The most recent nitrate level detected was 2% (0.16 mg/L) of the Maximum Contaminant Level (MCL) of 10 mg/L. The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful health effects. Though existing nitrate contamination was detected at the site, recent data indicates that nitrate concentrations are safe with respect to human health.

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 medium.

Volatile Organic Chemicals

Roads, residential septic systems, residential areas, logging areas represent the greatest identified risk for volatile organic chemical contamination to the well.

Many residents in the area typically heat their homes with various types of on-site fuel sources, including propane and heating oil stored in aboveground or underground storage tanks. Although this report does not address heating oil tanks (unless their location is known), they can pose a risk of volatile organic chemical contamination to drinking water sources. The most common causes of fuel leaks of these heating oil systems are overfilling the tank, ruptured fuel lines, leaking storage tanks, damaged or faulty valves and vandalism. Secondary containment around the tank and regular system maintenance can help prevent many of these harmful fuel leaks and help protect the drinking water supply.

The sampling history indicates that Volatile Organic Chemicals have not been detected

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 low.

Heavy Metals, Cyanide, and Other Inorganic Chemicals

Roads, residential areas, residential septic systems and logging represent the greatest risk for inorganic chemicals to the well.

Inorganic chemicals have not detected in source water.

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 low.

Synthetic Organic Chemicals

Residential area, residential septic systems, represent the greatest risk for synthetic organic chemicals to the well.

Synthetic organic chemicals have not been detected in source water. The system currently has an SOC waiver and is not required to sample.

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

Other Organic Chemicals

Residential area, residential septic systems, represent the greatest risk for other organic chemicals to the well

Other organic chemicals have not been detected. The system currently has an OOC waiver and is not required to sample.

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

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ACKNOWLEDGMENT

Source Water Assessments in the Seward area were jointly prepared by ADEC-Drinking Water Protection Program and Ecology and Environmnet (E & E Inc.). The Drinking Water Protection Program would like to thank Ecology and Environmnet (E & E Inc.) for their efforts in researching the area.

APPENDIX A

Bay View Trailer Court
Drinking Water Protection Area Location Map
(Map 1)

Map 1-Bay View Trailer Court: Drinking Water Protection Area

PWSID: 241101.001

Alaska Department of Environmental Conservation

Alaska Drinking Water Protection Program

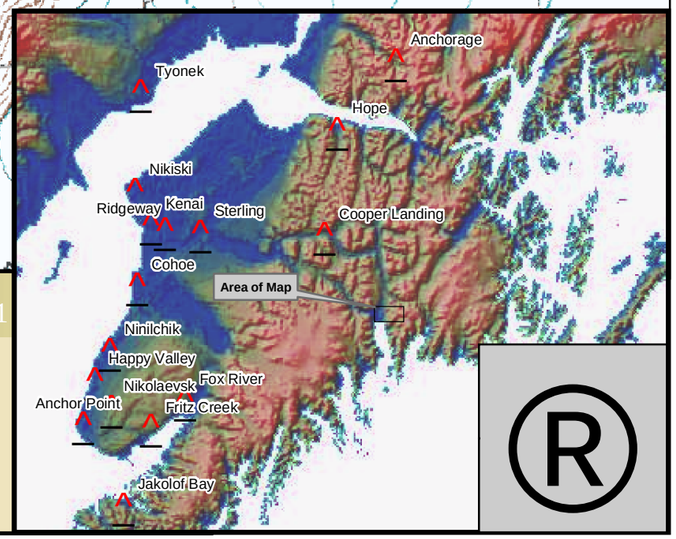
Feet
0 1,300 2,600

1:31,494

Data Sources:
Kenai Borough: Roads and parcels
USGS-63,360 topographic map and hillshade
Potential Sources of Contamination: ADEC

Legend

- Class A Public Water System
- Roads
- Zone A Protection Area
- Zone B Protection Area



APPENDIX B

Contaminant Source Inventory and Risk Ranking for Bay View Trailer Court (Tables 1-7)

Table 1

Contaminant Source Inventory for
Bay View Trailer Court

PWSID 241101.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Logging	E02	E02-1	A	2	
Residential Areas	R01	R01-1	A	2	15 residential acres
Septic systems (serves one single-family home)	R02	R02-1-9	A	2	9 residential septic systems in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	2	4 roads in Zone A. Assumed to be paved.
Logging	E02	E02-2	B	2	

Table 2

Contaminant Source Inventory and Risk Ranking for Bay View Trailer Court Sources of Bacteria and Viruses

PWSID 241101.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Residential Areas	R01	R01-1	A	Low	2	15 residential acres
Septic systems (serves one single-family home)	R02	R02-1-9	A	Low	2	9 residential septic systems in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	4 roads in Zone A. Assumed to be paved.

Table 3

Contaminant Source Inventory and Risk Ranking for Bay View Trailer Court Sources of Nitrates/Nitrites

PWSID 241101.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Logging	E02	E02-1	A	Low	2	
Residential Areas	R01	R01-1	A	Low	2	15 residential acres
Septic systems (serves one single-family home)	R02	R02-1-9	A	Low	2	9 residential septic systems in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	4 roads in Zone A. Assumed to be paved.
Logging	E02	E02-2	B	Low	2	

Table 4

Contaminant Source Inventory and Risk Ranking for Bay View Trailer Court Sources of Volatile Organic Chemicals

PWSID 241101.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Logging	E02	E02-1	A	Low	2	
Residential Areas	R01	R01-1	A	Low	2	15 residential acres
Septic systems (serves one single-family home)	R02	R02-1-9	A	Low	2	9 residential septic systems in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	4 roads in Zone A. Assumed to be paved.
Logging	E02	E02-2	B	Low	2	

Table 5

Contaminant Source Inventory and Risk Ranking for Bay View Trailer Court Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 241101.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Logging	E02	E02-1	A	Low	2	
Residential Areas	R01	R01-1	A	Low	2	15 residential acres
Septic systems (serves one single-family home)	R02	R02-1-9	A	Low	2	9 residential septic systems in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	4 roads in Zone A. Assumed to be paved.
Logging	E02	E02-2	B	Low	2	

Table 6

Contaminant Source Inventory and Risk Ranking for Bay View Trailer Court Sources of Synthetic Organic Chemicals

PWSID 241101.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Residential Areas	R01	R01-1	A	Low	2	15 residential acres
Septic systems (serves one single-family home)	R02	R02-1-9	A	Low	2	9 residential septic systems in Zone A

Table 7

Contaminant Source Inventory and Risk Ranking for Bay View Trailer Court Sources of Other Organic Chemicals

PWSID 241101.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Residential Areas	R01	R01-1	A	Low	2	15 residential acres
Septic systems (serves one single-family home)	R02	R02-1-9	A	Low	2	9 residential septic systems in Zone A
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	4 roads in Zone A. Assumed to be paved.

APPENDIX C

Bay View Trailer Court
Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Map 2)

E02-2

Area of Inset

E02-1

Well

Zone A has:
9 residential septic systems (R02)
15 residential acres (R02)
4 roads (X20)

Map 2-Bay View Trailer Court: Potential and Existing Sources of Contamination

Alaska Department of Environmental Conservation

0 2,130 4,260 Feet

1:26,466

Data Sources:
Roads and parcels: Kenai Borough
Aerial Photo: USGS and Microsoft Terraserver
Lakes and Rivers: USGS 63k
Potential Sources of Contamination: ADEC

Aerial photo taken 6/26/97

Legend

- Class A Public Water System
- Zone A Protection Area
- Zone B Protection Area
- Roads
- Septic systems (R02)
- Logging (E02)
- Residential Area (R02)
- Parcels_address

APPENDIX D

Vulnerability Analysis for Bay View Trailer Court Public Drinking Water Source

(Charts 1-14)

Chart 1. Susceptibility of the wellhead - Bay View Trailer Court PWSID 241101.001

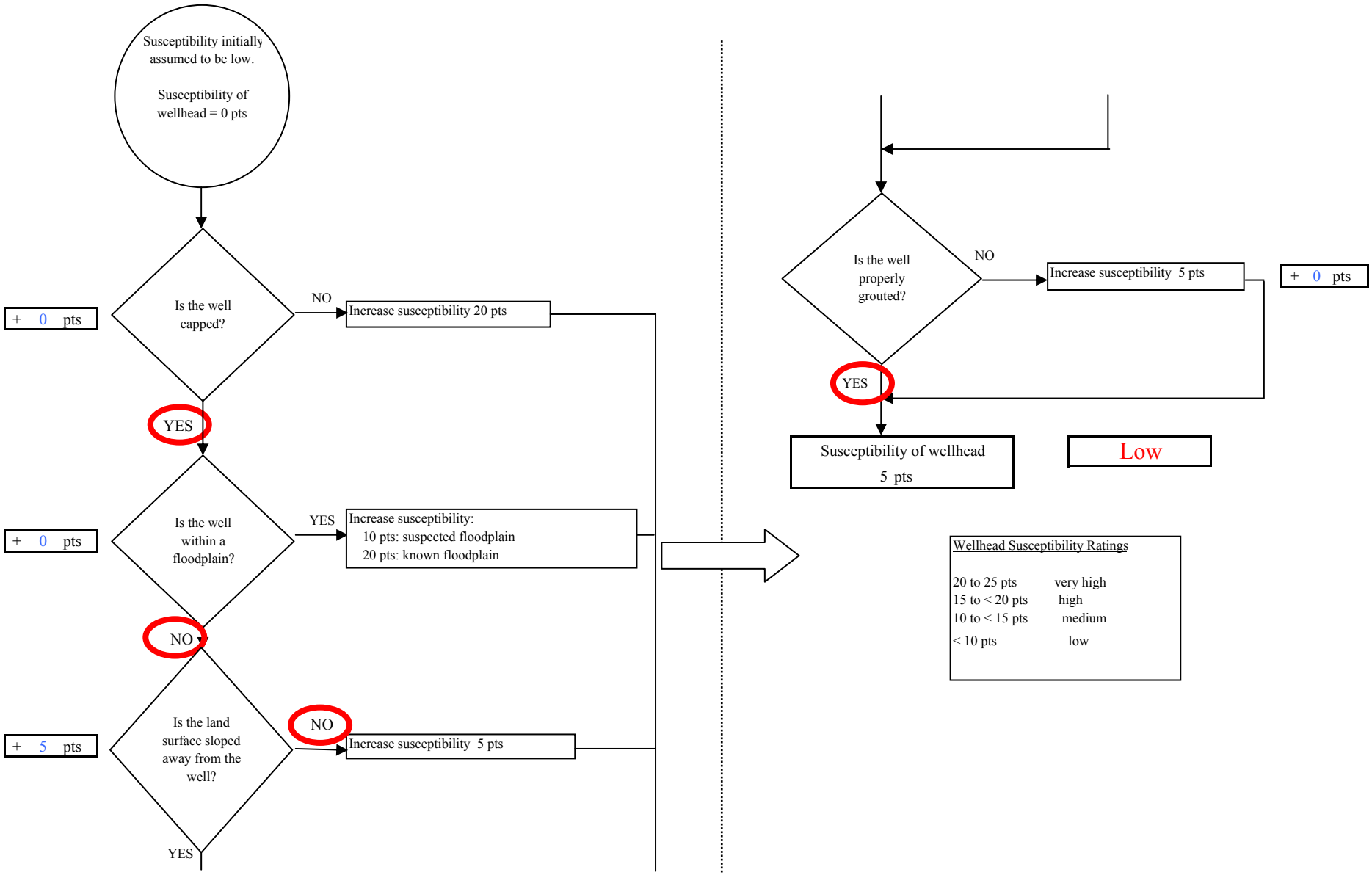


Chart 2. Susceptibility of the aquifer - Bay View Trailer Court PWSID 241101.001

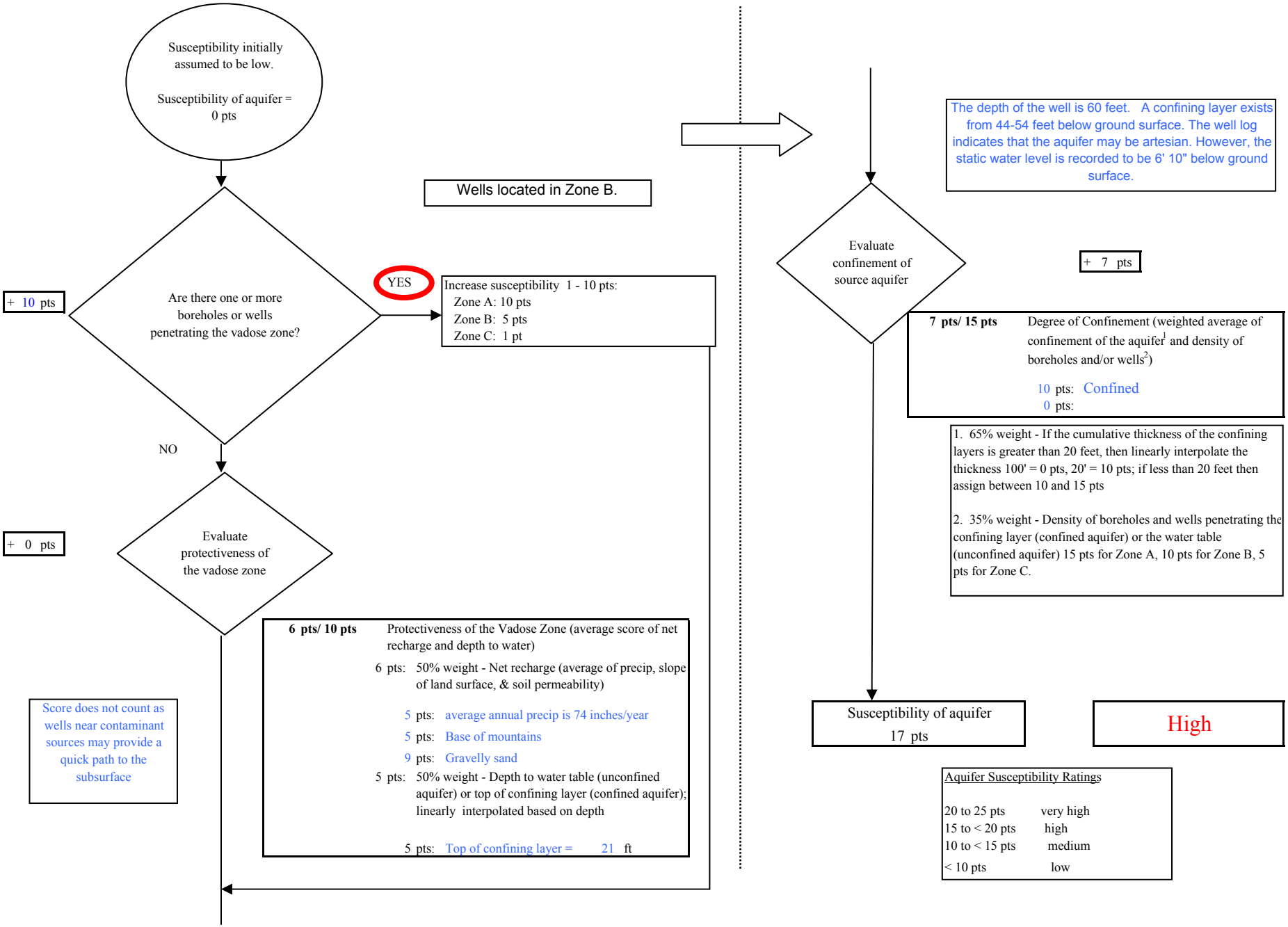
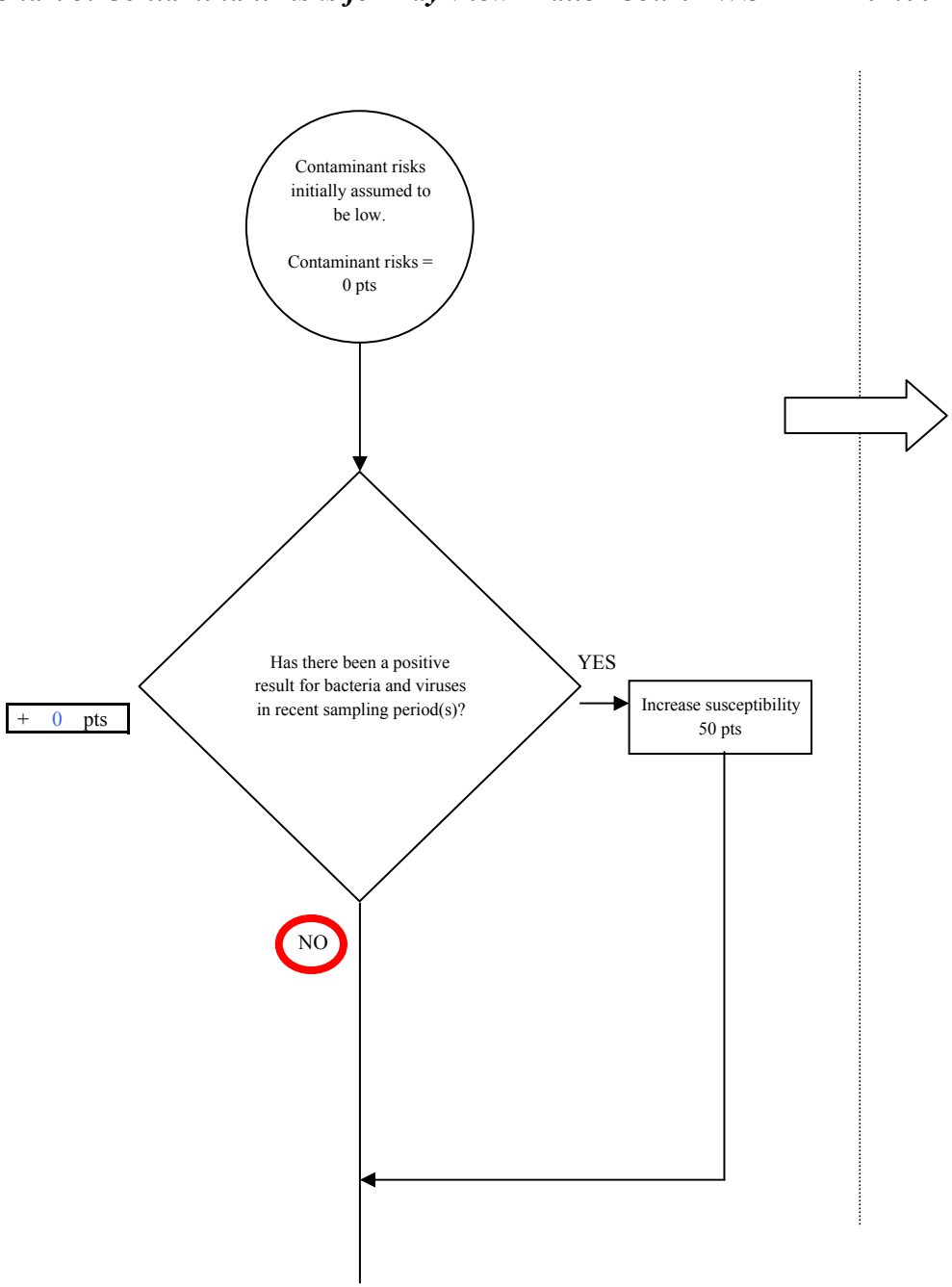
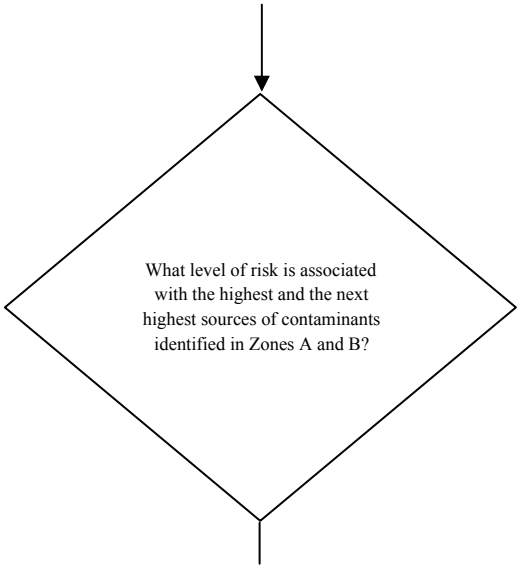


Chart 3. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Bacteria & Viruses





+ 20 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)	0	0	0
Medium(s)	0	0	0
Low(s)	11	0	11

	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.

Chart 3. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Bacteria & Viruses

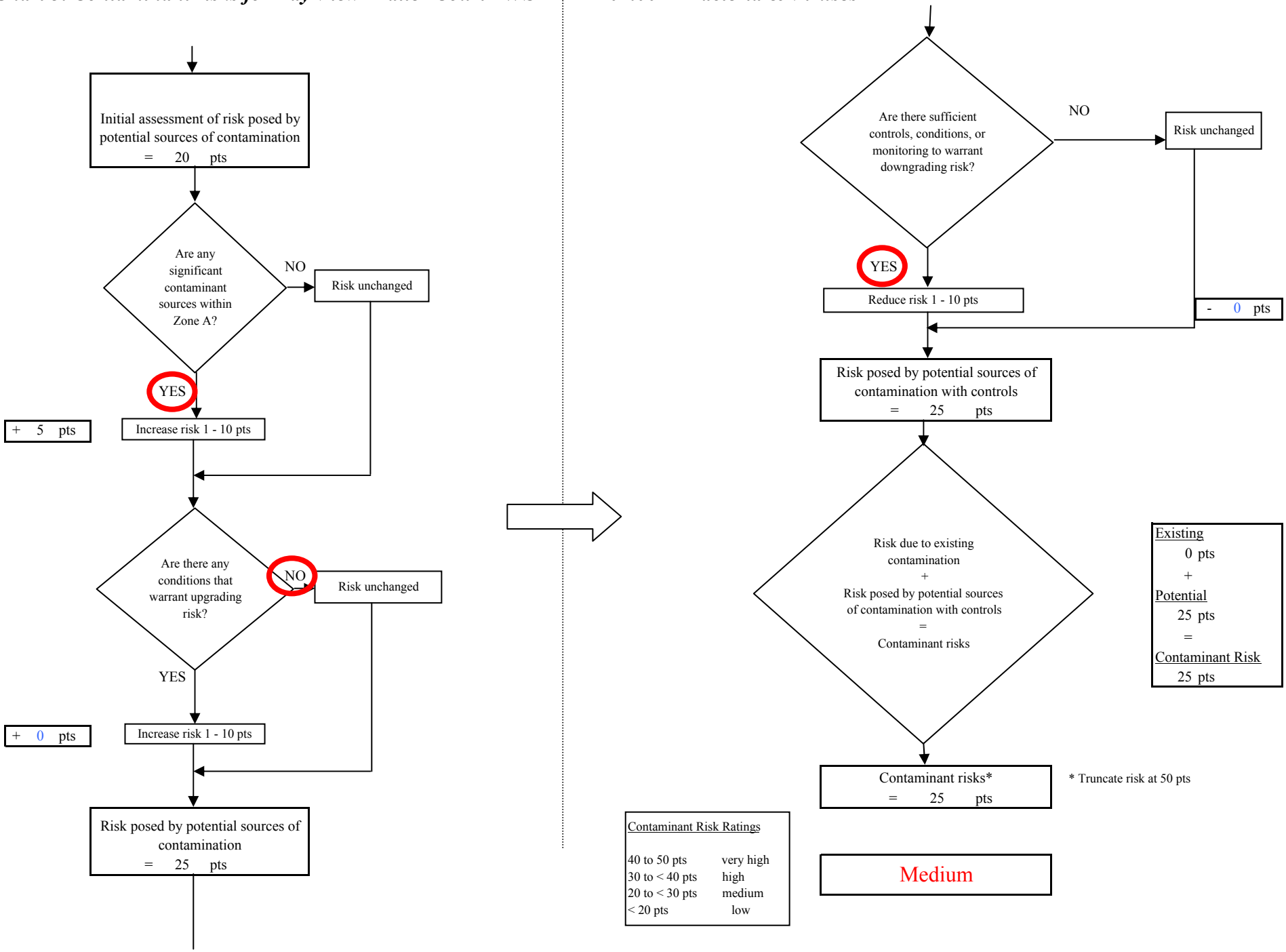


Chart 4. Vulnerability analysis for Bay View Trailer Court PWSID 241101.001 - Bacteria & Viruses

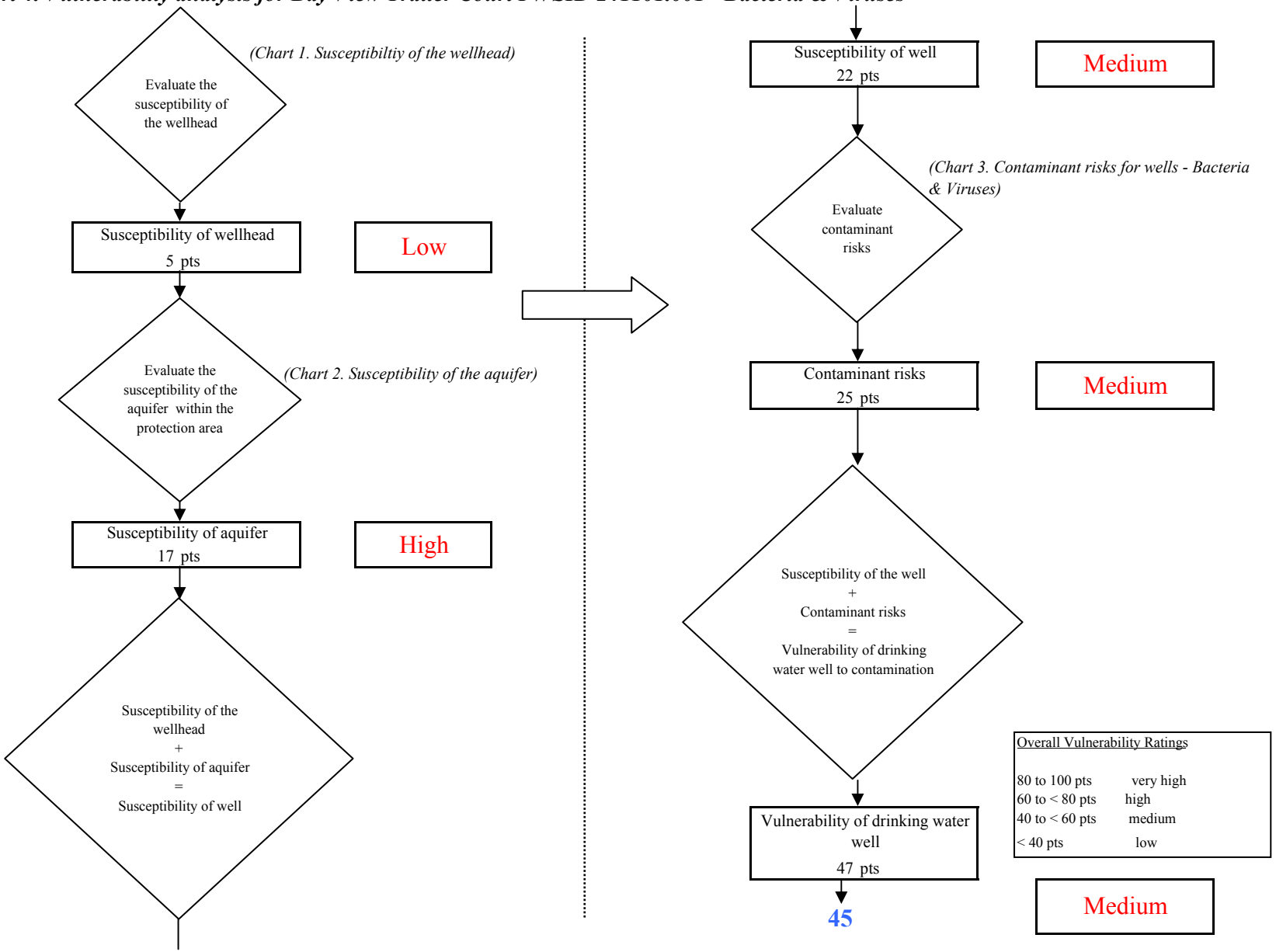


Chart 5. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Nitrates and Nitrites

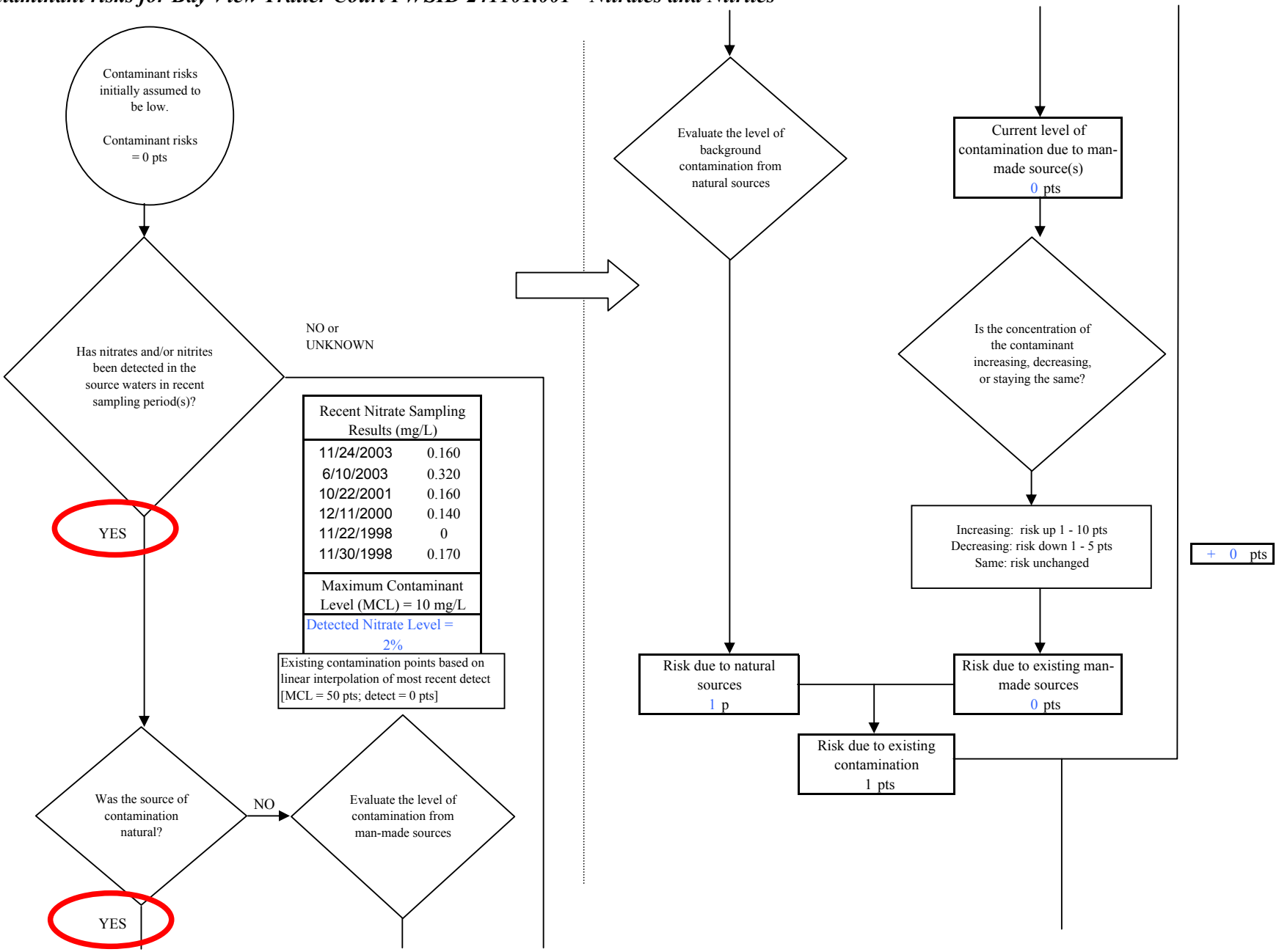


Chart 5. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Nitrates and Nitrites

+ 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)	12	1	13

	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

+ 5 pts

Chart 5. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Nitrates and Nitrites

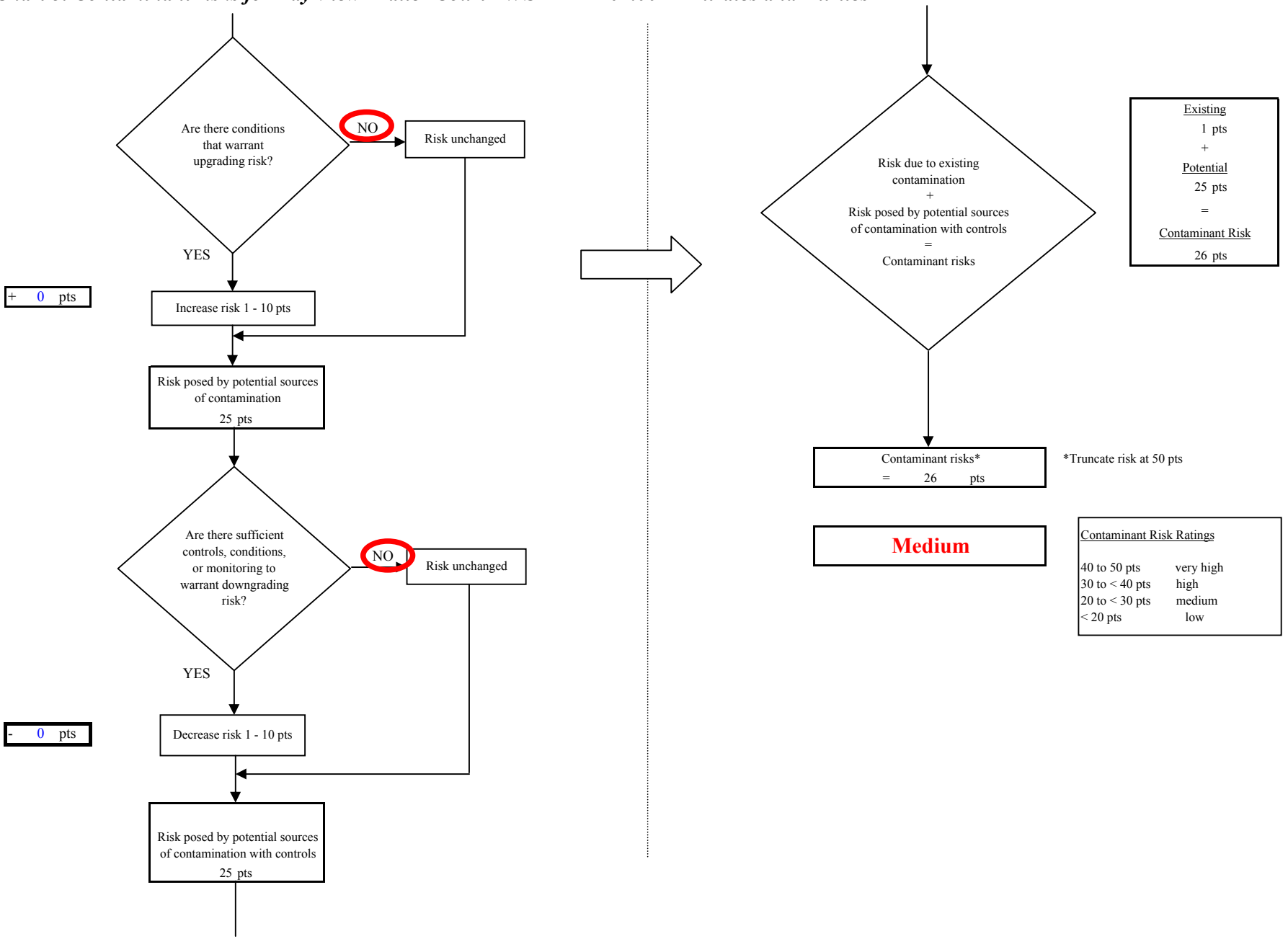


Chart 6. Vulnerability analysis for Bay View Trailer Court PWSID 241101.001 - Nitrates and Nitrites

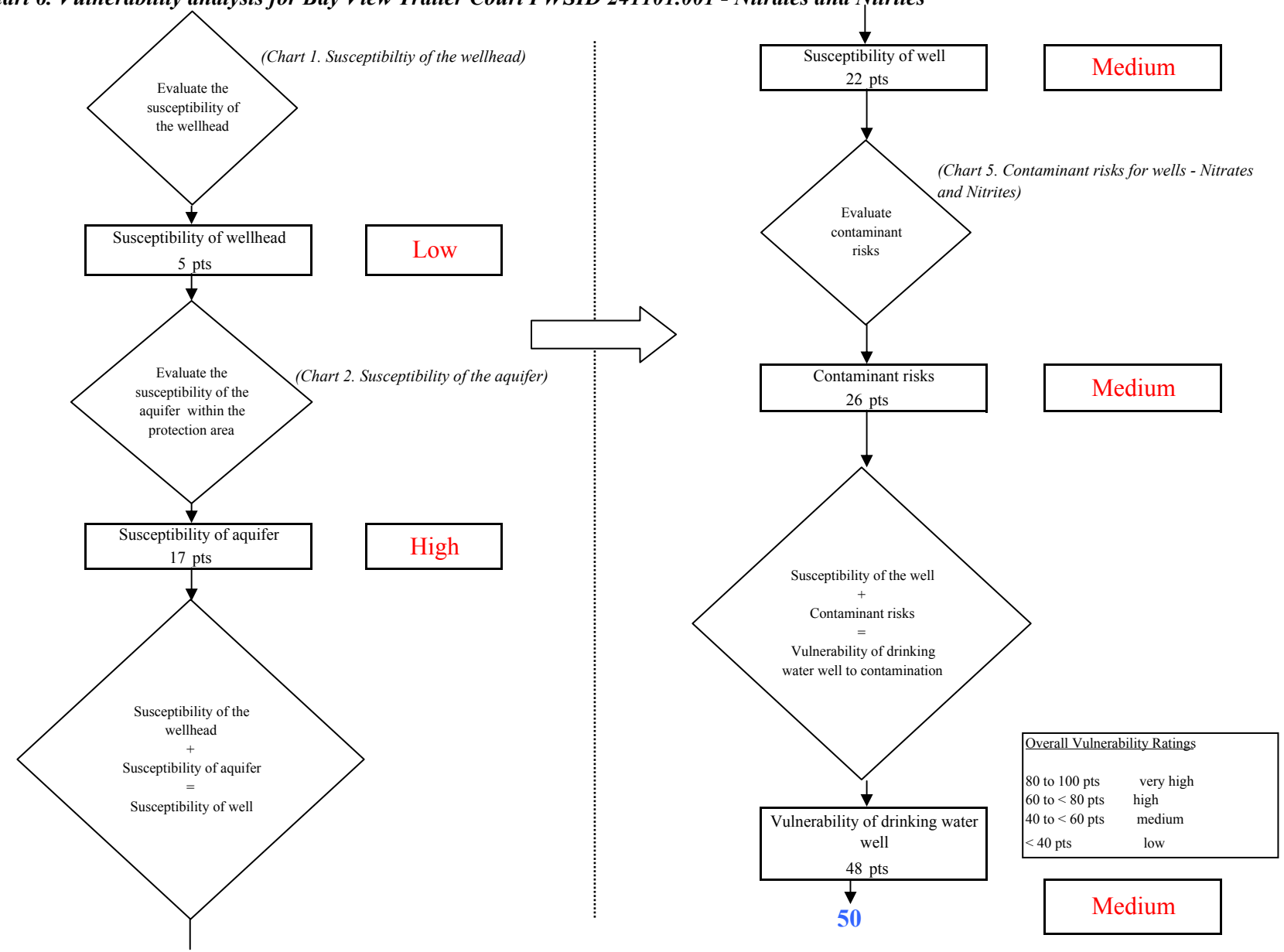


Chart 7. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Volatile Organic Chemicals

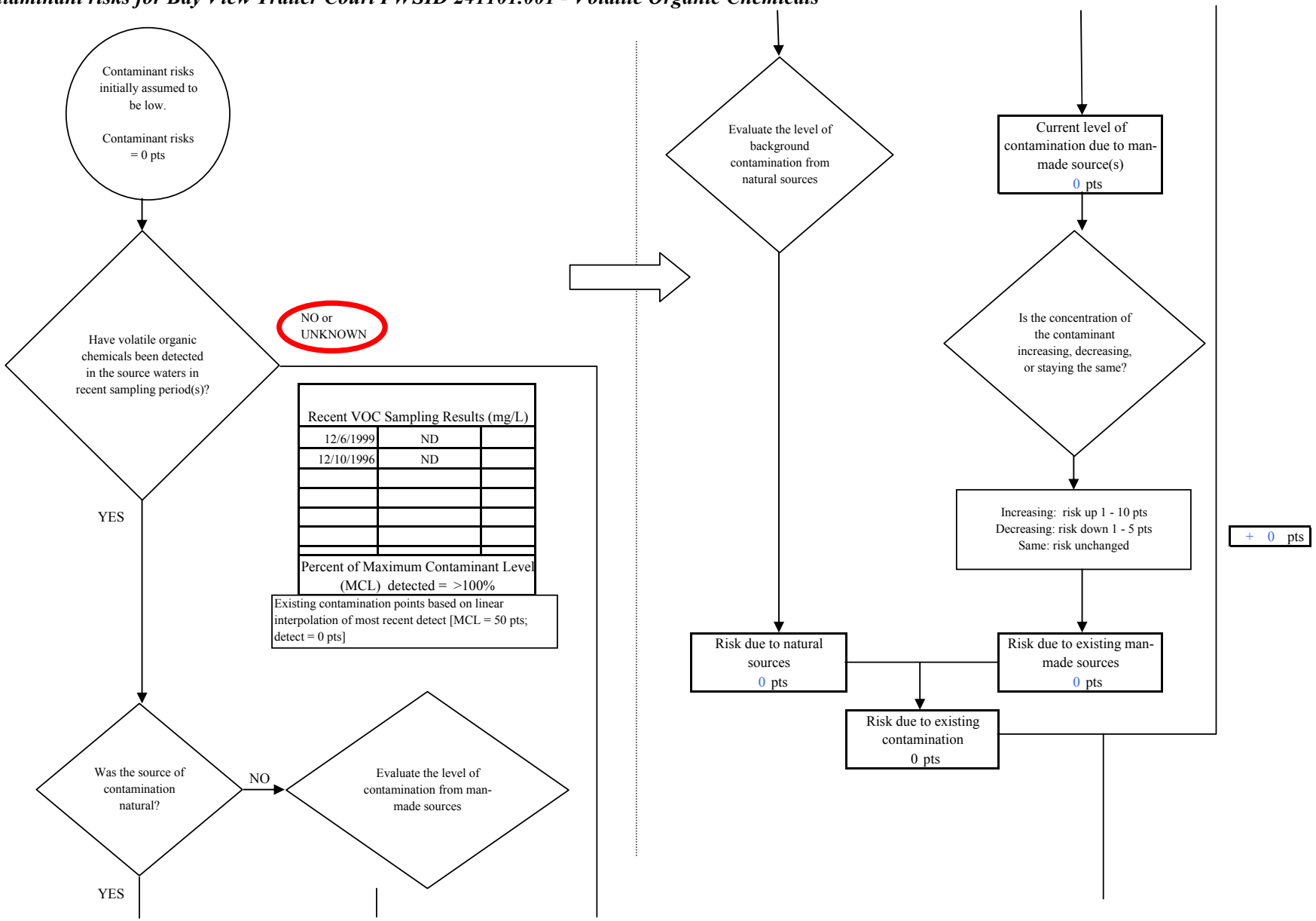


Chart 7. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Volatile Organic Chemicals

+ 10 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)	4	1	5

	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 10

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 = 10 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

Chart 7. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Volatile Organic Chemicals

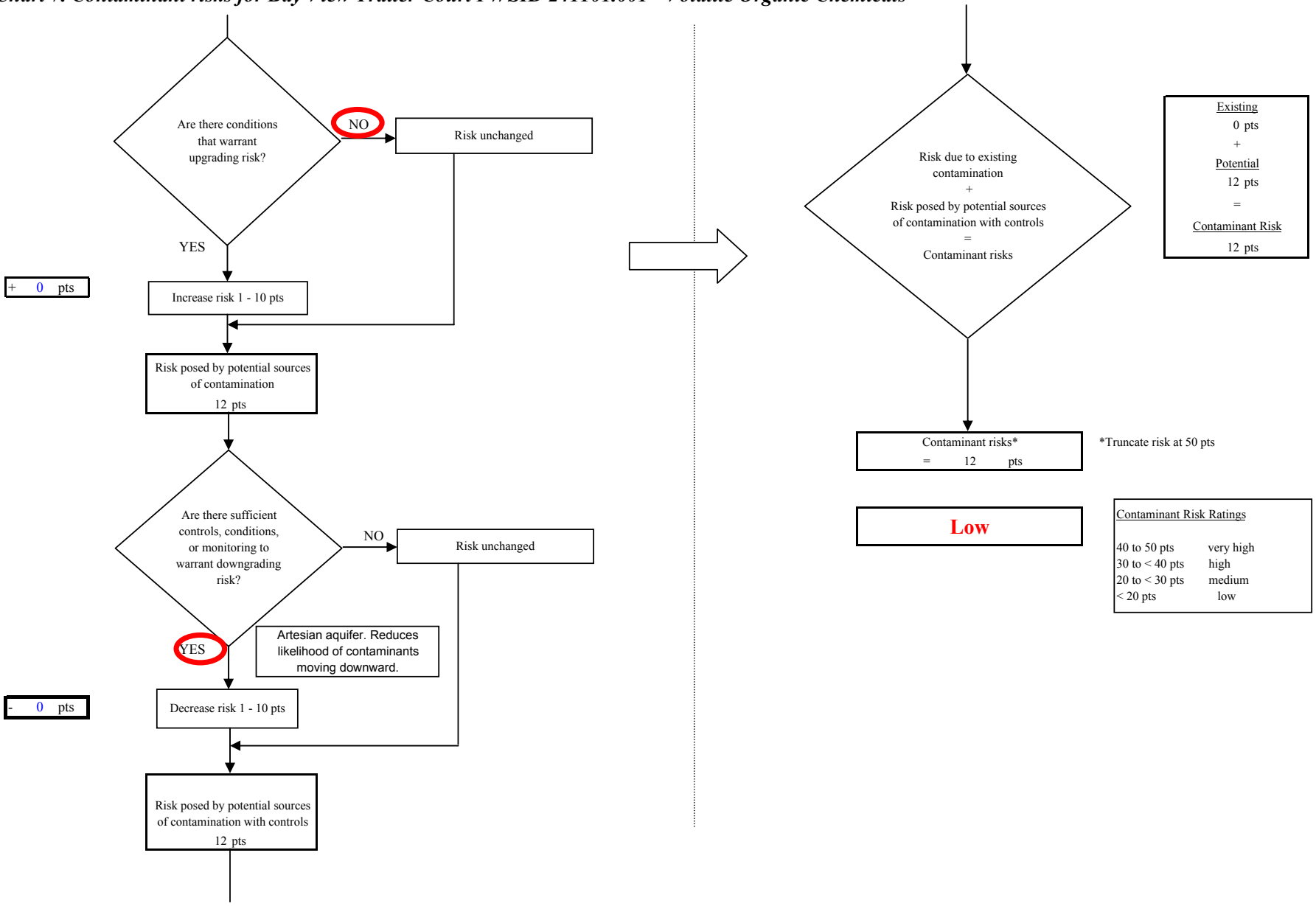


Chart 8. Vulnerability analysis for Bay View Trailer Court PWSID 241101.001 - Volatile Organic Chemicals

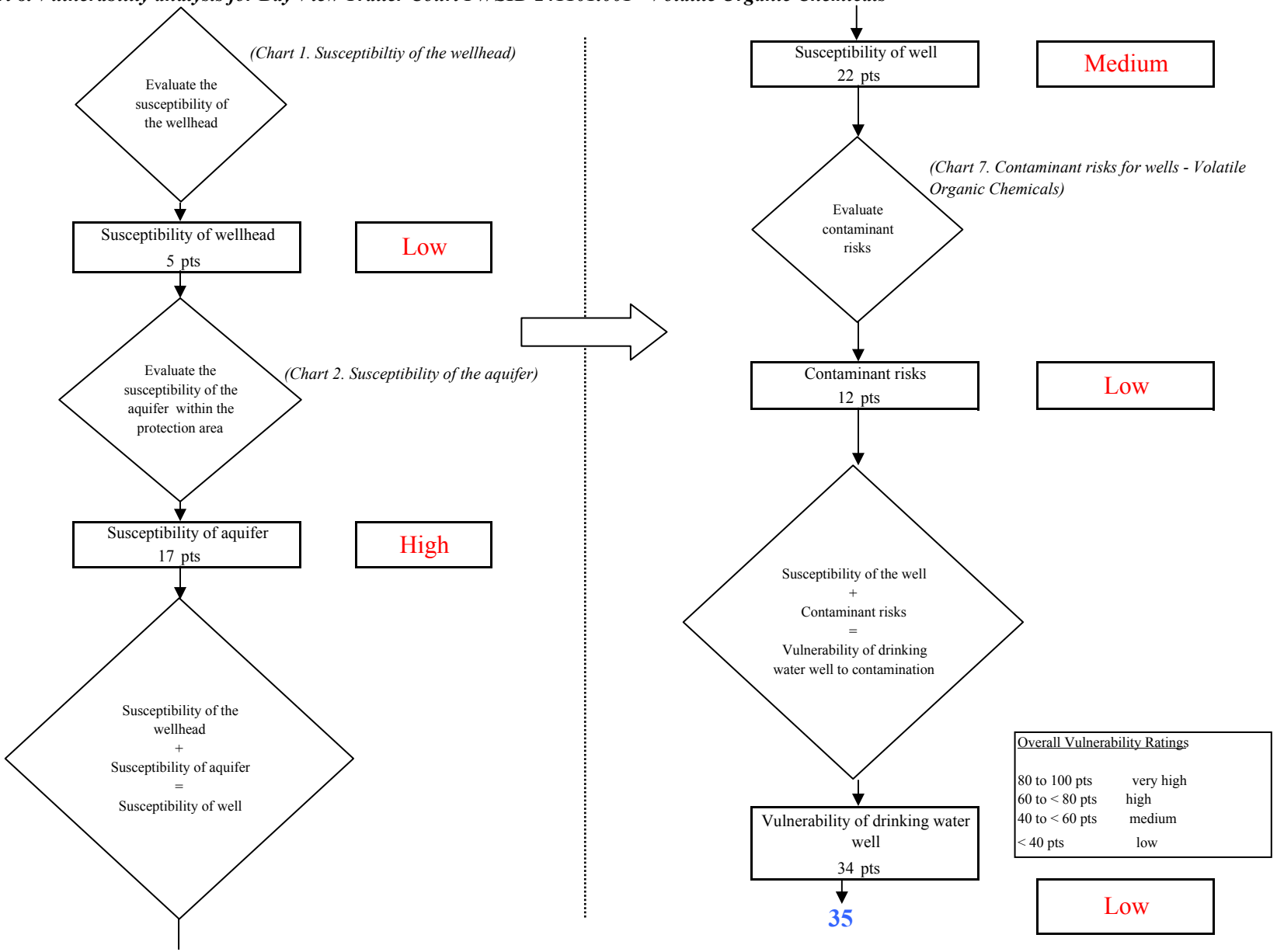


Chart 9. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Heavy Metals, Cyanide and Other Inorganic Chemicals

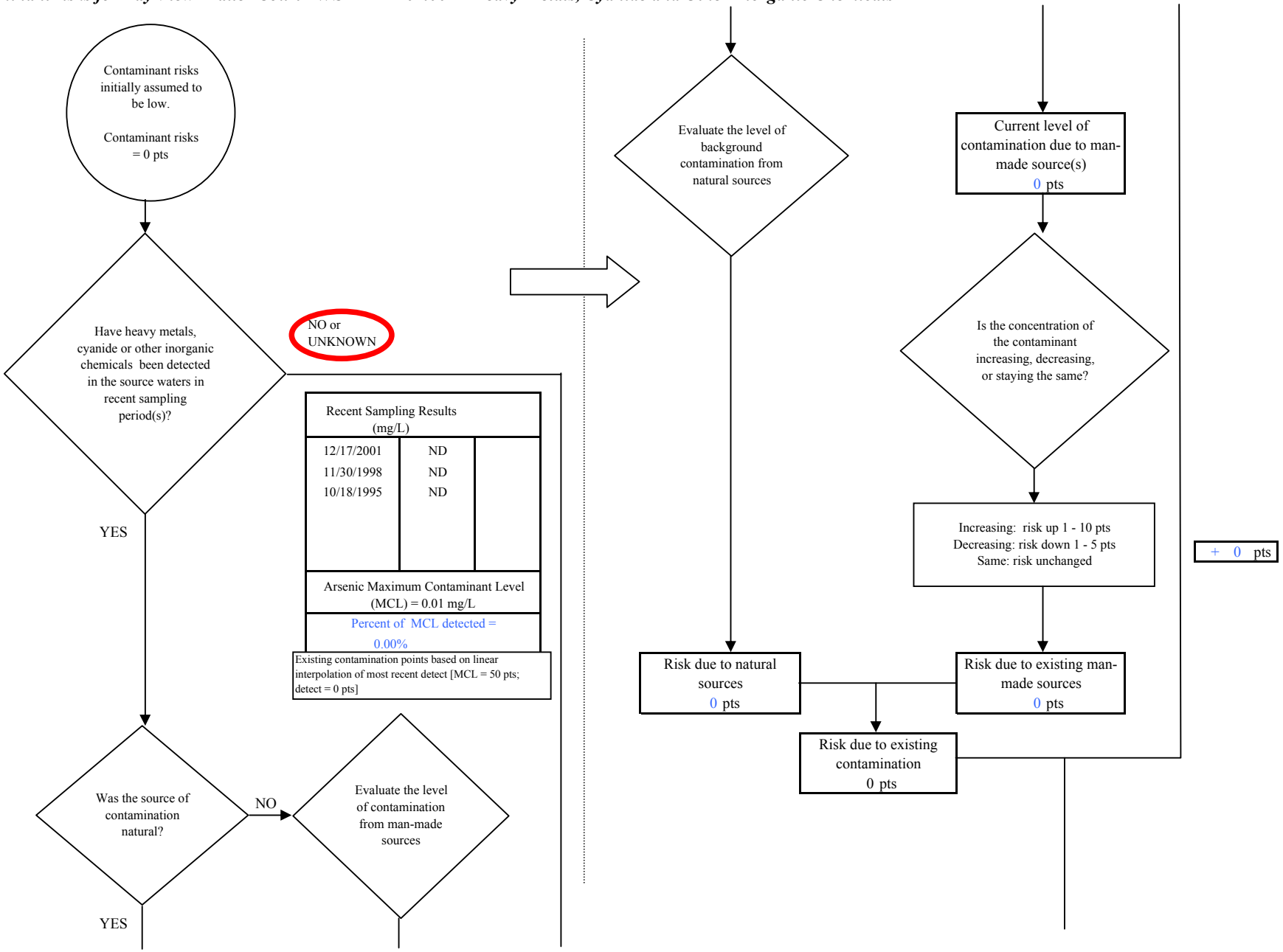
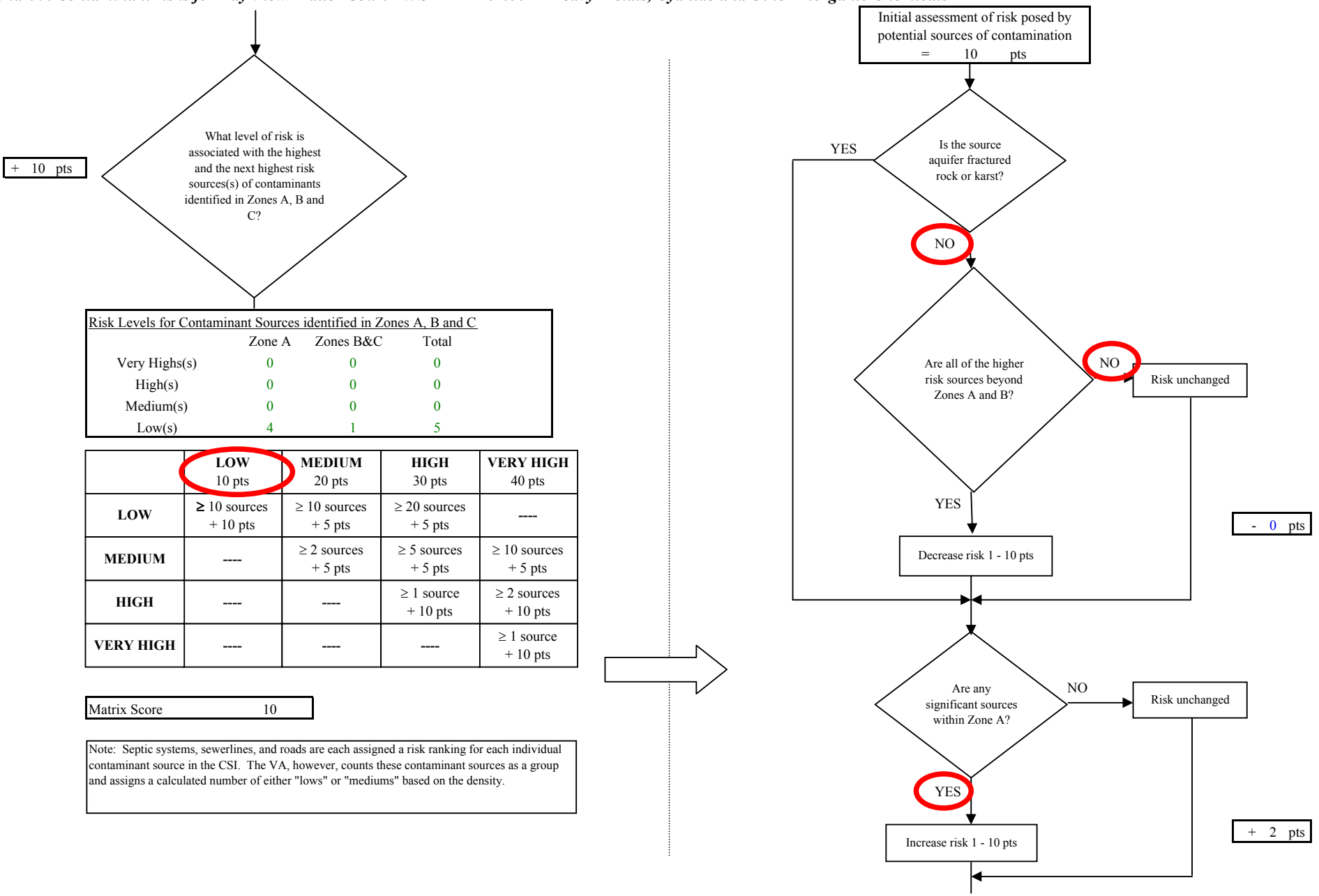


Chart 9. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Heavy Metals, Cyanide and Other Inorganic Chemicals



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)	4	1	5

	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 10

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 Bay View Trailer Court PWSID 241101.001 - Heavy Metals, Cyanide and Other Inorganic Chemicals

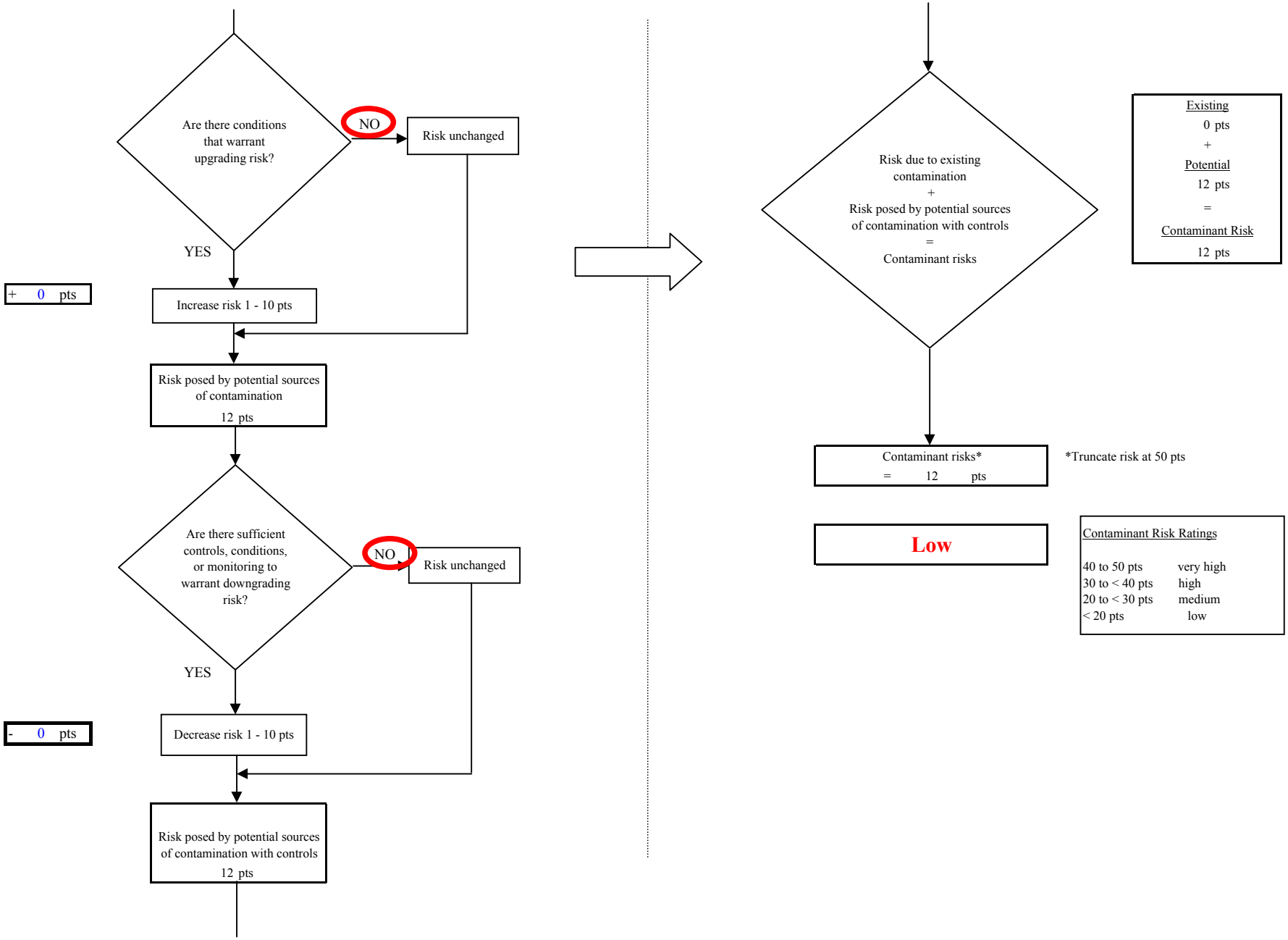


Chart 10. Vulnerability analysis for Bay View Trailer Court PWSID 241101.001 - Heavy Metals, Cyanide and Other Inorganic Chemicals

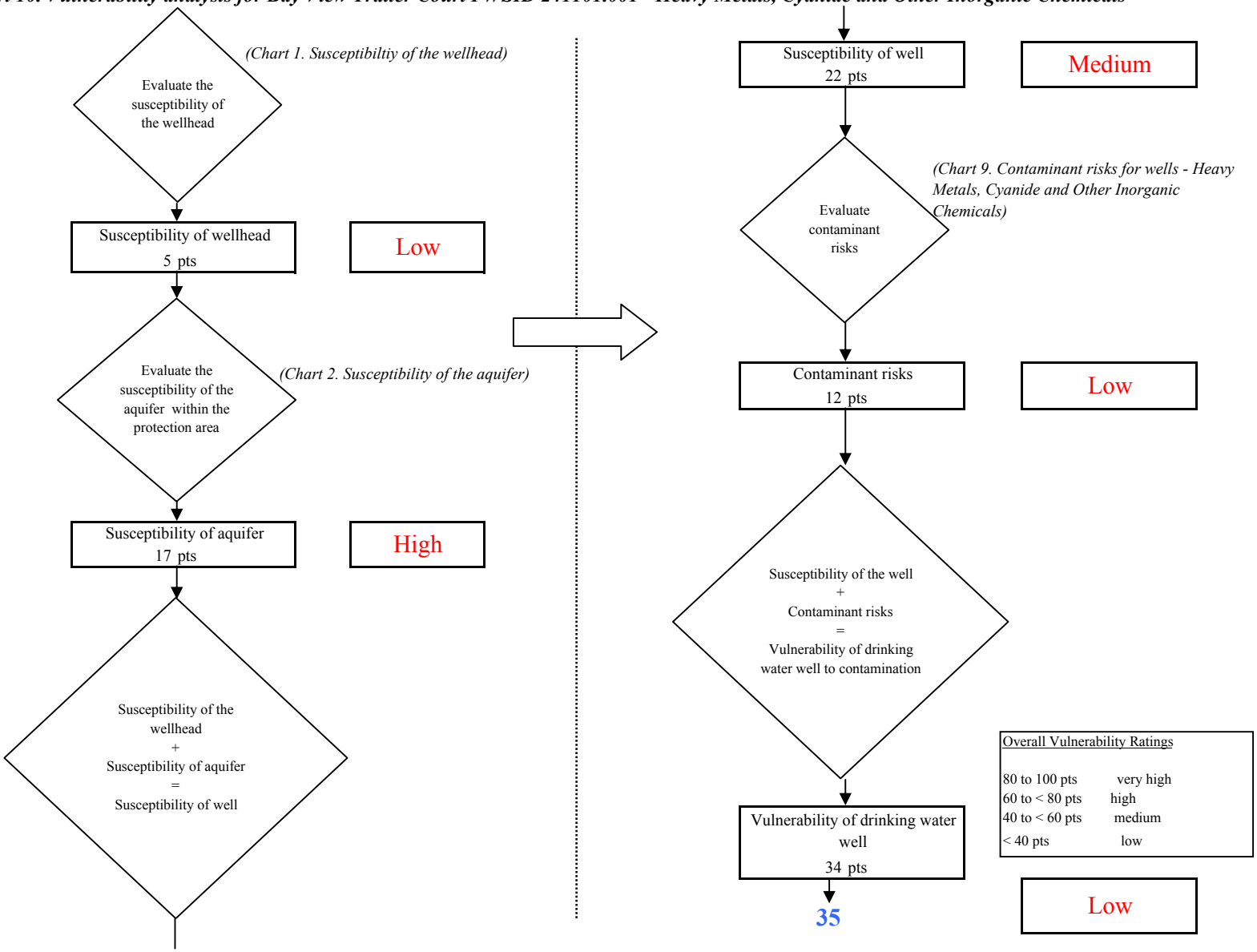


Chart 11. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Synthetic Organic Chemicals

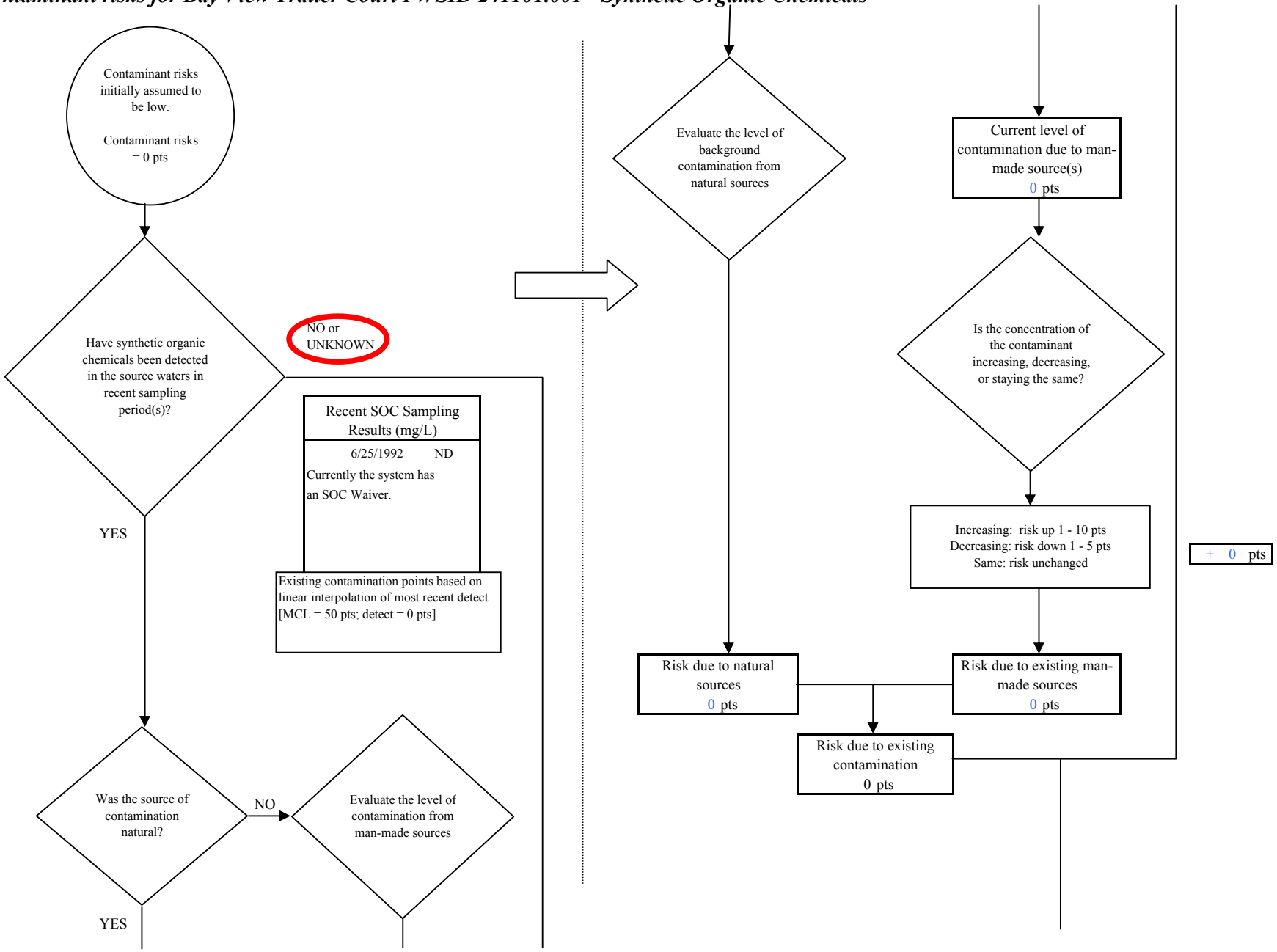


Chart 11. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Synthetic Organic Chemicals

+ 10 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)	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 10

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 = 10 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

Chart 11. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Synthetic Organic Chemicals

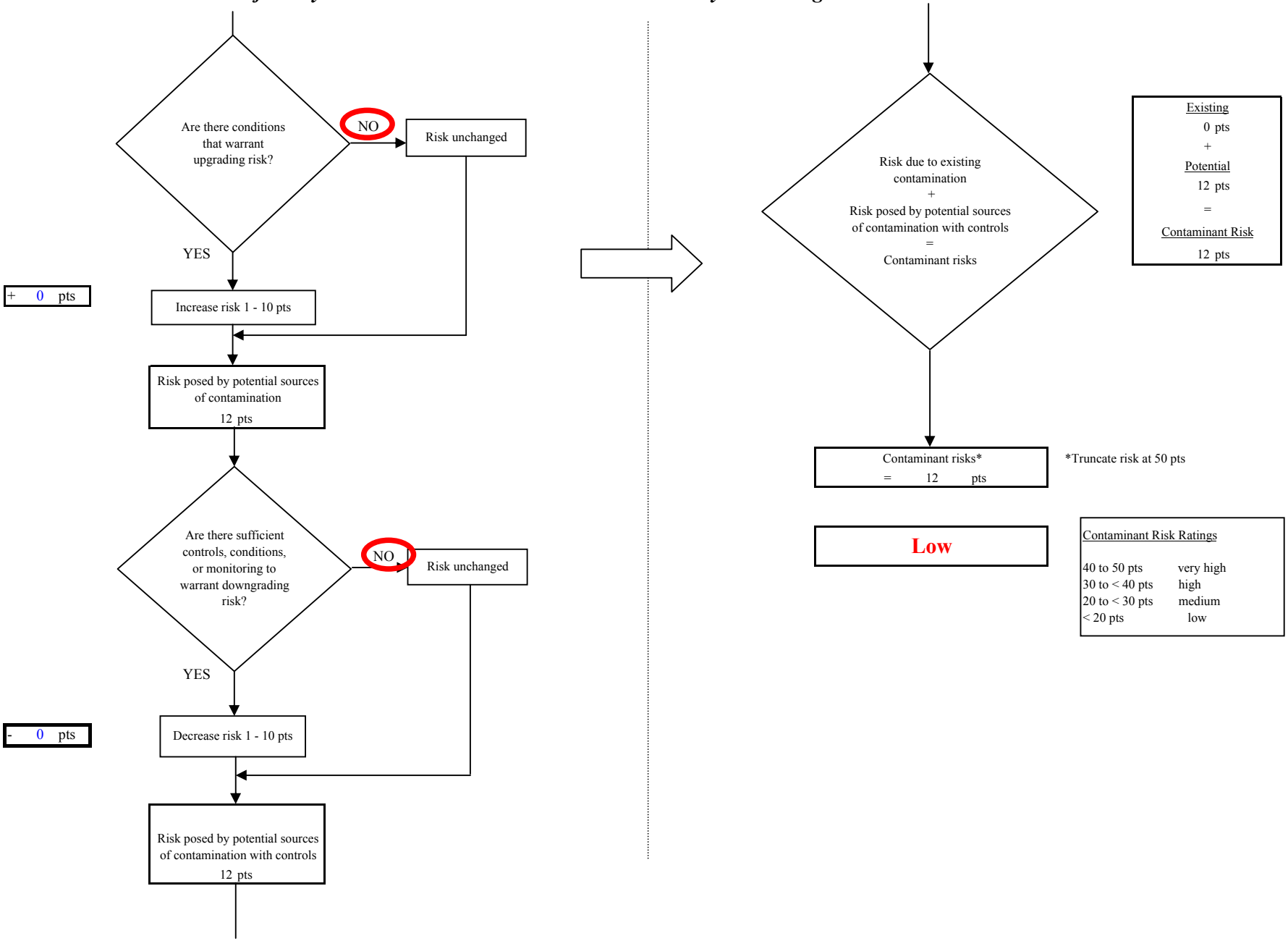


Chart 12. Vulnerability analysis for Bay View Trailer Court PWSID 241101.001 - Synthetic Organic Chemicals

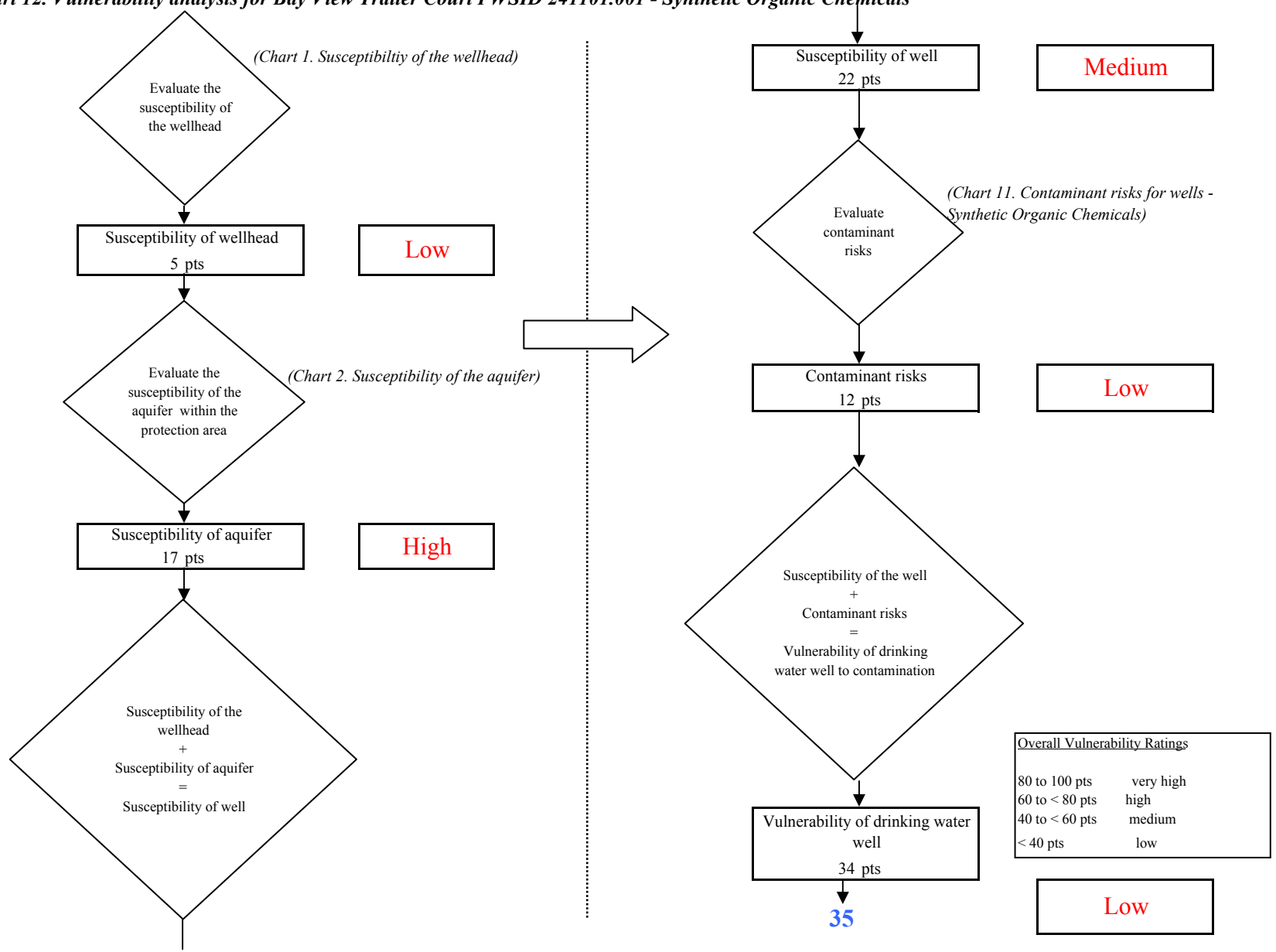


Chart 13. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Other Organic Chemicals

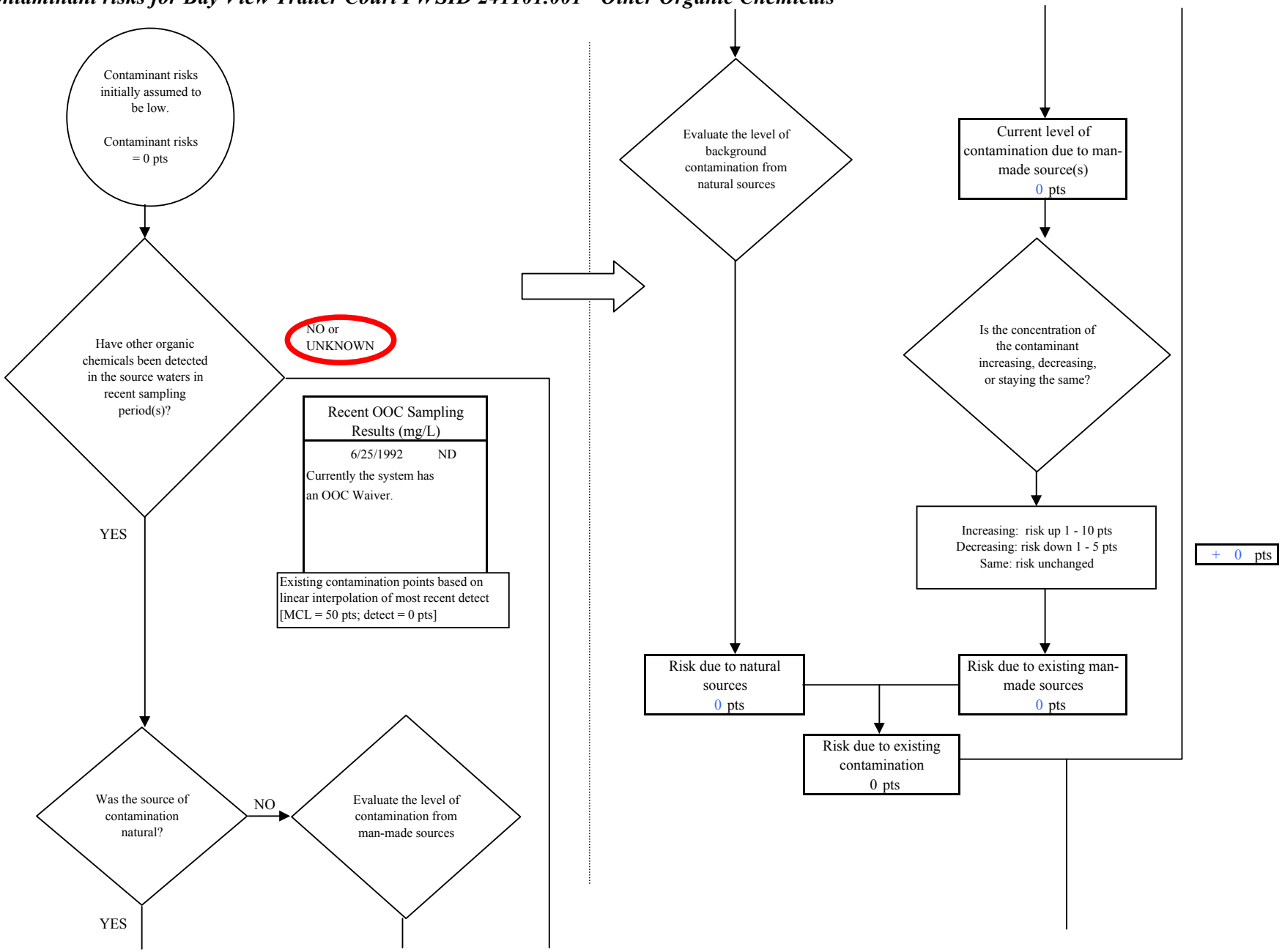


Chart 13. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Other Organic Chemicals

+ 10 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)	3	0	3

	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 10

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 = 10 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

Chart 13. Contaminant risks for Bay View Trailer Court PWSID 241101.001 - Other Organic Chemicals

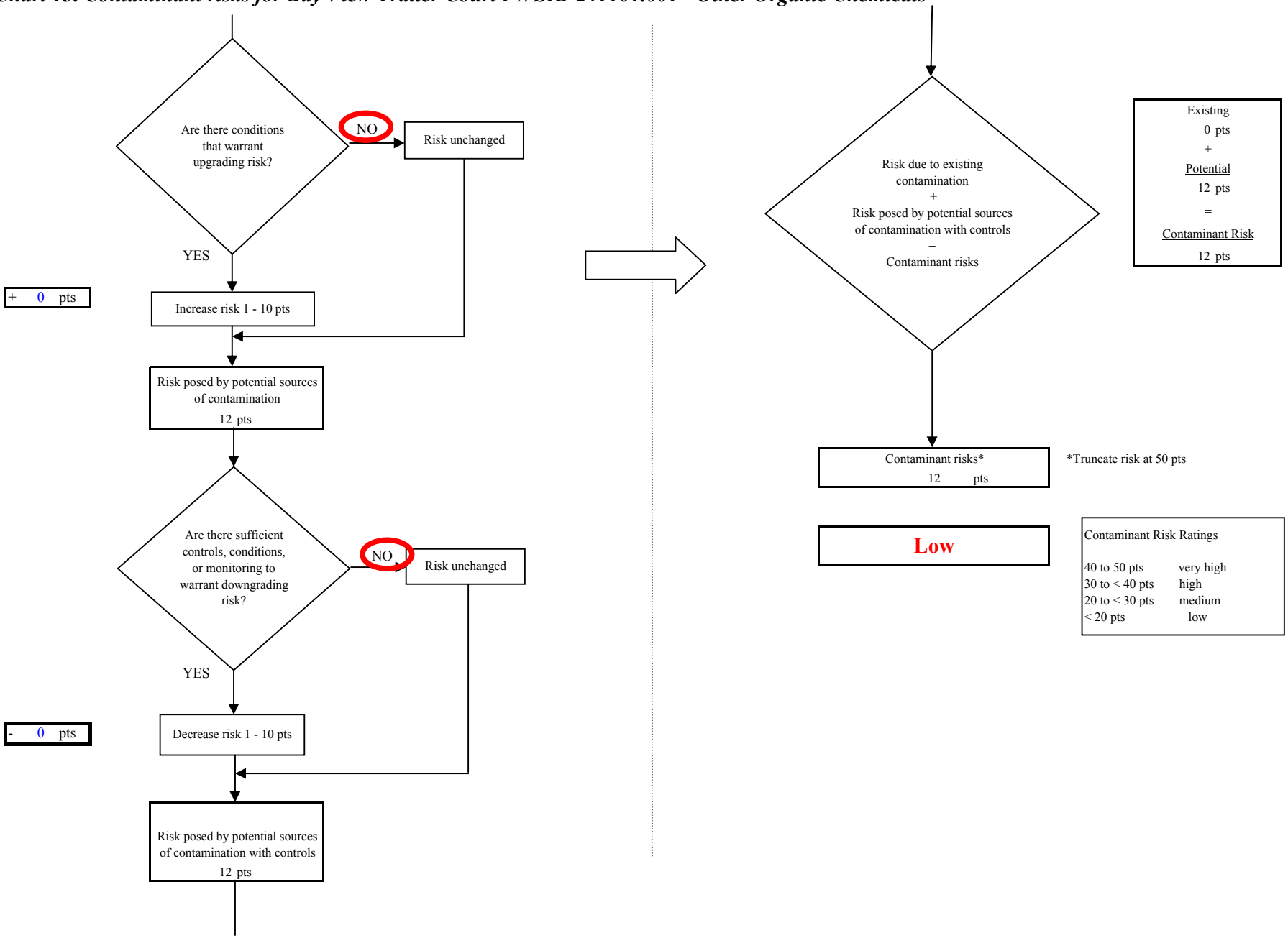


Chart 14. Vulnerability analysis for Bay View Trailer Court PWSID 241101.001 - Other Organic Chemicals