Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Gateway Salmon Bake, Tok, Alaska PWSID #381121

DRINKING WATER PROTECTION PROGRAM REPORT NO. 918

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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Source Water Assessment for Gateway Salmon Bake, Tok, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The public water system for Gateway Salmon Bake is a Class B (transient/non-community) water system consisting of one well. The Gateway Salmon Bake is located in Tok, Alaska. 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 and current sources of contaminants for Gateway Salmon Bake public drinking water source include large-capacity septic systems; RV dump stations; aboveground heating oil tanks; paved highways and roads; campgrounds and RV parks; laundromat (without dry cleaning); single-family septic systems; aboveground diesel and gasoline tanks; and water supply wells. These identified potential and existing sources of contamination are considered sources of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals. Overall, the public water sources for Gateway Salmon Bake received a vulnerability rating of **High** for bacteria and viruses, and nitrates and nitrites, and **Low** for volatile organic chemicals.

GATEWAY SALMON BAKE PUBLIC DRINKING WATER SYSTEM

Gateway Salmon Bake public water system is a Class B (transient/non-community) water system. The system consists of one well located in Tok, Alaska (See Map 1 of Appendix A). Tok is located at the junction of the Alaska Highway and the Tok cutoff to the Glenn Highway, 200 miles southeast of Fairbanks. Tok is called the "Gateway to Alaska" as it is the first major community upon entering Alaska, 93 miles from the Canadian border. The population of Tok is approximately 1,400.

Tok averages about 15 inches of precipitation per year, including 33 inches of snow. Although the quality of the groundwater can vary significantly in a short distance, groundwater supplies are generally abundant in the area. Static water levels in these wells are generally 50 to 80 feet below the surface. The coarse, alluvial, sandy gravel aquifer generally provides sufficient water, even in the winter when infiltration is low.

The Tok area topography varies from about 1,275 feet along the Tanana River to over 5,000 feet in the Alaska Range. Drainages along the Alaska Highway in this area generally flow northwest.

According to a Sanitary Survey dated June 24, 1998, the existing well was installed in 1986 with 6-inch diameter casing to a depth of 100 feet below ground surface. It is assumed that the length of the well screen is 10 feet. The Survey indicates that the land surface is sloped away from the well, providing adequate surface water drainage. It is assumed because the well was installed prior to 1992 that it is not grouted according to ADEC standards. Proper grouting provides added protection against contaminants traveling along the well casing and into source waters.

This system operates seasonally from May 15 through September 15 and serves approximately 25 non-residents through one service connection.

GATEWAY SALMON BAKE 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 DWPA 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. The input parameters describing the attributes of the aquifer in this calculation were estimated from information contained in the well logs and/or the Sanitary Survey. Additional methods were also used to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful DWPA (Please refer to the Guidance Manual for Class B Public Water Systems for additional information).

The DWPAs established for wells by the ADEC are usually separated into four zones. These zones correspond to differences in the time-of-travel (TOT) of the water moving through the aquifer to the well.

The TOT 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 Gateway Salmon Bake extends over one mile to the south of the well. Development in the vicinity of the well extends throughout Zone 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 Gateway Salmon Bake 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 B public water system assessments, three categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses;
- Nitrates and/or nitrites;
- Volatile organic chemicals

The sources are displayed on Map 2 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 TOT 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 GATEWAY SALMON BAKE 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

We assume the well for the Gateway Salmon Bake is completed in an unconfined aquifer. Because unconfined aquifers are recharged by surface water and precipitation that migrates downward from the surface, contaminants at the surface have the potential to adversely impact this aquifer. Table 2 shows the Susceptibility scores and ratings for the Golden Bear RV Park.

Table 2. Susceptibility

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	16	High
Natural Susceptibility	21	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	50	Very High
Nitrates and/or Nitrites	50	Very High
Volatile Organic Chemicals	27	Medium

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	70	High
Nitrates and Nitrites	70	High
Volatile Organic Chemicals	50	Medium

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Very High** with large-capacity septic systems; RV dump stations; paved highways and roads; campgrounds and RV parks; laundromats (without dry cleaning); and single-family septic systems representing the risks to the drinking water well (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. Recent sampling events indicated no positive results were detected for bacteria and viruses. However, after combining the contaminant risks with the overall natural susceptibility of the well, the vulnerability of the well to contamination by bacteria and viruses is **High**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Very High** with large-capacity septic systems; RV dump stations; paved highways and roads; and campgrounds and RV parks; laundromats (without dry cleaning); and single-family septic systems representing the risks to this source of public drinking water (See Chart 5 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D).

Sampling history for The Gateway Salmon Bake indicates that nitrates have been detected in the water, but only in very low concentrations (at 0.740 mg/L on 5/13/03) or 7% of the Maximum Contaminant Level (MCL). The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful health effects. Due to the high solubility and weak retention by soil, nitrates are very mobile, moving at approximately the same rate as water.

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

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Medium** with large-capacity septic systems; RV dump stations; aboveground heating oil tanks; paved highways and roads; campgrounds and RV parks; laundromats (without dry cleaning); single-family septic systems; and aboveground diesel and gasoline tanks the only known risks for volatile organic chemicals (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

Recent sample data for the drinking water at Gateway Salmon Bake indicates that volatile organic chemicals have not been detected in the water. However, after combining the contaminant risk for volatile organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination by volatile organic chemicals is **Medium**.

REFERENCES

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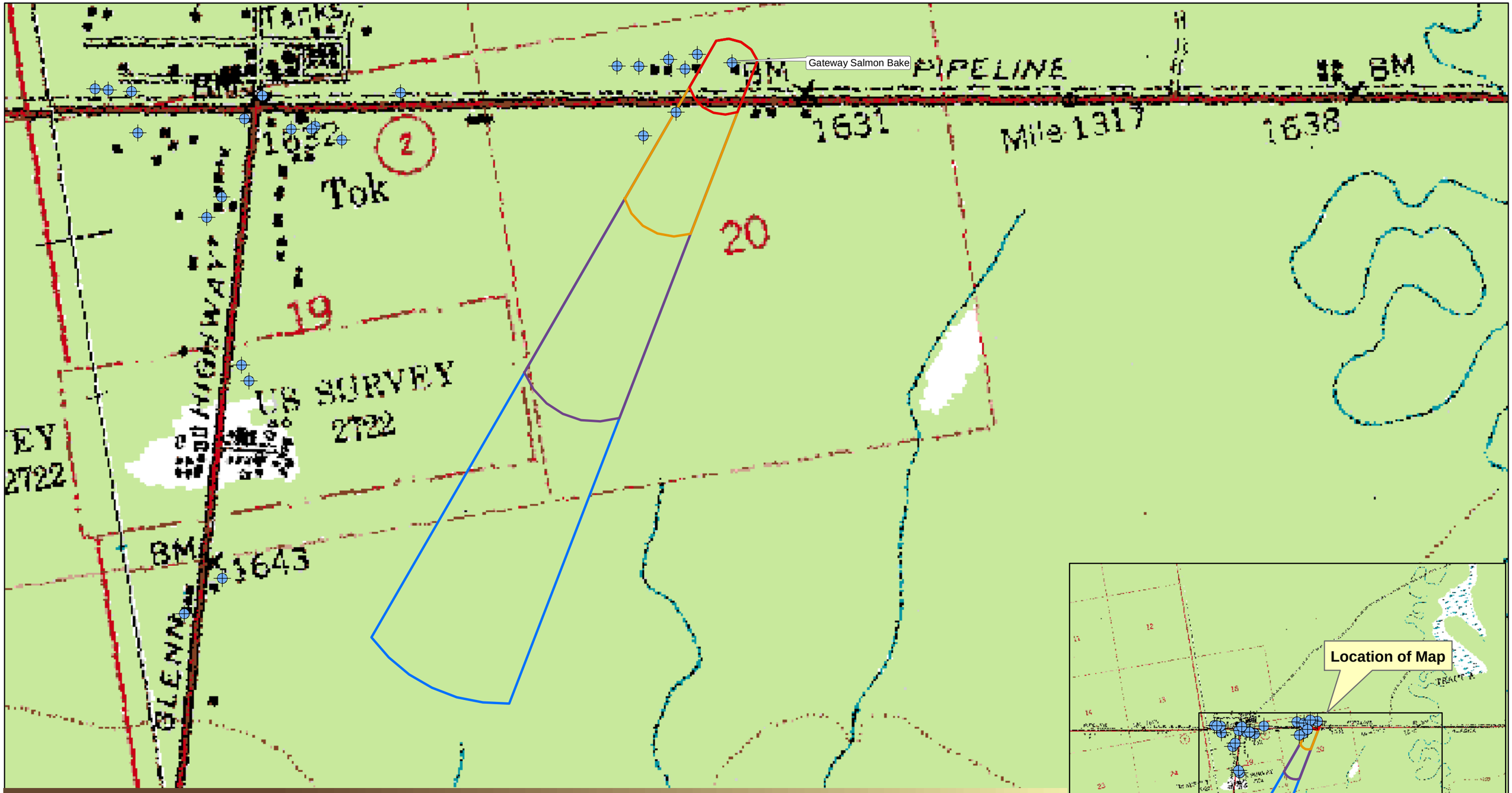
King, P.B., compiler, 1969, Tectonic map of North America: US Geological Survey Map (Scale 1:5,000,000) 2 sheets.

United States Environmental Protection Agency (2002). <http://www.epa.gov/safewater/mcl.html#mcls> (2003, September 1)

APPENDIX A

Gateway Salmon Bake
Drinking Water Protection Area Location Map
(Map 1)



Map 1: Gateway Salmon Bake Drinking Water Protection Areas

PWSID: 381121.001

Alaska Department of Environmental Conservation

Alaska Drinking Water Protection Program

0 455 910 1,820 2,730 3,640 Feet

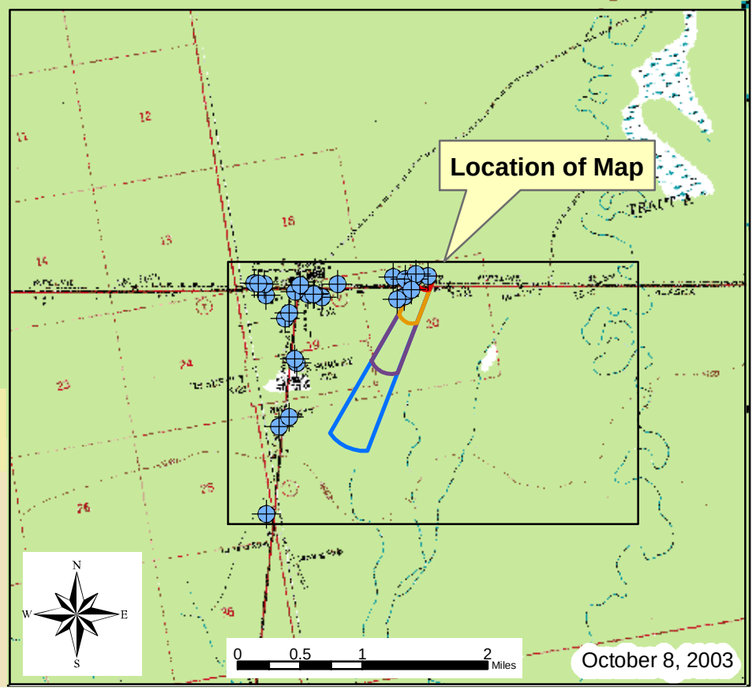
1:12,418

Data Sources:

Background image - USGS 1:63,000 mapping

Legend

- Public Drinking Water Systems
- **DWPA Zone A**: Several Months Travel Time
- **DWPA Zone B**: Less than 2 Years Travel Time
- **DWPA Zone C**: Less than 5 Years Travel Time
- **DWPA Zone D**: Less than 10 Years Travel Time



October 8, 2003

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Gateway Salmon Bake (Tables 1-4)

Table 1 **Contaminant Source Inventory for Gateway Salmon Bake** **PWSID 381121.001**

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	2	Large Capacity Septic System at Gateway Salmon Bake
RV dump stations	D18	D18-1	A	2	RV Dumpstation at Gateway Salmon Bake
Tanks, heating oil, nonresidential (aboveground)	T14	T14-1	A	2	Nonresidential Heating Oil Storage Tank at Gateway Salmon Bake
Tanks, heating oil, nonresidential (aboveground)	T14	T14-2	A	2	Fast Eddy's Heating Oil Storage Tank
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	2	Alaska Highway South of Gateway Salmon Bake
Campgrounds and RV Parks	X35	X35-1	A	2	Camping and RV Park at Gateway Salmon Bake
Laundromats without dry cleaning	C22	C22-1	B	2	Laundromat at Village Texaco
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	B	2	Fast Eddy's Large Capacity Septic System
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	B	2	Large Capacity Septic System for Village Texaco
Septic systems (serves one single-family home)	R02	R02-1	B	2	Single Family Septic System for Residence at Village Texaco
Tanks, heating oil, residential (above ground)	R08	R08-1	B	2	Residential Heating Oil Tank for Residence at Village Texaco
Tanks, diesel (above ground)	T06	T06-1	B	2	Diesel AST for Village Texaco
Tanks, gasoline (above ground)	T10	T10-1	B	2	Gas AST for Village Texaco
Water supply wells	W09	W09-1	B	2	Private Water Supply Well for Residence at Village Texaco

Table 2

Contaminant Source Inventory and Risk Ranking for Gateway Salmon Bake Sources of Bacteria and Viruses

PWSID 381121.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	High	2	Large Capacity Septic System at Gateway Salmon Bake
RV dump stations	D18	D18-1	A	Low	2	RV Dumpstation at Gateway Salmon Bake
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	Alaska Highway South of Gateway Salmon Bake
Campgrounds and RV Parks	X35	X35-1	A	Low	2	Camping and RV Park at Gateway Salmon Bake
Laundromats without dry cleaning	C22	C22-1	B	Low	2	Laundromat at Village Texaco
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	B	High	2	Fast Eddy's Large Capacity Septic System
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	B	High	2	Large Capacity Septic System for Village Texaco
Septic systems (serves one single-family home)	R02	R02-1	B	Low	2	Single Family Septic System for Residence at Village Texaco

Table 3

Contaminant Source Inventory and Risk Ranking for Gateway Salmon Bake Sources of Nitrates/Nitrites

PWSID 381121.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic (Drainfield Disposal Method)	D10	D10-1	A	High	2	Large Capacity Septic System at Gateway System Salmon Bake
RV dump stations	D18	D18-1	A	Low	2	RV Dumpstation at Gateway Salmon Bake
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	Alaska Highway South of Gateway Salmon Bake
Campgrounds and RV Parks	X35	X35-1	A	Low	2	Camping and RV Park at Gateway Salmon Bake
Laundromats without dry cleaning	C22	C22-1	B	Low	2	Laundromat at Village Texaco
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	B	High	2	Fast Eddy's Large Capacity Septic System
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	B	High	2	Large Capacity Septic System for Village Texaco
Septic systems (serves one single-family home)	R02	R02-1	B	Low	2	Single Family Septic System for Residence at Village Texaco

Table 4

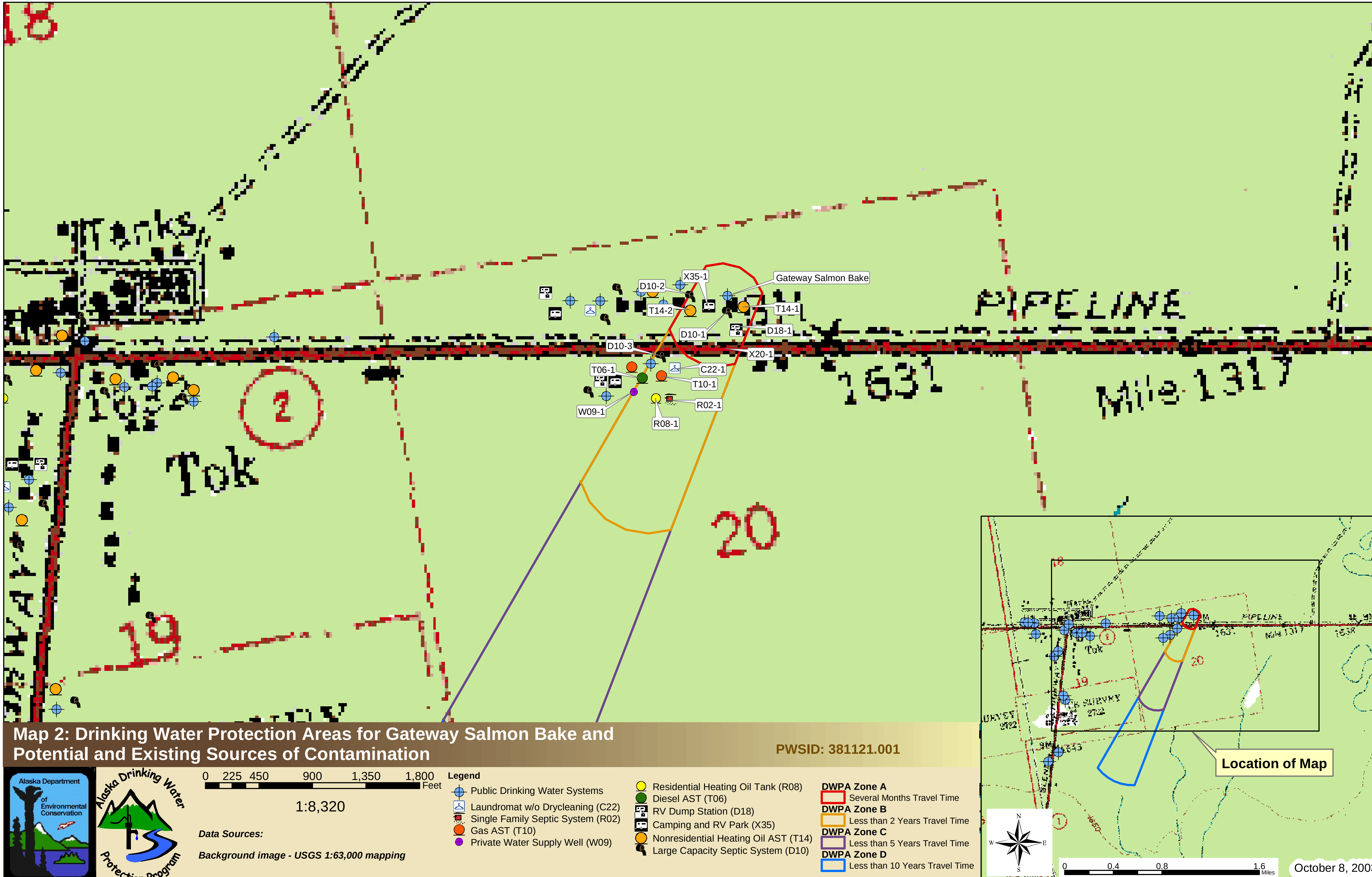
Contaminant Source Inventory and Risk Ranking for Gateway Salmon Bake Sources of Volatile Organic Chemicals

PWSID 381121.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	Large Capacity Septic System at Gateway Salmon Bake
RV dump stations	D18	D18-1	A	Low	2	RV Dumpstation at Gateway Salmon Bake
Tanks, heating oil, nonresidential (aboveground)	T14	T14-1	A	Low	2	Nonresidential Heating Oil Storage Tank at Gateway Salmon Bake
Tanks, heating oil, nonresidential (aboveground)	T14	T14-2	A	Low	2	Fast Eddy's Heating Oil Storage Tank
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	Alaska Highway South of Gateway Salmon Bake
Campgrounds and RV Parks	X35	X35-1	A	Low	2	Camping and RV Park at Gateway Salmon Bake
Laundromats without dry cleaning	C22	C22-1	B	Low	2	Laundromat at Village Texaco
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-2	B	Low	2	Fast Eddy's Large Capacity Septic System
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-3	B	Low	2	Large Capacity Septic System for Village Texaco
Septic systems (serves one single-family home) Village Texaco	R02	R02-1	B	Low	2	Single Family Septic System for Residence at
Tanks, heating oil, residential (above ground) Village Texaco	R08	R08-1	B	Medium	2	Residential Heating Oil Tank for Residence at
Tanks, diesel (above ground)	T06	T06-1	B	Medium	2	Diesel AST for Village Texaco
Tanks, gasoline (above ground)	T10	T10-1	B	Medium	2	Gas AST for Village Texaco

APPENDIX C

Gateway Salmon Bake
Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Map 2)


Map 2: Drinking Water Protection Areas for Gateway Salmon Bake and Potential and Existing Sources of Contamination
PWSID: 381121.001
Gateway Salmon Bake
X35-1
D10-2
T14-2
T14-1
D10-1
D18-1
D10-3
X20-1
T06-1
C22-1
T10-1
R02-1
W09-1
R08-1
PIPELINE
1631
Mile 1317
Tok
20
19
0 225 450 900 1,350 1,800
Feet
1:8,320
Data Sources:
Background image - USGS 1:63,000 mapping
Alaska Department of Environmental Conservation
Alaska Drinking Water Protection Program
Legend
Public Drinking Water Systems
Laundromat w/o Drycleaning (C22)
Single Family Septic System (R02)
Gas AST (T10)
Private Water Supply Well (W09)
Residential Heating Oil Tank (R08)
Diesel AST (T06)
RV Dump Station (D18)
Camping and RV Park (X35)
Nonresidential Heating Oil AST (T14)
Large Capacity Septic System (D10)
DWPA Zone A
Several Months Travel Time
DWPA Zone B
Less than 2 Years Travel Time
DWPA Zone C
Less than 5 Years Travel Time
DWPA Zone D
Less than 10 Years Travel Time
Location of Map
0 0.4 0.8 1.6
Miles
October 8, 2003

APPENDIX D

Vulnerability Analysis for Gateway Salmon Bake Public Drinking Water Source (Charts 1-8)

Chart 1. Susceptibility of the wellhead - Gateway Salmon Bake

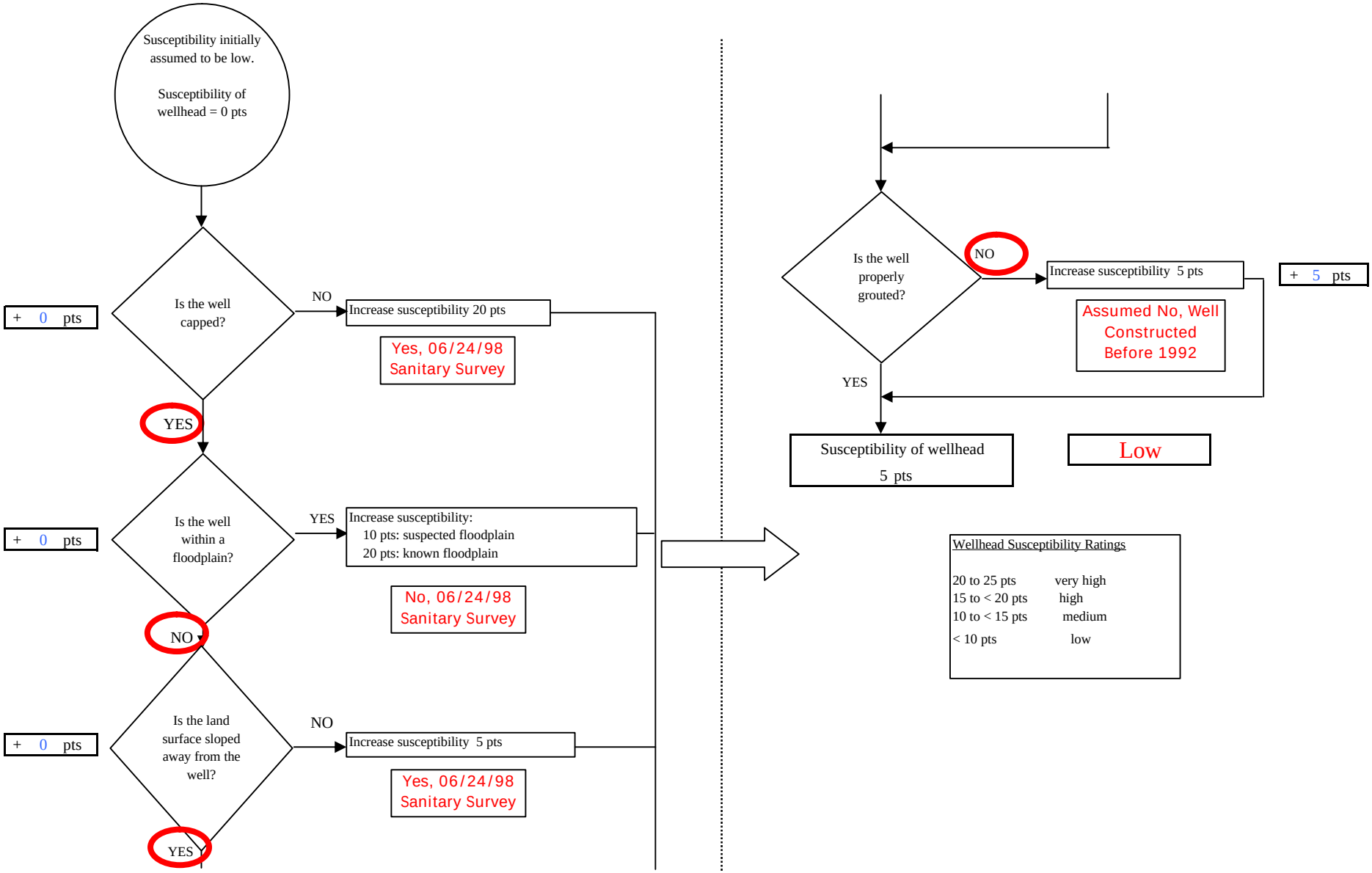


Chart 2. Susceptibility of the aquifer - Gateway Salmon Bake

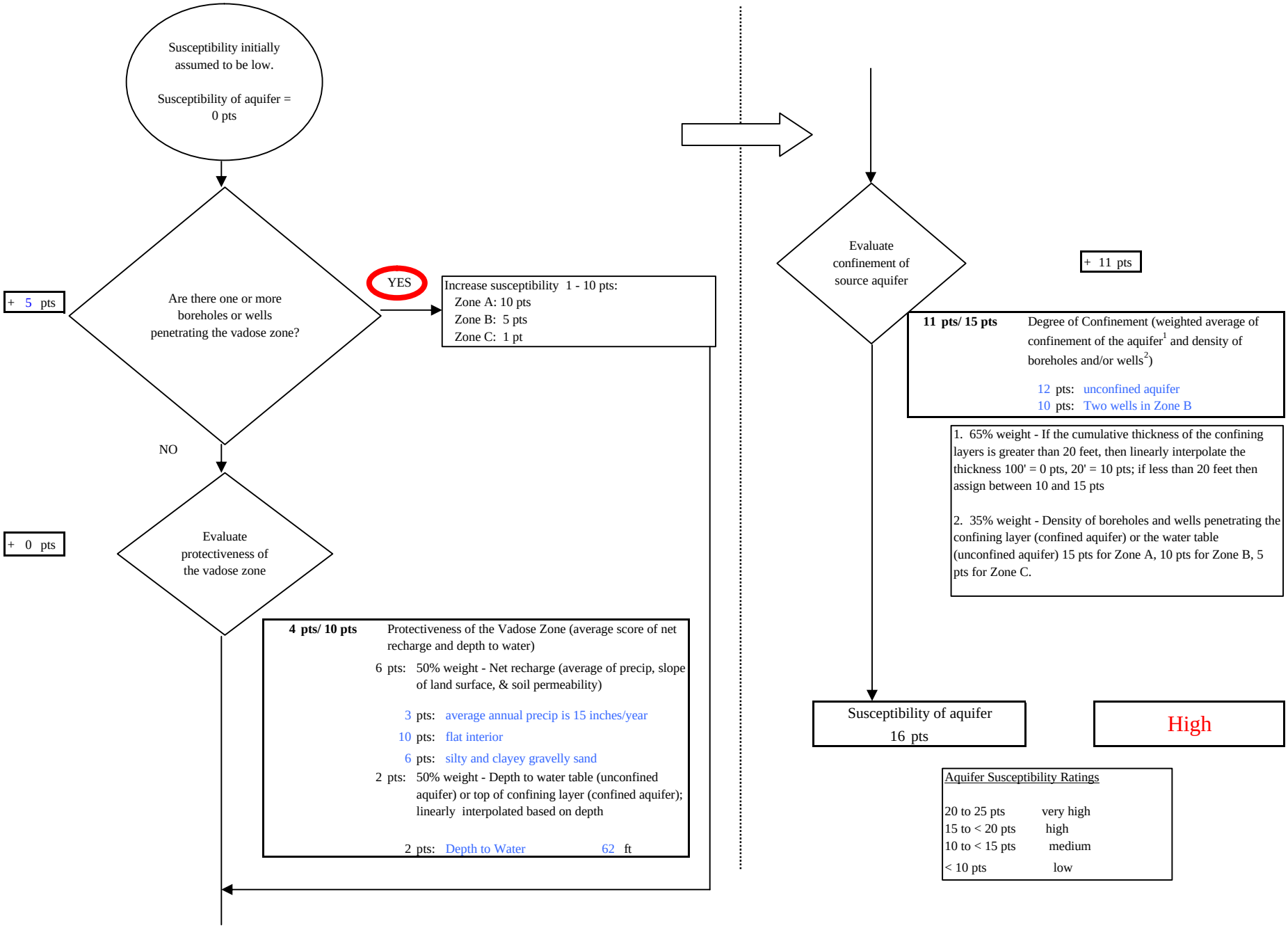
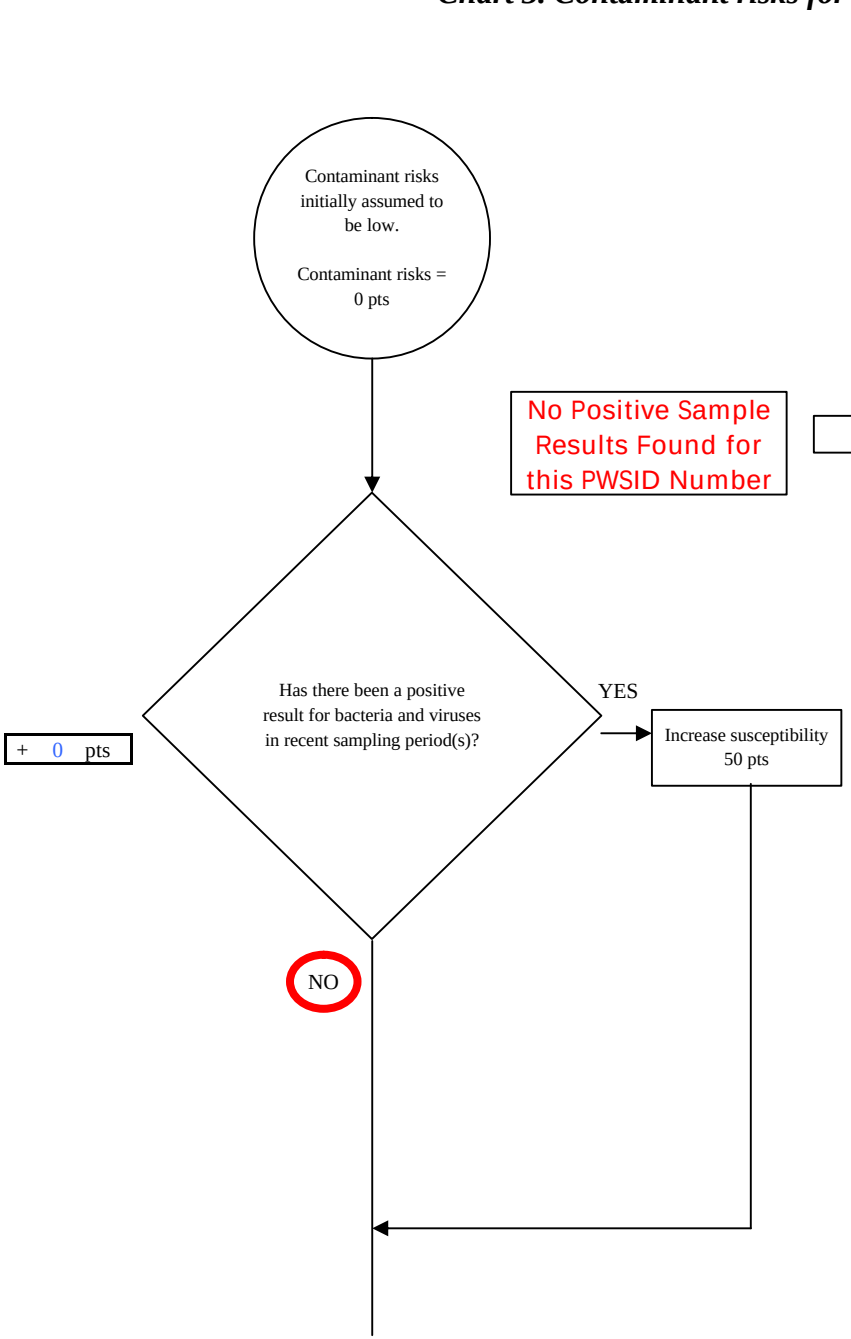
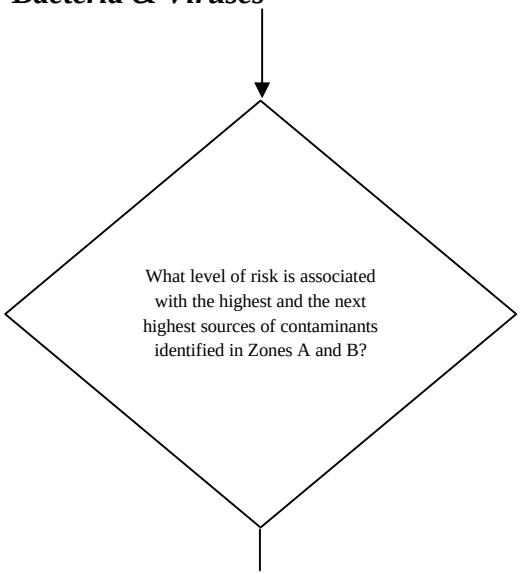


Chart 3. Contaminant risks for Gateway Salmon Bake - Bacteria & Viruses



No Positive Sample Results Found for this PWSID Number



+ 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)	1	2	3
Medium(s)	0	0	0
Low(s)	3	2	5

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	[3] 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 Gateway Salmon Bake - Bacteria & Viruses

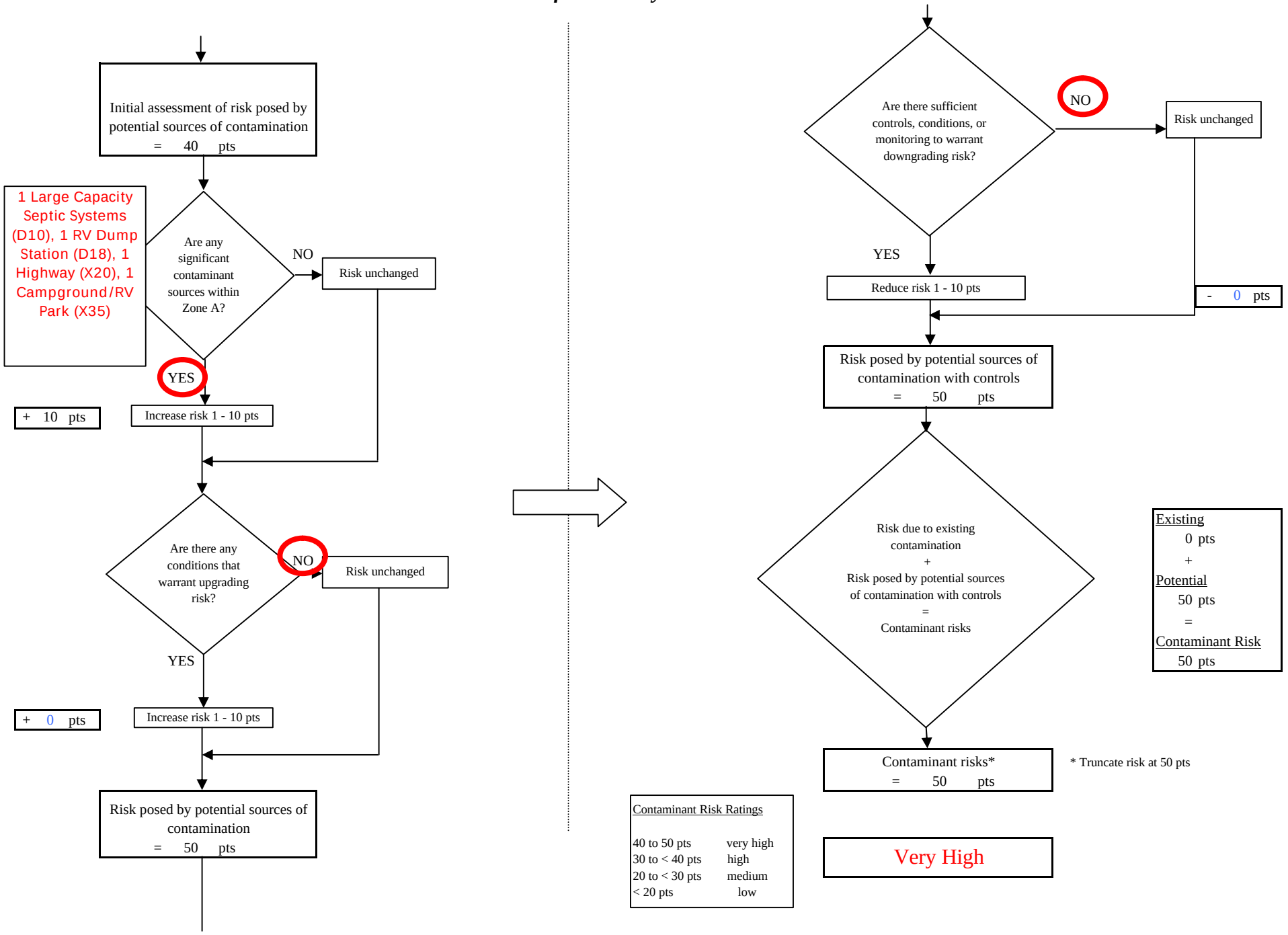


Chart 4. Vulnerability analysis for Gateway Salmon Bake - Bacteria & Viruses

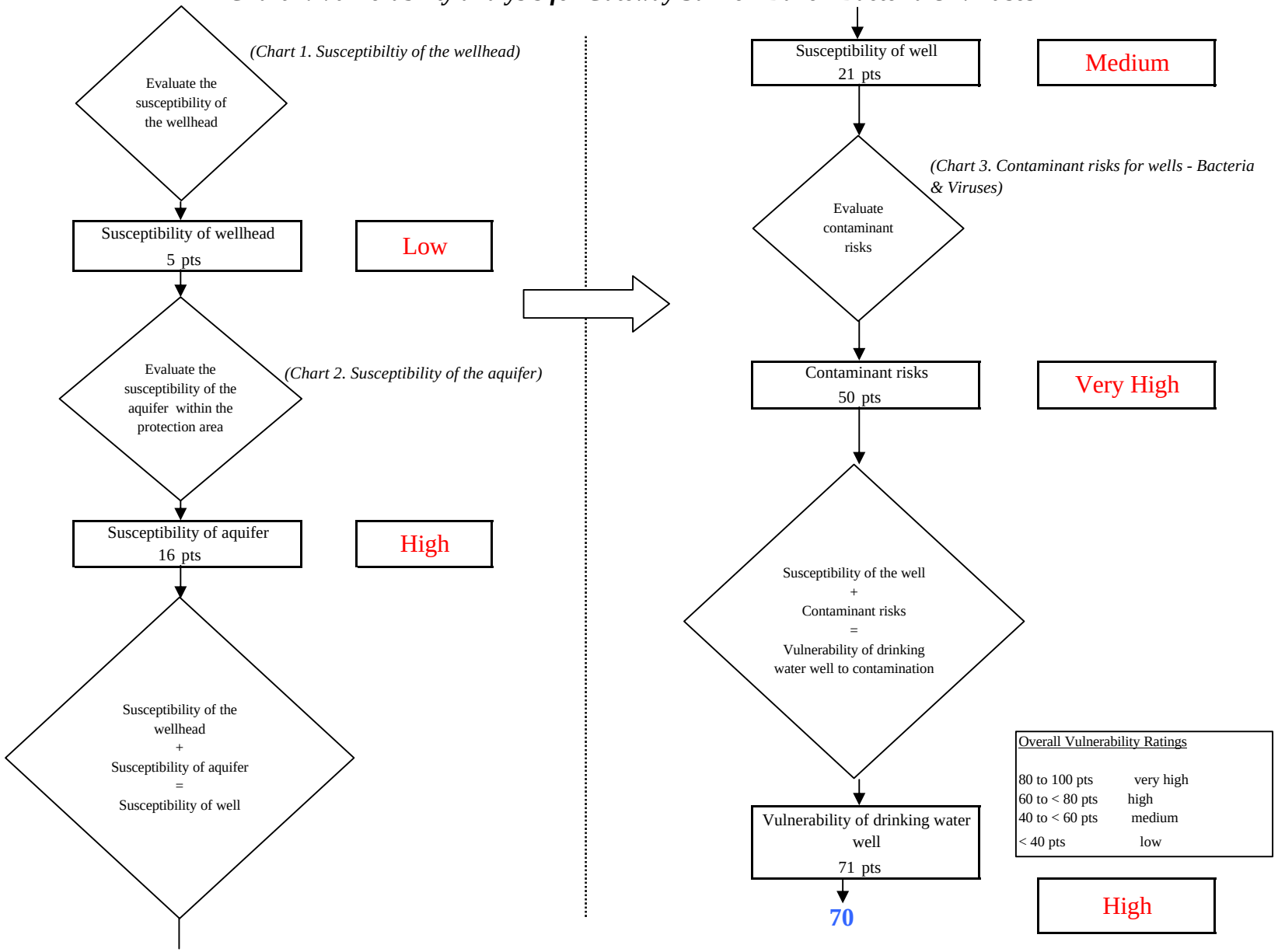


Chart 5. Contaminant risks for Gateway Salmon Bake - Nitrates and Nitrites

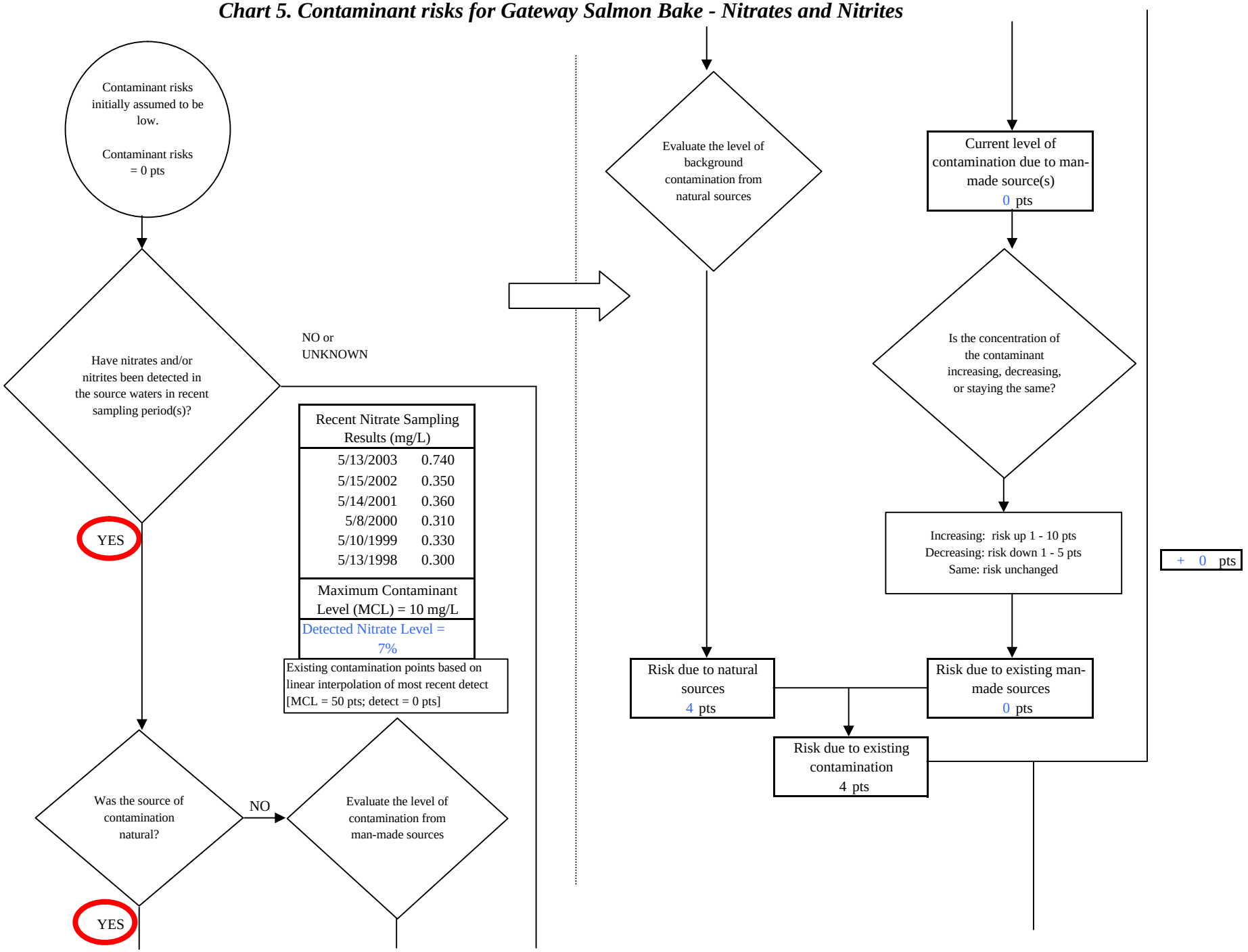


Chart 5. Contaminant risks for Gateway Salmon Bake - Nitrates and Nitrites

+ 40 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)	1	2	3
Medium(s)	0	0	0
Low(s)	3	2	5

	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
LOW	[3] 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.

Initial assessment of risk posed by potential sources of contamination = 40 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

1 Large Capacity Septic Systems (D10), 1 RV Dump Station (D18), 1 Highway (X20), 1 Campground/RV Park (X35)

YES

Increase risk 1 - 10 pts

+ 10 pts

Chart 5. Contaminant risks for Gateway Salmon Bake - Nitrates and Nitrites

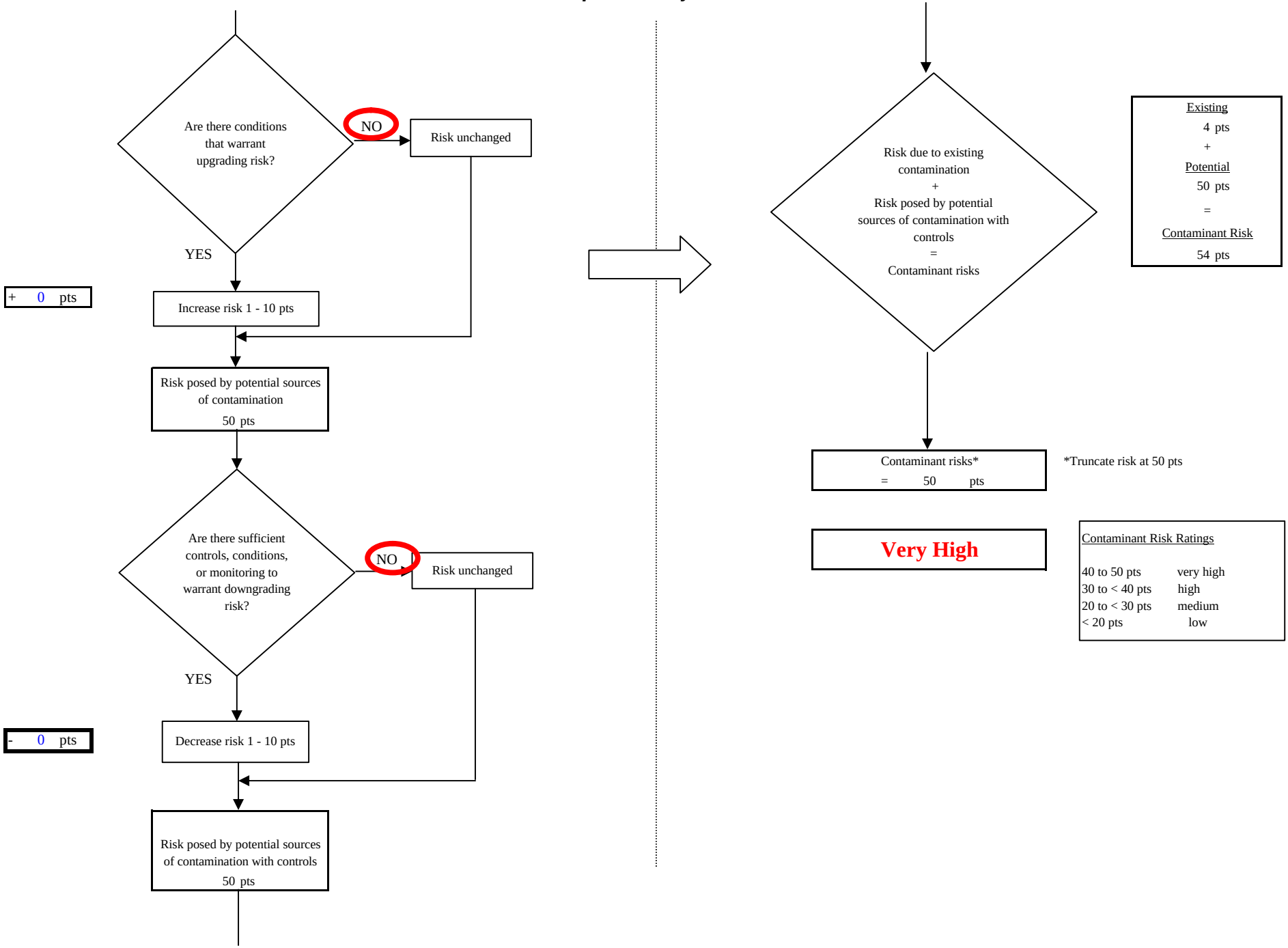


Chart 6. Vulnerability analysis for Gateway Salmon Bake - Nitrates and Nitrites

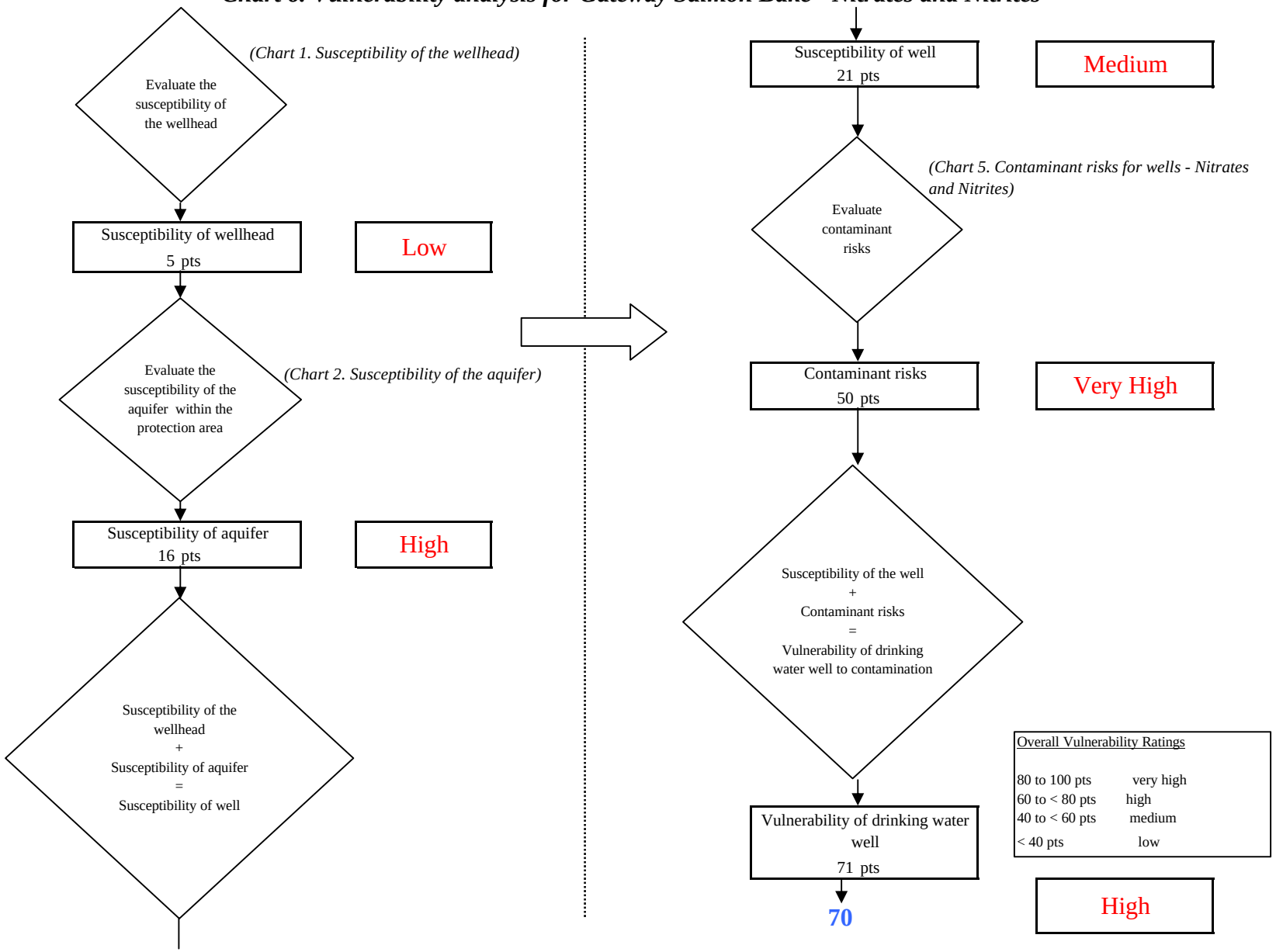


Chart 7. Contaminant risks for Gateway Salmon Bake - Volatile Organic Chemicals

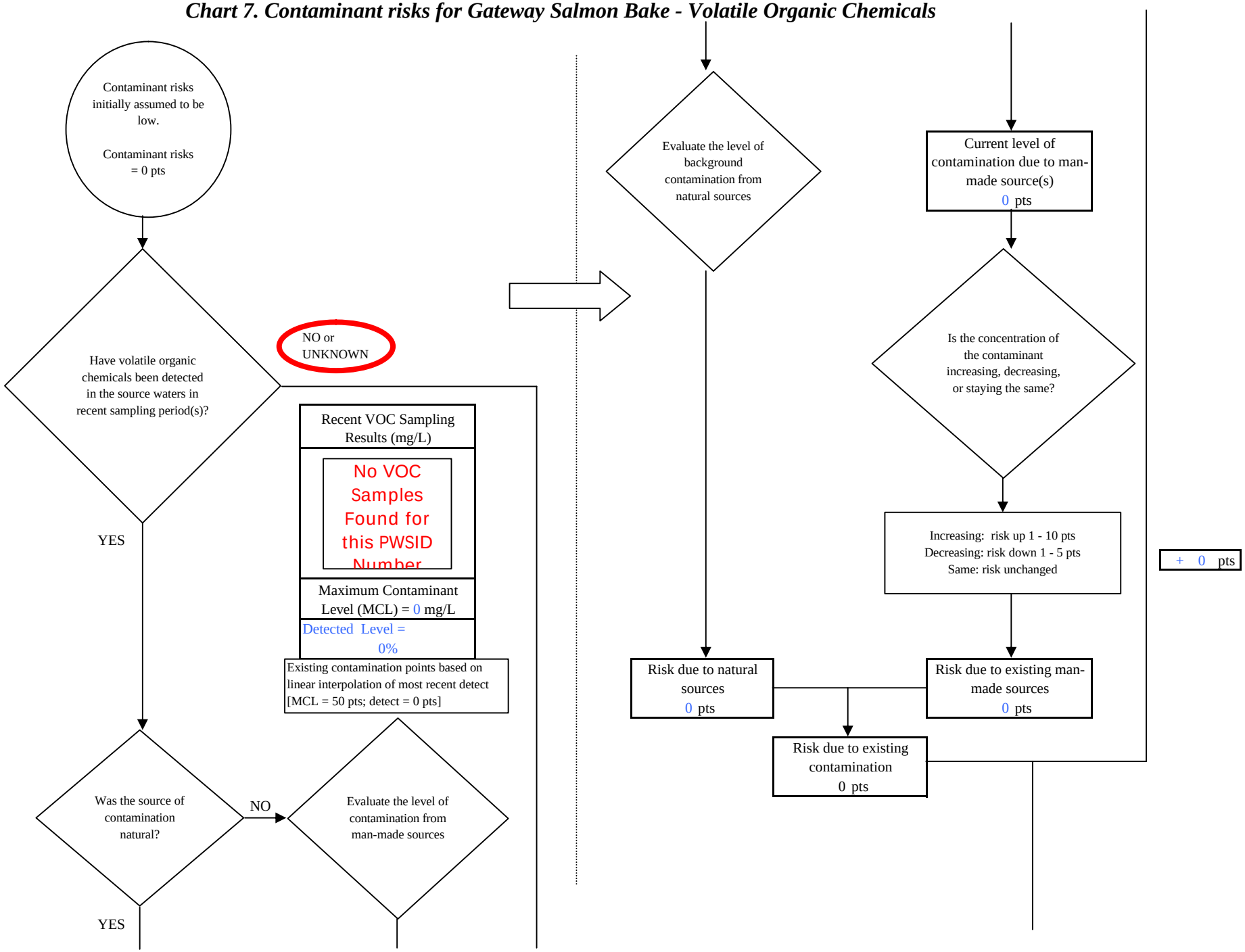


Chart 7. Contaminant risks for Gateway Salmon Bake - Volatile Organic Chemicals

Initial assessment of risk posed by potential sources of contamination = 25 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

1 Large Capacity Septic Systems (D10), 1 RV Dump Station (D18), 1 Highway (X20), 1 Campground/RV Park (X35), and 2 Heating Oil Storage Tank (T14)

+ 25 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	3	3
Low(s)	6	4	10

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	[3] 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 25

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 7. Contaminant risks for Gateway Salmon Bake - Volatile Organic Chemicals

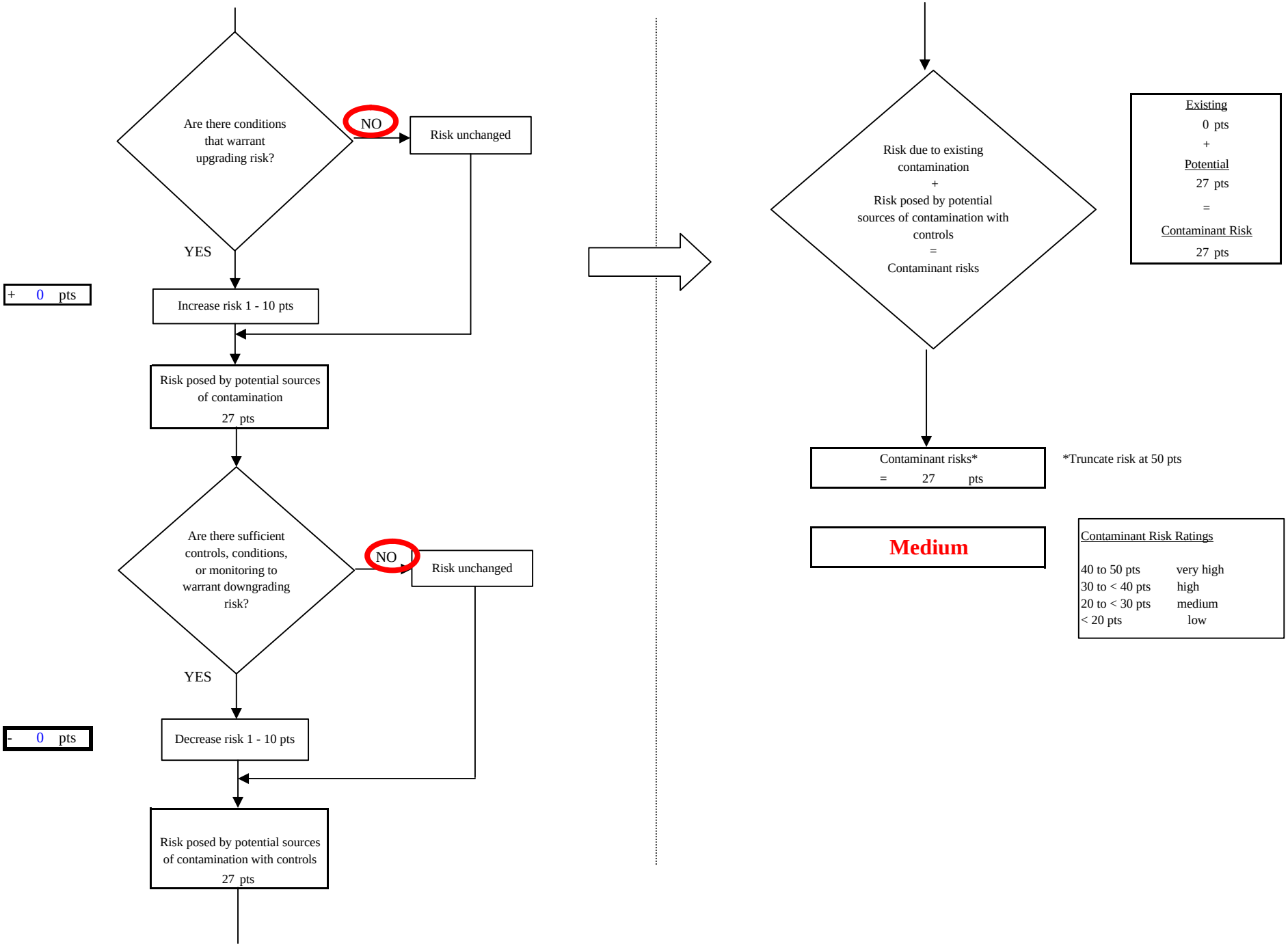


Chart 8. Vulnerability analysis for Gateway Salmon Bake - Volatile Organic Chemicals