Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for the Drinking Water System for Larry's Apartments Delta Junction, Alaska

PWSID # 370879.001

June 2004

DRINKING WATER PROTECTION PROGRAM REPORT 1383
Alaska Department of Environmental Conservation

Source Water Assessment for the Drinking Water System for Larry's Apartments Delta Junction, Alaska

PWSID # 370879.001

DRINKING WATER PROTECTION PROGRAM REPORT 1383

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.

CONTENTS

TABLES

APPENDICES

Source Water Assessment for the Public Water System Larry's Apartments Source of Public Drinking Water, Delta Junction, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Public Water System (PWS) for Larry's apartments has one well. The well (PWS No. 370879.001) has been used as a drinking water source since it was drilled in 1964.

The well is a Class A (community and non-transient non-community) water system located at 2461 Rapids Drive in Delta Junction, Alaska. Available records indicate that the system has a pressure tank and that the drinking water source is not treated. This system operates year round and serves approximately 50 residents through 26 apartment service connections. The wellhead received a susceptibility rating of **Very High** and the aquifer received a susceptibility rating of **High**. Combining these two ratings produce a **Very High** rating for the natural susceptibility of the well.

Identified potential and current sources of contaminants for the public drinking water source include: fuel tanks, an injection well, wastewater collection systems, DEC recognized contaminated sites, and oil and gas pipelines. A detailed inventory can be found in Table 1 of Appendix B. 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 **Very High** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, and other organic chemicals; **High** for heavy metals, cyanide and other inorganic chemicals; and **Medium** for synthetic organic chemicals.

PUBLIC DRINKING WATER SYSTEM

The PWS well at Larry's Apartments is a Class A (community/non-transient/non-community) public water system. The system is located at at 2461 Rapids Drive in Delta Junction, Alaska (Sec. 23, T010S, R010E, Fairbanks Meridian, see Map A of Appendix A). The community of Delta Junction is located at the convergence of the Richardson and Alaska Highways, approximately 95 miles southeast of Fairbanks (ADCED, 2003). The community has a population of 984 (ADCED, 2003) Total annual precipitation in Delta Junction is 12 inches, including approximately 37 inches of snowfall. Temperatures can be as extreme as -63 to 92°F.

The community of Delta Junction obtains most of their water supply from individual wells. The Delta School has its own well water system. Septic systems are used for sewage disposal (ADCED, 2003). Delta Junction residents rely on the Golden Valley Electric Association for electricity, which is powered by coal and diesel as a backup. Refuse is collected by a private firm, Delta Sanitation, and hauled to the landfill.

Construction details were not available in ADEC records, and it is assumed based on a nearby well that the depth of the well is 207 feet below the ground surface. Based on available well construction details, it is assumed that the well is screened in an unconfined aquifer. The well is located within a floodplain.

Information acquired from a June 2002 sanitary survey for the PWS indicated that the land surface was not 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 not grouted according to ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing annulus and into source waters.

Big Delta lies along the Richardson Highway near the junction of the Delta River and Jarvis Creek. The area is in the eastern reaches of the Tanana-Kuskokwim Lowland, a broad depression bordering the Alaska Range on the north.

Granodiorites and quartz monzonites are exposed in the southern part of the Delta-Clearwater area. These

rocks are in intrusive contact with pelitic schist to the south and west.

Coalescing alluvial fans compsed of moderately well-sorted silt, sand and gravel are the principal surficial deposits in the Big Delta area. The thickness of the unconsolidated material is estimated to be as much as 760 meters. Not all of this thickness is alluvium; however, because alluvial deposits are typically not deposited below sea level. It is likely that deep sediments in the area are poorly sorted lacustrine, glacial, or marine sediments of low permeability. The area was glaciated in at least three episodes, which is evidenced by the presence of terminal moraines in the Delta and Gerstle River valleys and in the valleys of several small creeks draining the north face of the Alaska Range.

Five major soil types exist in the Big Delta area: Salchaket, Jarvis, Nenana, Chena, and Tanana. Salchaket is a deep, somewhat poorly drained, fine sandy loam soil and is typically found on the alluvial plains and terraces of the Delta River. The soil forms in the overbank deposits of flowing water and is underlain by a stratum of gravelly cobble. Jarvis is also a very fine sandy silt loam. It is moderately deep and is stratified over a gravelly substrate. This soil is found along Jarvis Creek and includes both loess and overbank flood deposits. Nenana silt loam is a sandy soil that typically forms in sand dunes occupying the site of former floodplains. Chena is a very fine soil occurring as a thin mantle of silt loam overlying a substratum of gravelly sand. This type of soil occupies nearly level terrain near Big Delta and is well drained. Tanana is a silt loam formed in local alluvial sediments and is poorly drained. This soil typically occurs in vegetated areas in the presence of permafrost.

The area lies in the discontinuous permafrost zone. There is a noticeable absence of permafrost directly adjacent to and beneath the Delta and Gerstle Rivers and Jarvis Creek (Nelson, 1995).

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 PWS at Larry's Apartments. 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 PWS at Larry's Apartments PWS was determined using an analytical calculation and includes Zones A, B, C, 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 PWS DWPA at Larry's Apartments. 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 7 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 well at Larry's Apartments is assumed to be completed in an unconfined aquifer. Unconfined aquifers are more 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	25	Very High
Susceptibility of the Aquifer	18	High
Natural Susceptibility	43	Very High

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	40	Very High
Nitrates and/or Nitrites	43	Very High
Volatile Organic Chemicals	50	Very High
Heavy Metals, Cyanide and Other Inorganic Chemicals	29	Medium
Synthetic Organic Chemicals	12	Low
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	85	Very High
Nitrates and Nitrites	85	Very High
Volatile Organic Chemicals	95	Very High
Heavy Metals, Cyanide and Other Inorganic Chemicals	70	High
Synthetic Organic Chemicals	55	Medium
Other Organic Chemicals	95	Very High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Very High**. The risk is primarily attributed to the presence of a large capacity septic 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, 2002). 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 **Very 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 large capacity septic system 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 nitrates have been detected in recent sampling events, however did not exceed the MCL of 10mg/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).

Nitrate levels are often derived from the decomposition of organic matter in soils. Although the nitrate source is unknown, such occurrences may be attributed to septic systems or other sources.

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 **Very High.**

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Very High**. The risk is primarily attributed to the presence of a gasoline station and several underground fuel tanks in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 4 – Appendix B).

No recent sampling data was available in ADEC records for the PWS at Larry's Apartments (see Chart – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

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 **Very High**.

Heavy Metals, Cyanide and Other Inorganic Chemicals

The contaminant risk for heavy metals, cyanide and other inorganic chemicals is **Medium**. The risk is primarily attributed to the presence of copper, lead, barium and chromium in recent sampling events and the presence of underground fuel tanks in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 5 – Appendix B).

Based on review of recent sampling records for this PWS, low levels of copper, Lead, barium and chromium have been detected, but have not exceeded the MCLs of 1.3, .015, 2, and .1 mg/L, respectively (see Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D).

The reported concentrations of copper and lead are likely attributed to the water treatment/conveyance system.

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).

Chromium is a naturally occurring element found in rocks, animals, plants, soil, and in volcanic dust and gases. Chromium is present in the environment in several different forms. The most common forms are chromium(0), chromium(III), and chromium(VI). No taste or odor is associated with chromium compounds.

Chromium is steel-gray, lustrous, hard, metallic, and takes a high polish. Its compounds are toxic. It is found as chromite ore. Siberian red lead (crocoite, PrCrO4) is a chromium ore prized as a red pigment for oil paints. Chromium metal powder is a fire hazard. All chromium compounds should be regarded as highly toxic. Chromium(VI) compounds are highly toxic and carcinogenic. Chromium(III) compounds

are less toxic. Chromium compounds are important pollutants.

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 **Low**. The risk is primarily attributed to a large capacity septic system and wastewater collection system in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 6 – Appendix B).

No recent sampling data was available in ADEC records for the PWS at Larry's Apartments (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 **Medium**.

Other Organic Chemicals

The contaminant risk for other organic chemicals is **Very High**. The risk is primarily attributed to oil and gas pipelines 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 PWS at Larry's Apartments (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 **Very 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 Delta Junction 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.

REFERENCES

Alaska Department of Community and Economic Development (ADCED), 2003 [WWW document]. URL: http://www.dced.state.ak.us/cbd/commdb/CF_COMDB.htm

Alaska Department of Environmental Conservation, Contaminated Sites Database, 2003 [WWW database], URL http://www.state.ak.us/dec/dspar/csites/cs_search.htm

Alaska Department of Environmental Conservation, Leaking Underground Storage Tank Database, 2003 [WWW database], URL http://www.dec.state.ak.us/spar/stp/ust/search/fac_search.asp

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

Nelson, Gordon L, 1995, Information from Overview of Environmental and Hydrogeologic Conditions near Big Delta, Alaska, U.S. Geological Survey Open File Report 95-180, prepared in cooperation with the FAA

United States Environmental Protection Agency (EPA), 2002 [WWW document]. URL http://www.epa.gov/safewater/mcl.html.

United States Environmental Protection Agency, Office of Water. Retrieved February 2002. [WWW document]. URL http://www.epa.gov/safewater/hfacts.html#Inorganic

APPENDIX A

Drinking Water Protection Area Location Map
(Map A)

APPENDIX B

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

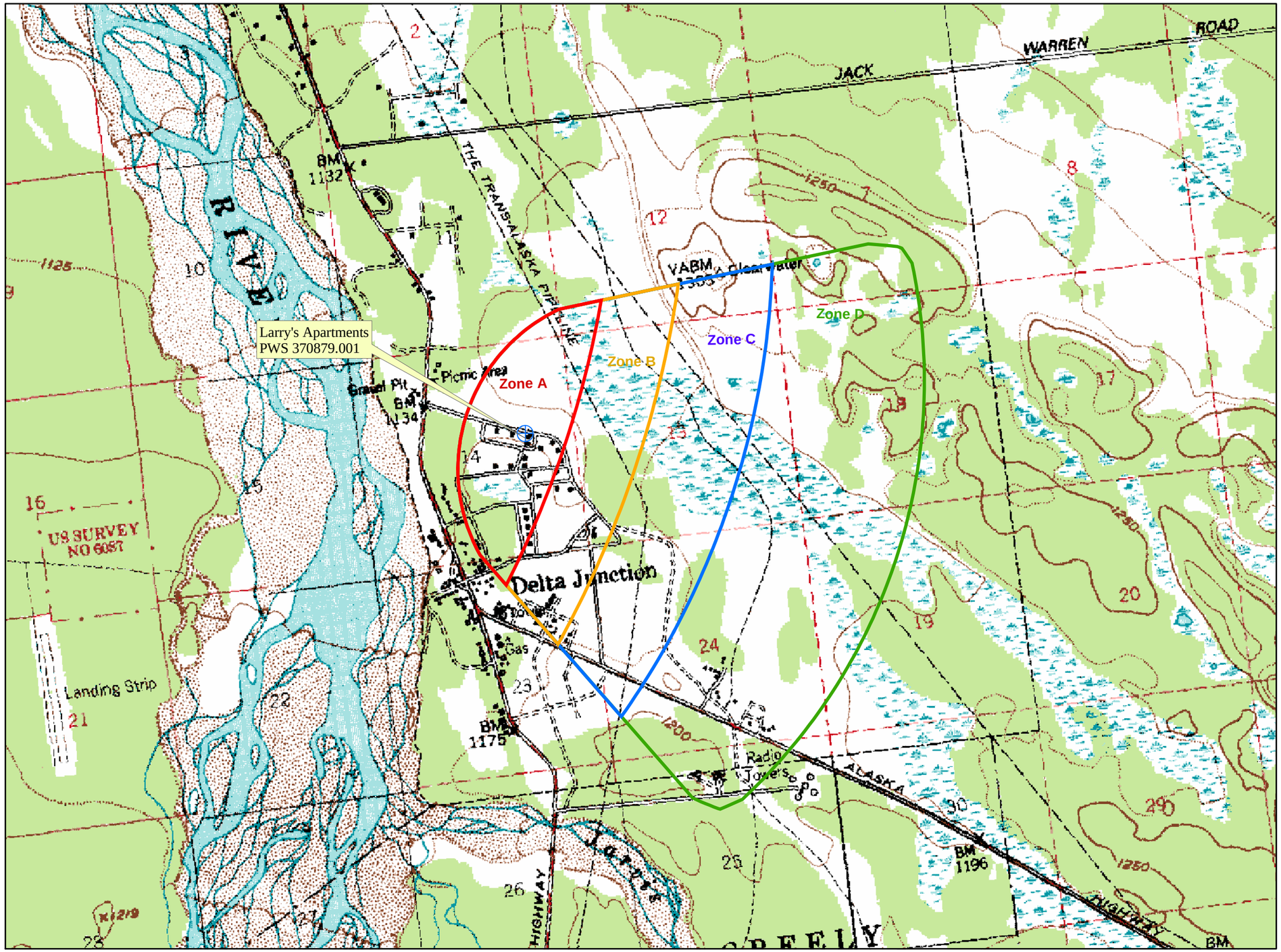
APPENDIX C

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

APPENDIX D

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

Public Water Well System for PWS #370879.001 Larry's Apartments



LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours

Transportation

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

Groundwater Protection Zones

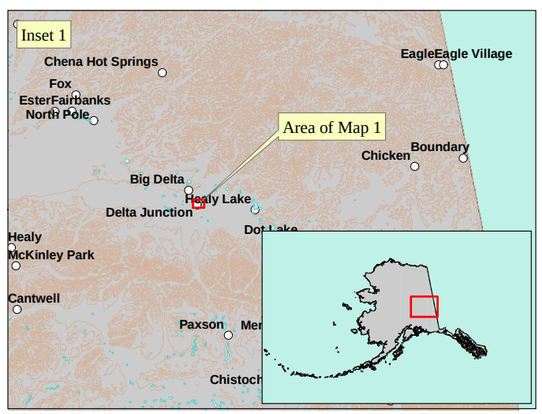
- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone C Protection Area– 5 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time

Data Sources:
Contaminant Sources, Public Water System Wells, Contours
Alaska Department of Environmental Conservation (ADEC)

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.



Larry's Apartments
PWS 370879.001
Appendix A Map A

Table 1

Contaminant Source Inventory for ***Larry's Apartments***

PWSID 370879.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Gasoline stations (with repair shop)	C16	C16-01	A	C	BUFFALO SERVICE STATION
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	C	Wastewater impoundment assumed in Zone A
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	C	LARRY'S APARTMENTS
Tanks, heating oil, residential (above ground)	R08	R08-01	A	C	Assume 100 or less residential aboveground heating oil tanks in Zone A
Tanks, diesel (underground)	T08	T08-01	A	C	BUFFALO SERVICE STATION
Closed tanks, diesel (underground)	T09	T09-01	A	C	BUFFALO SERVICE STATION
Closed tanks, diesel (underground)	T09	T09-02	A	C	BUFFALO SERVICE STATION
Tanks, gasoline (underground)	T12	T12-01	A	C	BUFFALO SERVICE STATION
Closed tanks, gasoline (underground)	T13	T13-01	A	C	BUFFALO SERVICE STATION
Closed tanks, gasoline (underground)	T13	T13-02	A	C	BUFFALO SERVICE STATION
Closed tanks, gasoline (underground)	T13	T13-03	A	C	BUFFALO SERVICE STATION
Closed tanks, lubricants or other petroleum products (underground)	T21	T21-01	A	C	BUFFALO SERVICE STATION
Closed tanks, lubricants or other petroleum products (underground)	T21	T21-02	A	C	BUFFALO SERVICE STATION
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	C	AHFC Properties - Harper Street Reckey # - 1992330923001 Diesel fuel spill - quantity and date not specified. Lots 1 and 2 North and West addition in Delta Jct. (rpltr6)
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	C	BUFFALO SERVICE STATION
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	C	Alaska Highway
Highways and roads, dirt/gravel	X24	X24-01	A	C	Assume 1 - 20 roads in Zone A
Pipelines (oil and gas)	X28	X28-01	A	C	TransAlaska Pipeline
Pipelines (oil and gas)	X28	X28-02	A	C	Military Pipeline

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Motor /motor vehicle repair shops	C31	C31-01	B	C	DELTA WINDSHIELD REPAIR
Tanks, heating oil, residential (above ground)	R08	R08-02	B	C	Assume 80 or less residential aboveground heating oil tanks in Zone B
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	C	North Tank Farm No record in DEC database
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-01	B	C	GLACIER STATE TELCO
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-02	B	C	SOURDOUGH FUEL - DELTA JUNCTION
Tanks, heating oil, residential (above ground)	R08	R08-03	C	C	Assume 50 or less residential aboveground heating oil tanks in Zone C
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	C	BERGSTADS TRAILER COURT
Tanks, heating oil, residential (above ground)	R08	R08-04	D	C	Assume 30 or less residential aboveground heating oil tanks in Zone D

Table 2

Contaminant Source Inventory and Risk Ranking for Larry's Apartments Sources of Bacteria and Viruses

PWSID 370879.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Medium	C	Wastewater impoundment assumed in Zone A
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	High	C	LARRY'S APARTMENTS
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Alaska Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-01	B	Low	C	GLACIER STATE TELCO
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-02	B	Low	C	SOURDOUGH FUEL - DELTA JUNCTION
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	High	C	BERGSTADS TRAILER COURT

Table 3

Contaminant Source Inventory and Risk Ranking for Larry's Apartments Sources of Nitrates/Nitrites

PWSID 370879.001

Contaminant Source Type	***Contaminant Source ID***	***CS ID tag***	***Zone***	***Risk Ranking for Analysis***	***Map Number***	***Comments***
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Medium	C	Wastewater impoundment assumed in Zone A
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	High	C	LARRY'S APARTMENTS
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Alaska Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-01	B	Low	C	GLACIER STATE TELCO
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-02	B	Low	C	SOURDOUGH FUEL - DELTA JUNCTION
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	High	C	BERGSTADS TRAILER COURT

Table 4

Contaminant Source Inventory and Risk Ranking for Larry's Apartments
Sources of Volatile Organic Chemicals

PWSID 370879.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Gasoline stations (with repair shop)	C16	C16-01	A	High	C	BUFFALO SERVICE STATION
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Wastewater impoundment assumed in Zone A
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	LARRY'S APARTMENTS
Tanks, heating oil, residential (above ground)	R08	R08-01	A	Medium	C	Assume 100 or less residential aboveground heating oil tanks in Zone A
Tanks, diesel (underground)	T08	T08-01	A	High	C	BUFFALO SERVICE STATION
Closed tanks, diesel (underground)	T09	T09-01	A	Medium	C	BUFFALO SERVICE STATION
Closed tanks, diesel (underground)	T09	T09-02	A	Medium	C	BUFFALO SERVICE STATION
Tanks, gasoline (underground)	T12	T12-01	A	High	C	BUFFALO SERVICE STATION
Closed tanks, gasoline (underground)	T13	T13-01	A	Medium	C	BUFFALO SERVICE STATION
Closed tanks, gasoline (underground)	T13	T13-02	A	Medium	C	BUFFALO SERVICE STATION
Closed tanks, gasoline (underground)	T13	T13-03	A	Medium	C	BUFFALO SERVICE STATION
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	High	C	AHFC Properties - Harper Street Reckey # - 1992330923001 Diesel fuel spill - quantity and date not specified. Lots 1 and 2 North and West addition in Delta Jct. (rpltr6)
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	High	C	BUFFALO SERVICE STATION
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Alaska Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A
Pipelines (oil and gas)	X28	X28-01	A	Medium	C	TransAlaska Pipeline
Pipelines (oil and gas)	X28	X28-02	A	Medium	C	Military Pipeline
Motor /motor vehicle repair shops	C31	C31-01	B	Medium	C	DELTA WINDSHIELD REPAIR

Contaminant Source Inventory and Risk Ranking for Larry's Apartments

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, residential (above ground)	R08	R08-02	B	Medium	C	Assume 80 or less residential aboveground heating oil tanks in Zone B
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	High	C	North Tank Farm No record in DEC database
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-01	B	High	C	GLACIER STATE TELCO
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-02	B	High	C	SOURDOUGH FUEL - DELTA JUNCTION

Table 5

Contaminant Source Inventory and Risk Ranking for Larry's Apartments

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 370879.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Gasoline stations (with repair shop)	C16	C16-01	A	Low	C	BUFFALO SERVICE STATION
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Wastewater impoundment assumed in Zone A
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	LARRY'S APARTMENTS
Tanks, gasoline (underground)	T12	T12-01	A	Medium	C	BUFFALO SERVICE STATION
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	Low	C	AHFC Properties - Harper Street Reckey # - 1992330923001 Diesel fuel spill - quantity and date not specified. Lots 1 and 2 North and West addition in Delta Jct. (rpltr6)
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Alaska Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A
Pipelines (oil and gas)	X28	X28-01	A	Low	C	TransAlaska Pipeline
Pipelines (oil and gas)	X28	X28-02	A	Low	C	Military Pipeline
Motor /motor vehicle repair shops	C31	C31-01	B	Medium	C	DELTA WINDSHIELD REPAIR
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	Low	C	North Tank Farm No record in DEC database
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-01	B	Low	C	GLACIER STATE TELCO
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-02	B	Low	C	SOURDOUGH FUEL - DELTA JUNCTION

Table 6

Contaminant Source Inventory and Risk Ranking for Larry's Apartments
Sources of Synthetic Organic Chemicals

PWSID 370879.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Wastewater impoundment assumed in Zone A
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	LARRY'S APARTMENTS
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	Low	C	AHFC Properties - Harper Street Reckey # - 1992330923001 Diesel fuel spill - quantity and date not specified. Lots 1 and 2 North and West addition in Delta Jct. (rpltr6)
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	Low	C	BUFFALO SERVICE STATION
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	Low	C	North Tank Farm No record in DEC database
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-01	B	Low	C	GLACIER STATE TELCO
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-02	B	Low	C	SOURDOUGH FUEL - DELTA JUNCTION

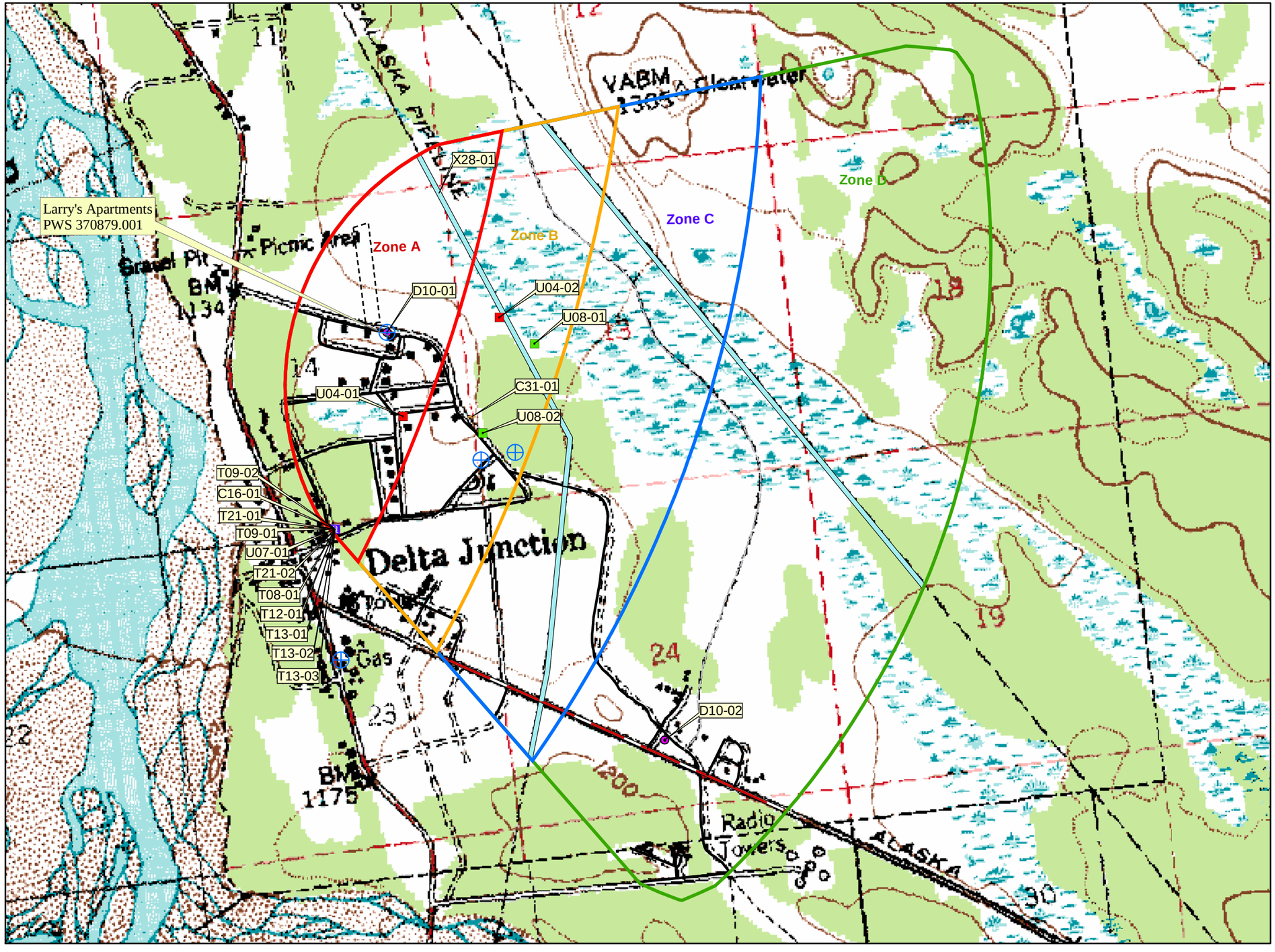
Table 7

Contaminant Source Inventory and Risk Ranking for Larry's Apartments
Sources of Other Organic Chemicals

PWSID 370879.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Gasoline stations (with repair shop)	C16	C16-01	A	Medium	C	BUFFALO SERVICE STATION
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	C	Wastewater impoundment assumed in Zone A
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	LARRY'S APARTMENTS
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	A	Low	C	AHFC Properties - Harper Street Reckey # - 1992330923001 Diesel fuel spill - quantity and date not specified. Lots 1 and 2 North and West addition in Delta Jct. (rpltr6)
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	Low	C	BUFFALO SERVICE STATION
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Alaska Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assume 1 - 20 roads in Zone A
Pipelines (oil and gas)	X28	X28-01	A	High	C	TransAlaska Pipeline
Pipelines (oil and gas)	X28	X28-02	A	High	C	Military Pipeline
Motor /motor vehicle repair shops	C31	C31-01	B	Medium	C	DELTA WINDSHIELD REPAIR
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	Low	C	North Tank Farm No record in DEC database
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-01	B	Low	C	GLACIER STATE TELCO
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-02	B	Low	C	SOURDOUGH FUEL - DELTA JUNCTION

Public Water Well System for PWS #370879.001 Larry's Apartments
Potential and Existing Sources of Contamination



LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours

Transportation

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

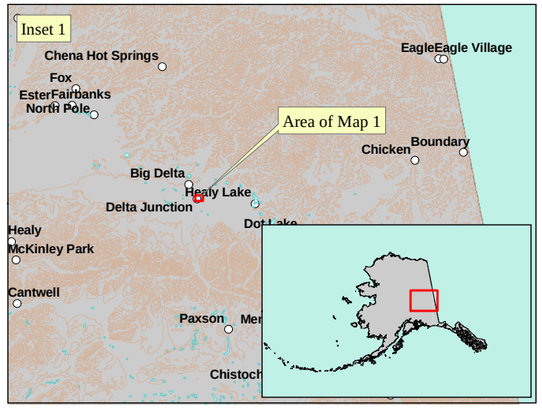
Groundwater Protection Zones

- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone C Protection Area– 5 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time

Existing or Potential Contaminant Sources

- Gasoline stations with repair shops (C16)
- Motor/motor vehicle repair shops (C31)
- Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method) (D10)
- Tanks, diesel, underground (T08)
- Closed tanks, diesel, underground (T09)
- Tanks, gasoline, underground (T12)
- Closed tanks, gasoline, underground (T13)
- Closed tanks, lubricants or other petroleum products, underground (T21)
- Contaminated sites, DEC recognized, non-Superfund, non-RCRA (U04)
- Open Leaking Underground Fuel Storage Tank (LUST) (lubricants or other petroleum products) (U07)
- Closed Leaking Underground Fuel Storage Tank (LUST) (lubricants or other petroleum products) (U08)
- Pipelines (oil and gas) (X28)

Data Sources:
Contaminant Sources, Public Water System Wells, Contours
Alaska Department of Environmental Conservation (ADEC)
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 0.125 0.25 0.5 0.75 1 Miles

Larry's Apartments
PWS 370879.001
Appendix C Map C

Chart 1. Susceptibility of the wellhead - Larry's Apartments (PWS No. 370879.001)

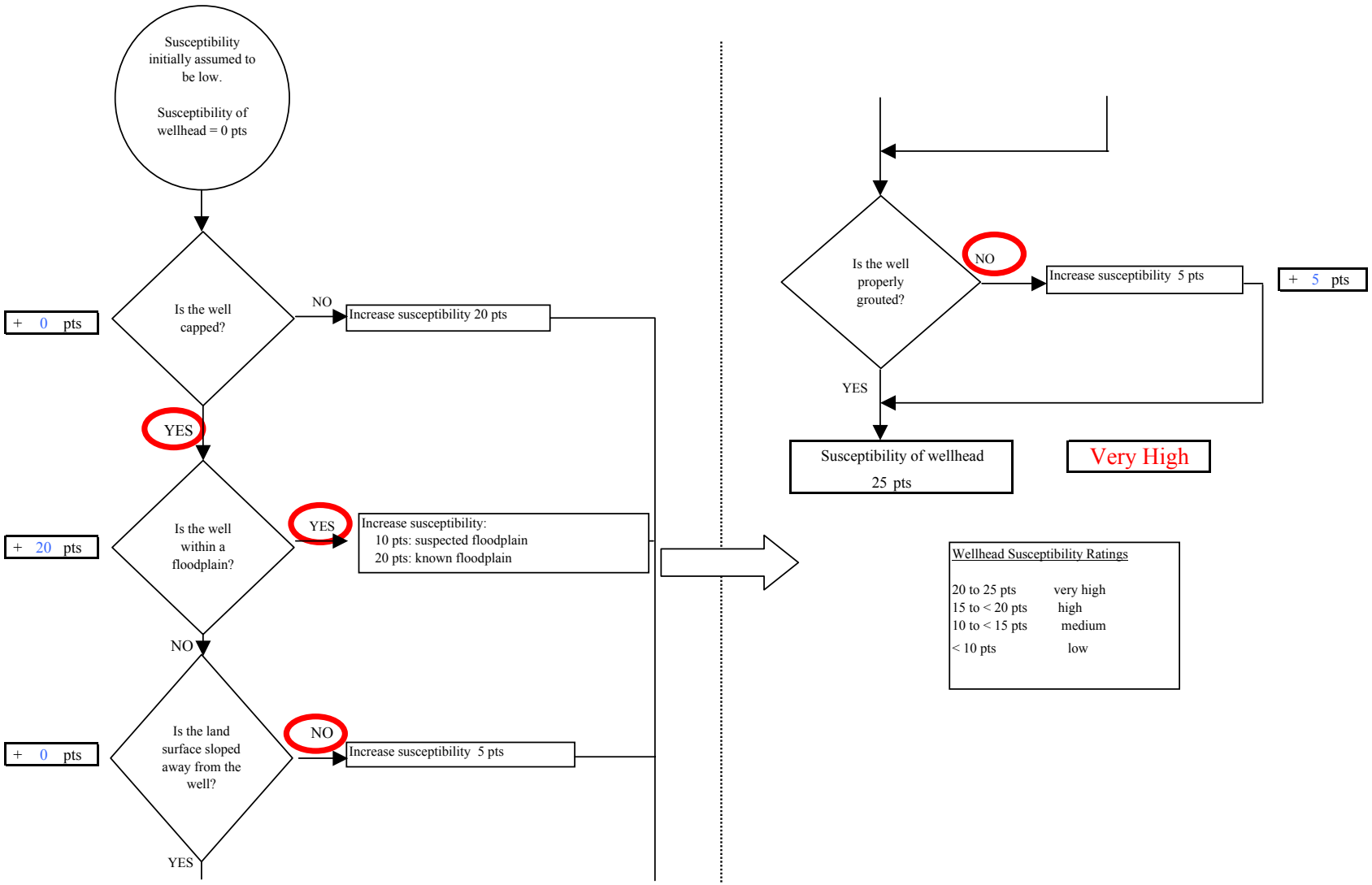


Chart 2. Susceptibility of the aquifer Larry's Apartments (PWS No. 370879.001)

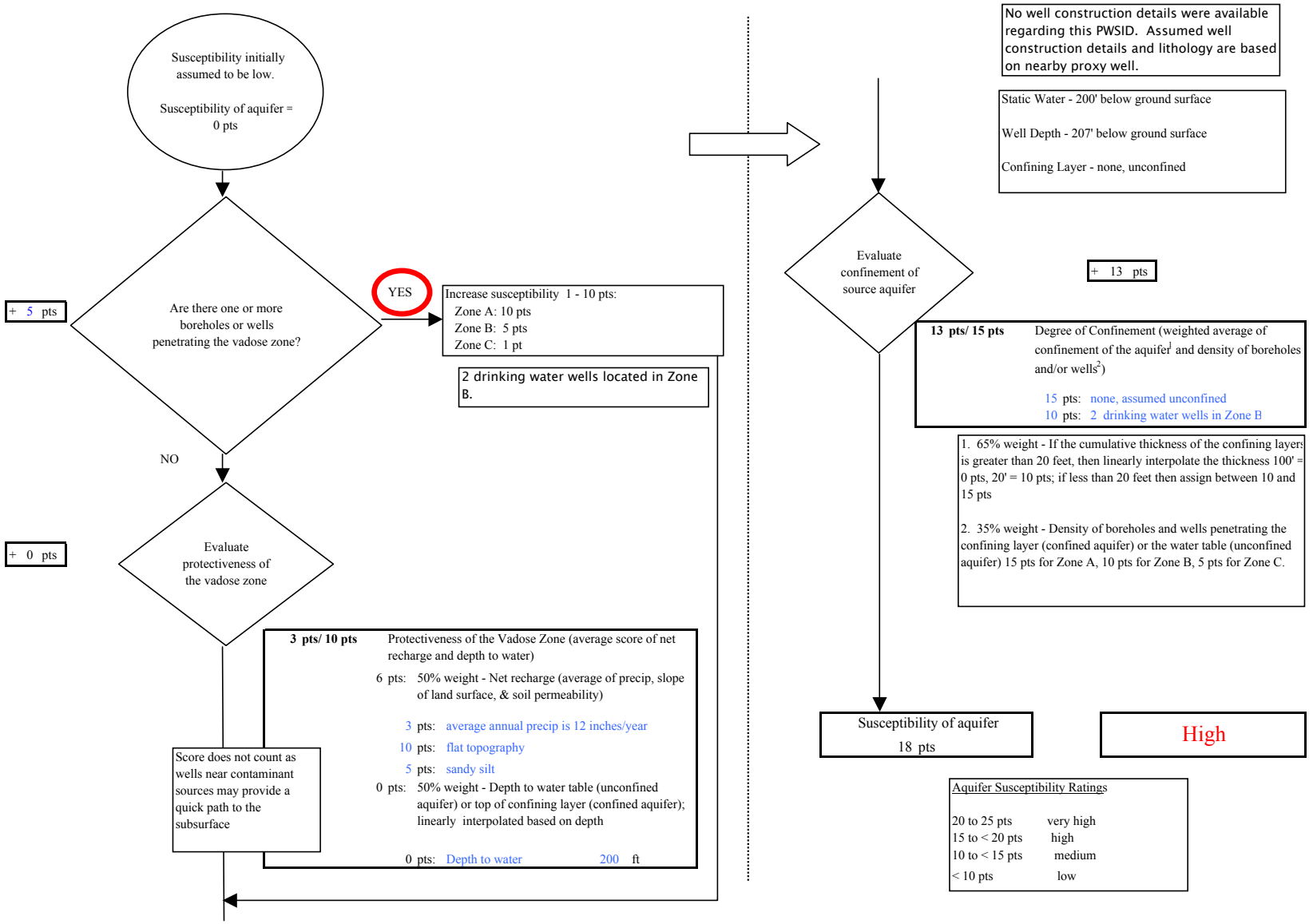
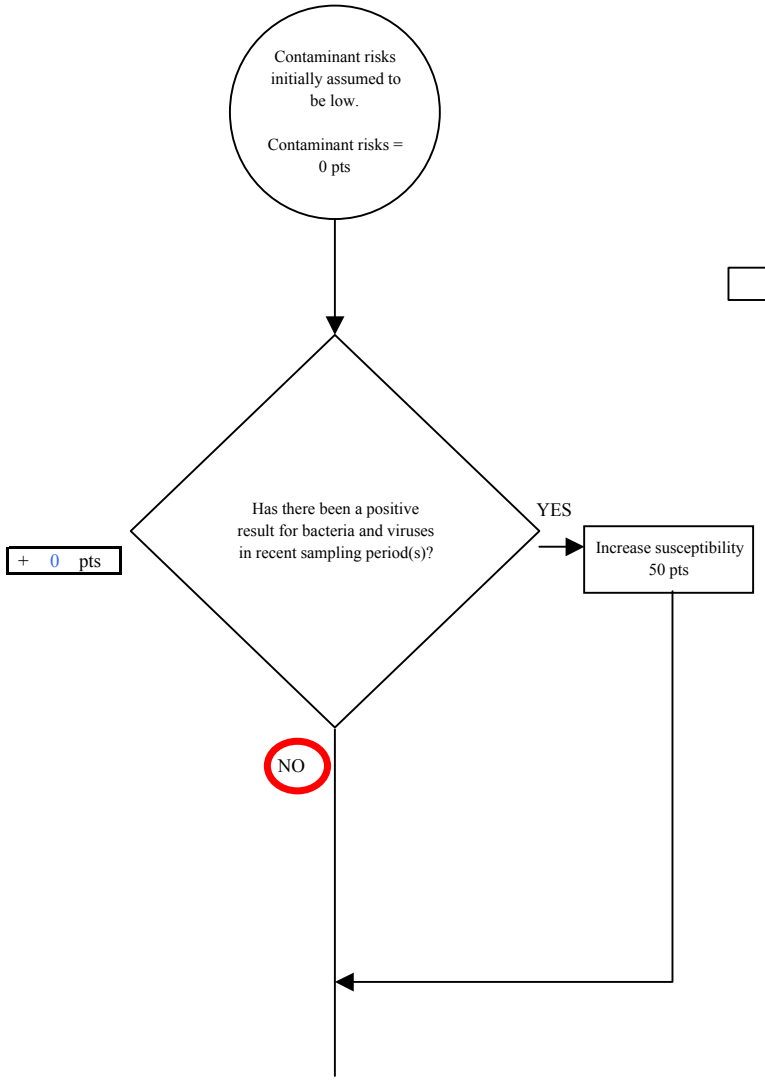
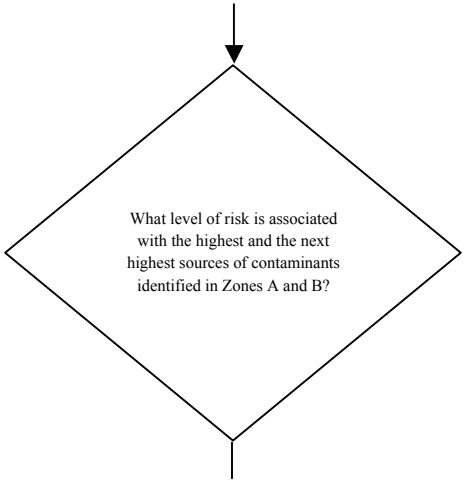


Chart 3. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Bacteria & Viruses





+ 30 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	0	1
Medium(s)	1	0	1
Low(s)	1	2	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 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 3. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Bacteria & Viruses

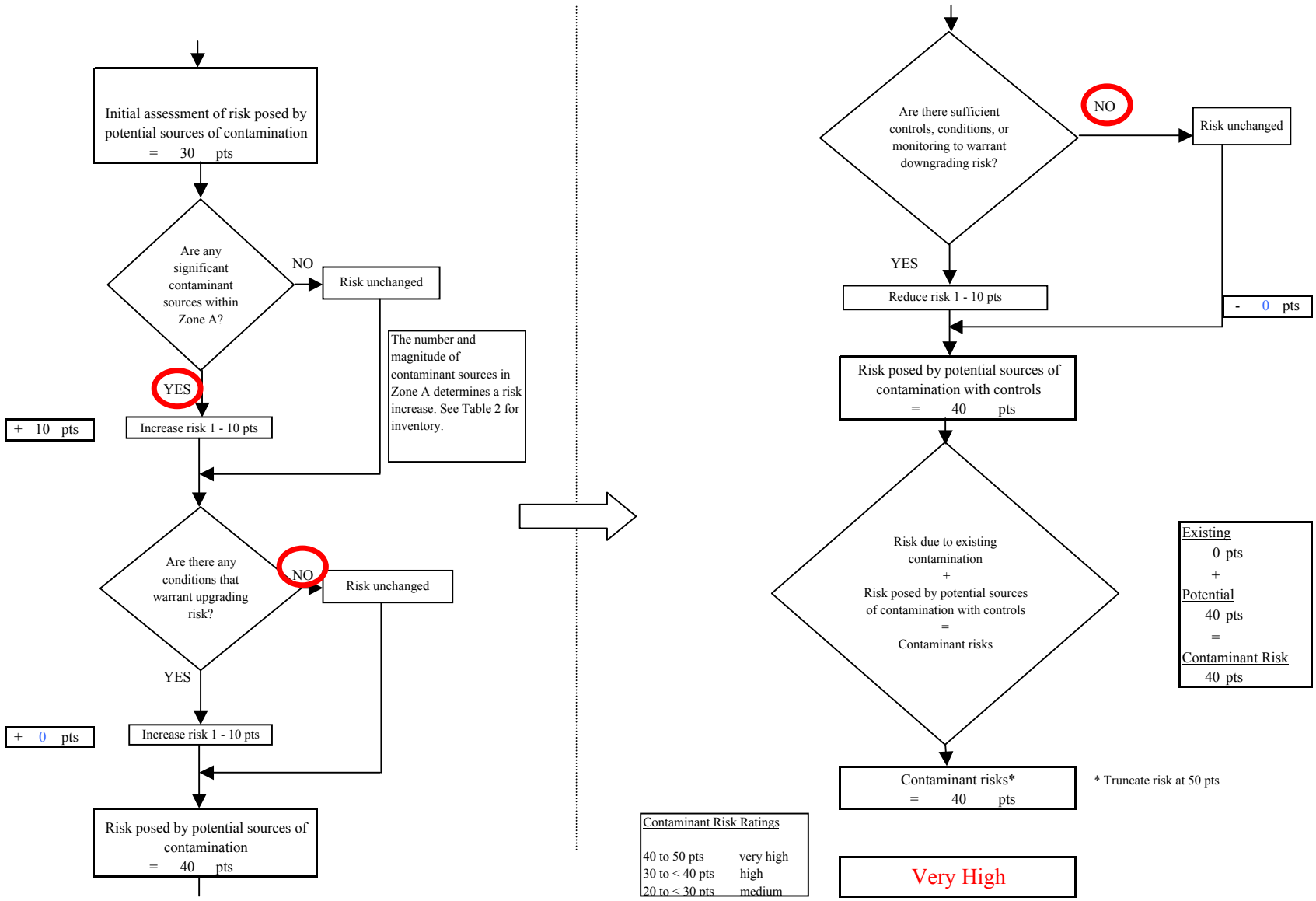


Chart 4. Vulnerability analysis for Larry's Apartments (PWS No. 370879.001) - Bacteria & Viruses

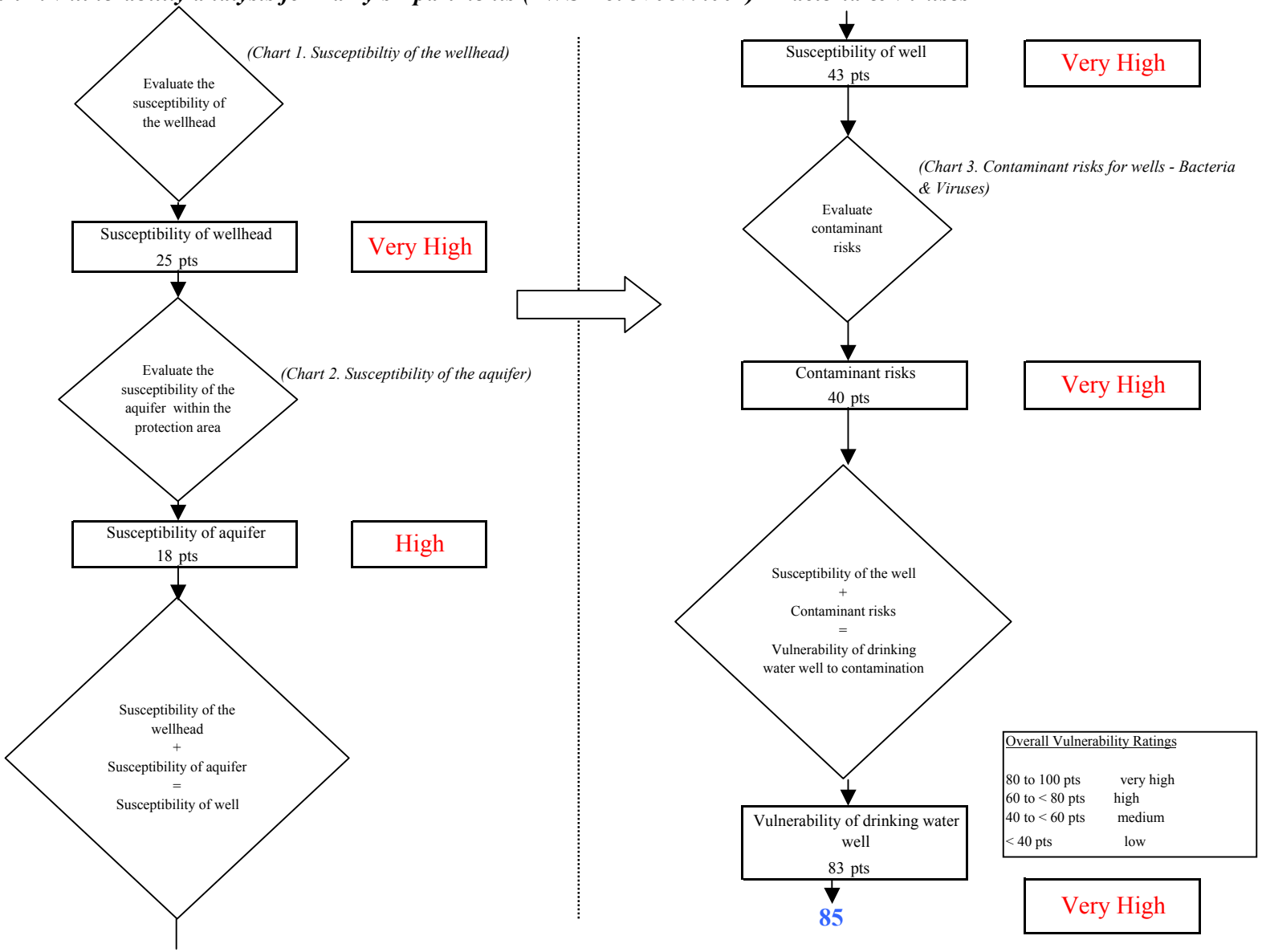


Chart 5. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Nitrates and Nitrites

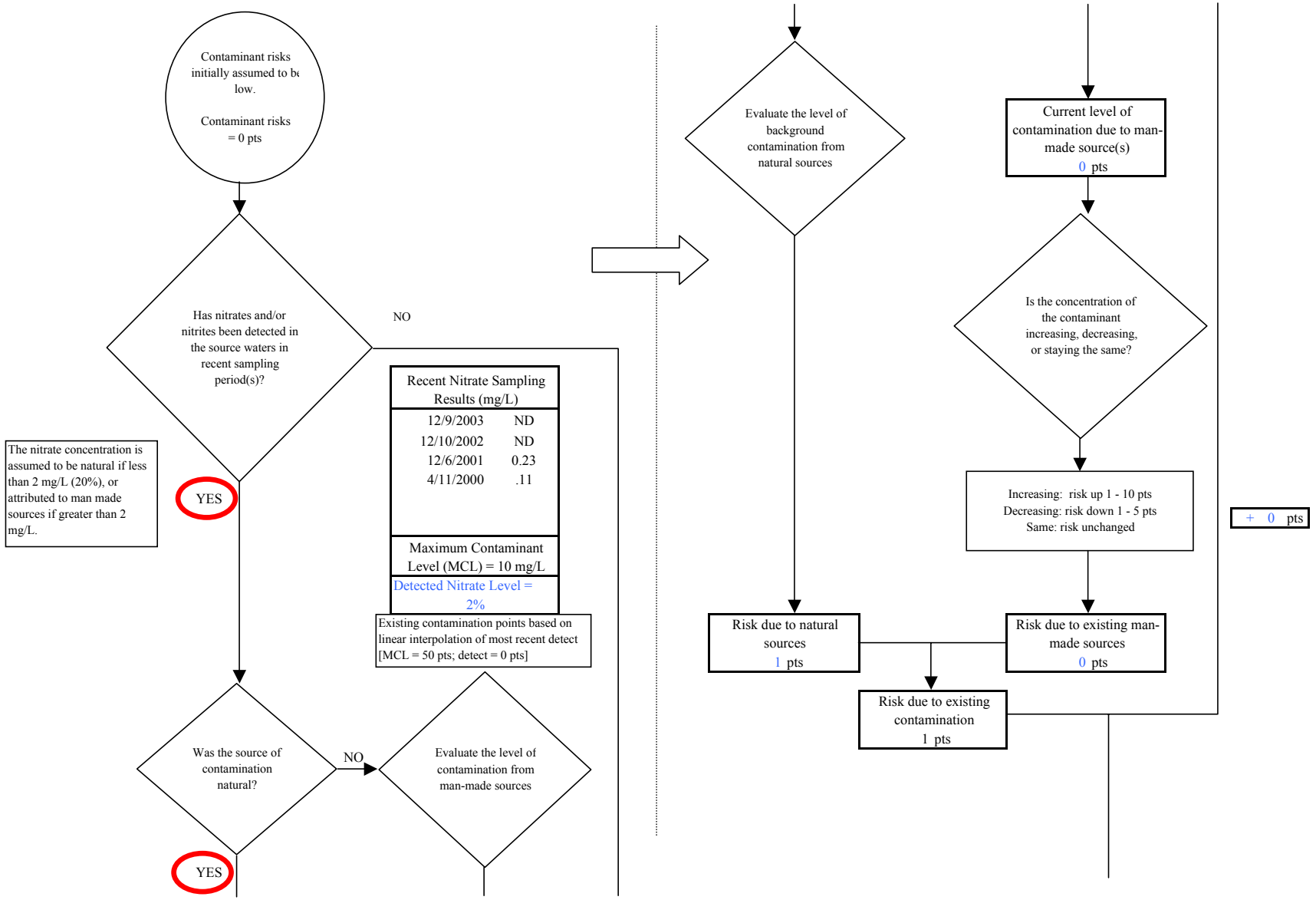


Chart 5. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Nitrates and Nitrites

+ 30 pts

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

Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	1	0	1
Medium(s)	1	0	1
Low(s)	1	2	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	30

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.

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

Is the source aquifer fractured rock or karst?

YES

NO

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

NO → Risk unchanged

YES → Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO → Risk unchanged

YES → Increase risk 1 - 10 pts

+ 10 pts

The number and magnitude of contaminant sources in Zone A determines a risk increase. See Table 3 for inventory.

Chart 5. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Nitrates and Nitrites

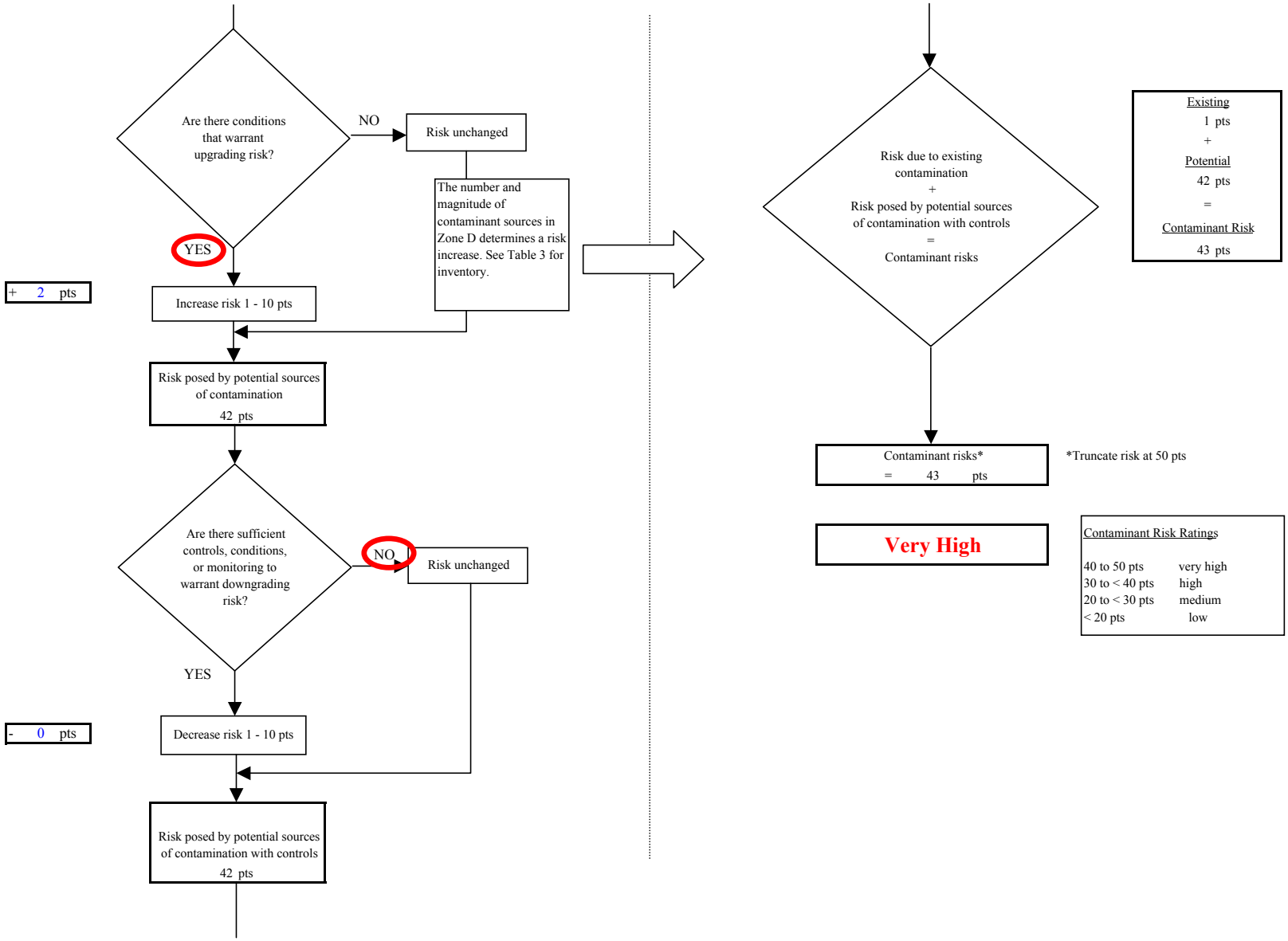


Chart 6. Vulnerability analysis for Larry's Apartments (PWS No. 370879.001) - Nitrates and Nitrites

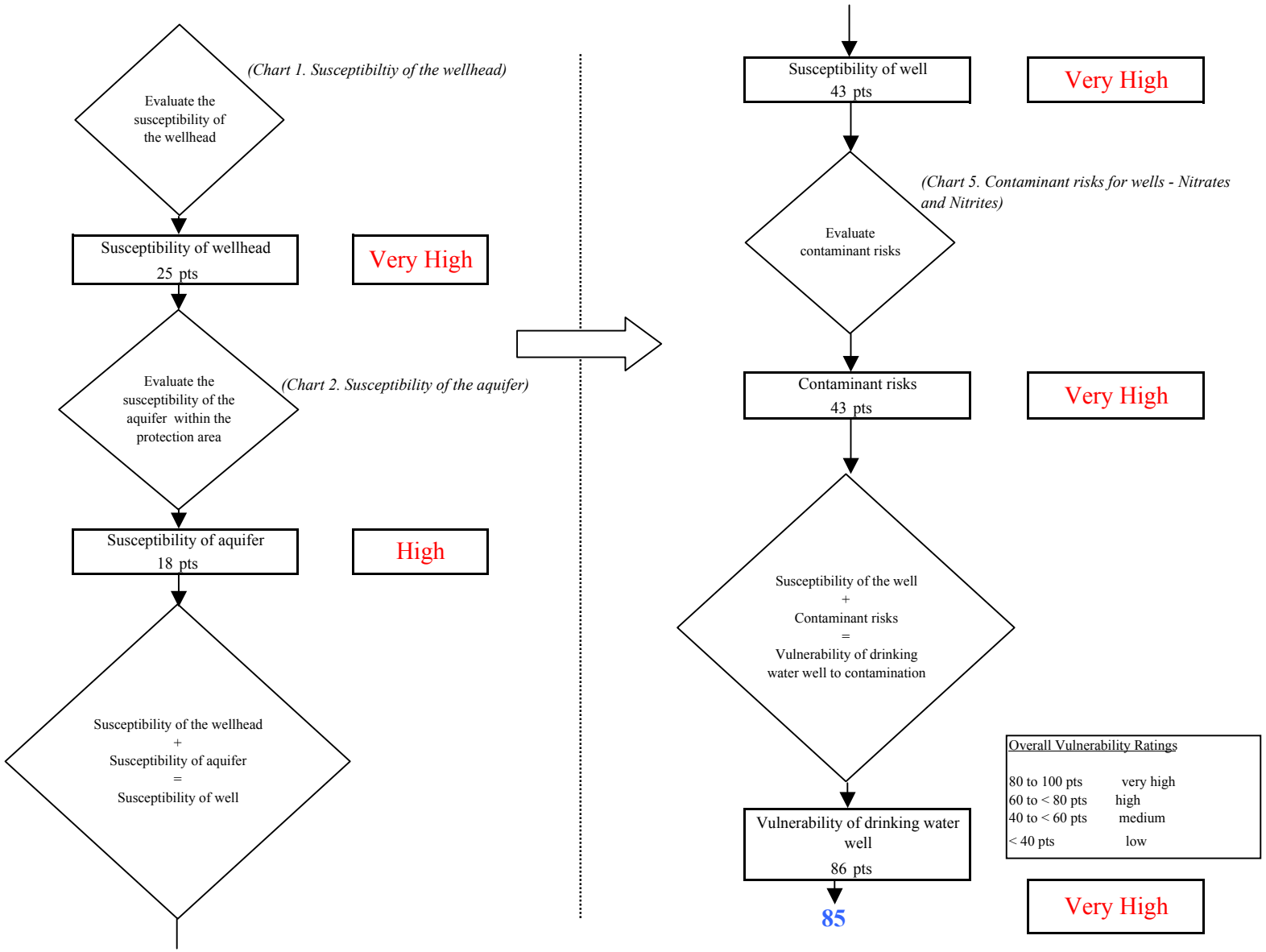


Chart 7. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Volatile Organic Chemicals

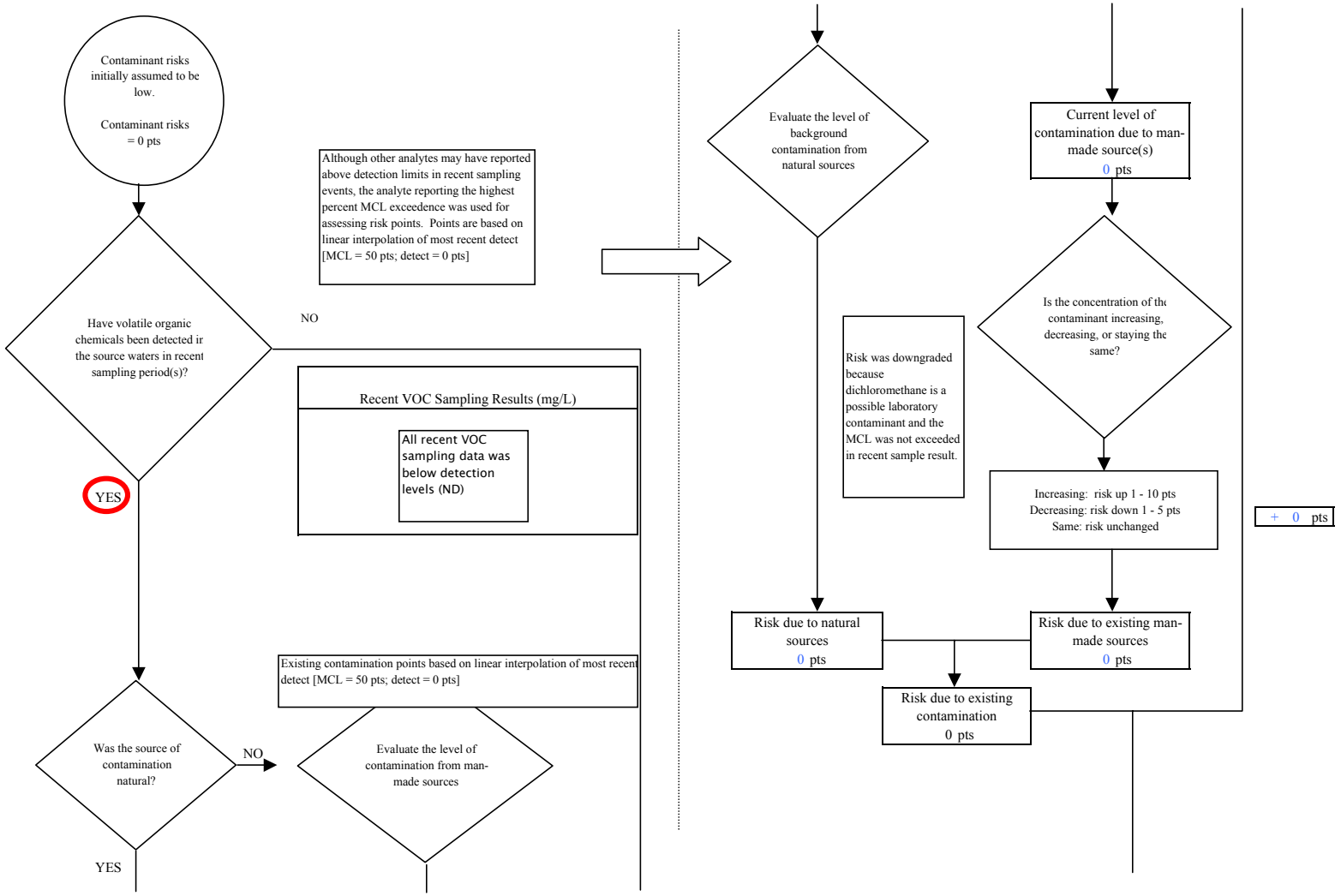


Chart 7. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Volatile Organic Chemicals

+ 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)	5	3	8
Medium(s)	107	81	188
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 40

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.

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

YES → Increase risk 1 - 10 pts

+ 10 pts

The number and magnitude of contaminant sources in Zone A determines a risk increase. See Table 4 for inventory.

Chart 7. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Volatile Organic Chemicals

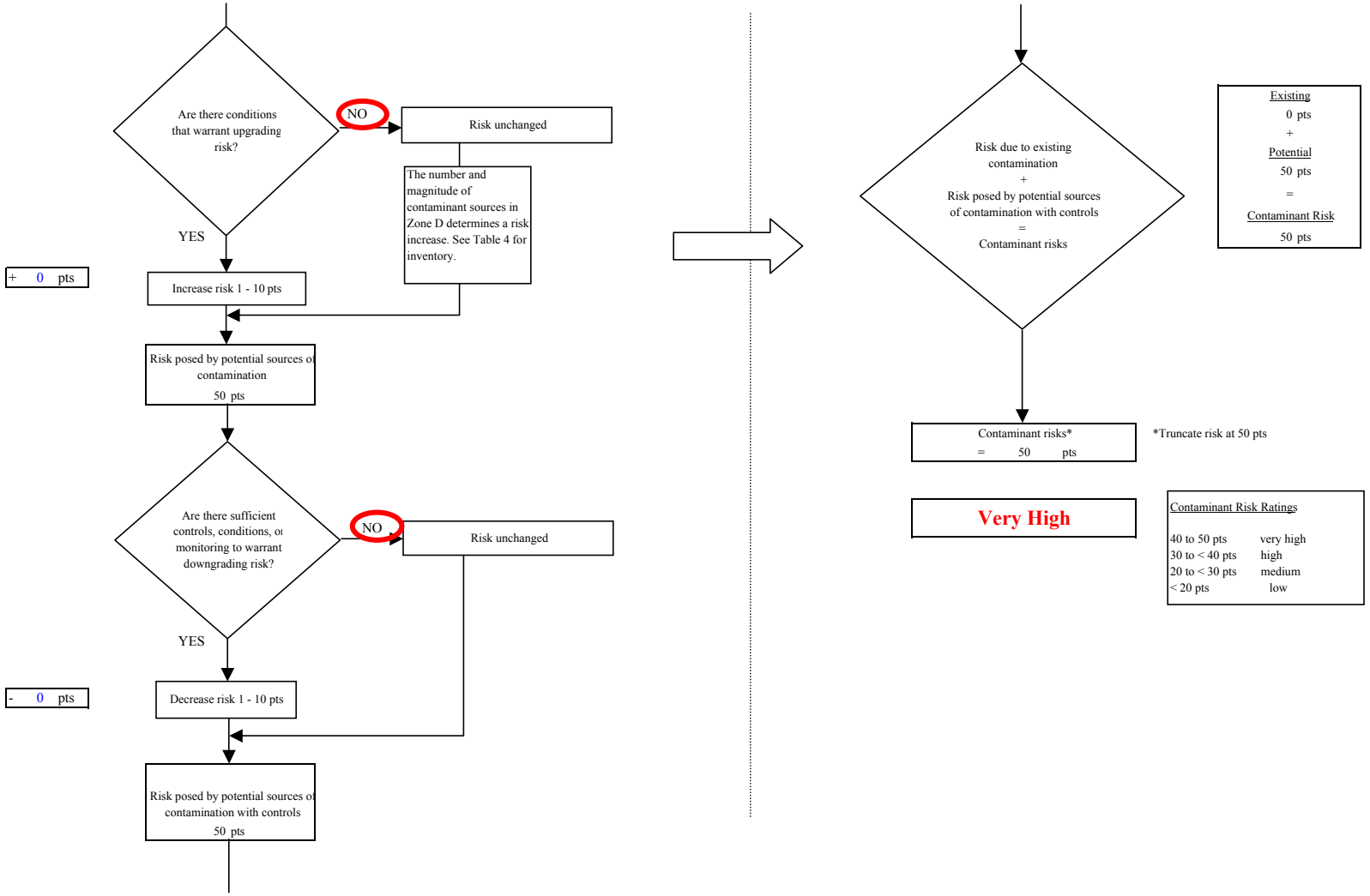


Chart 8. Vulnerability analysis for Larry's Apartments (PWS No. 370879.001) - Volatile Organic Chemicals

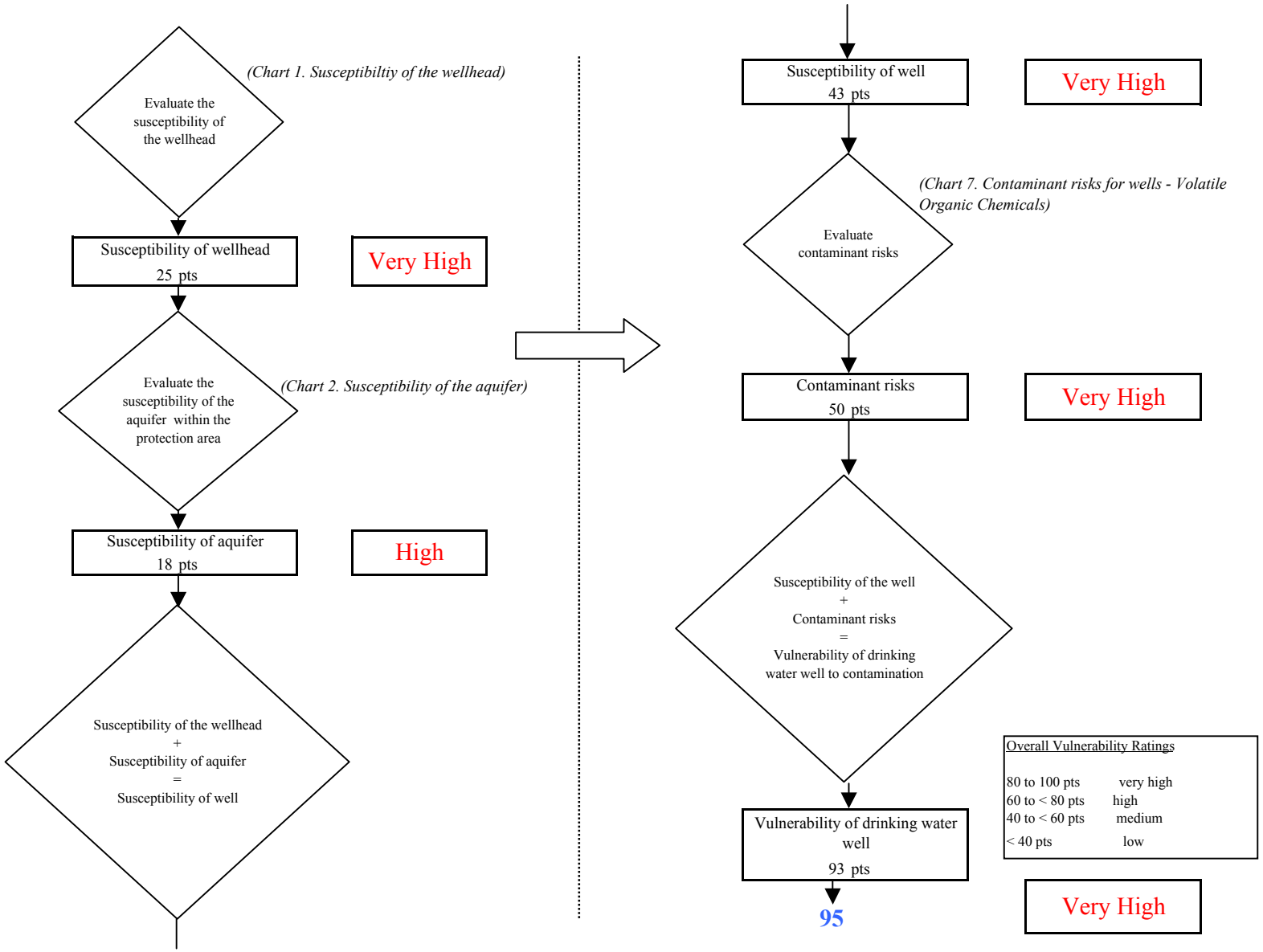


Chart 9. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

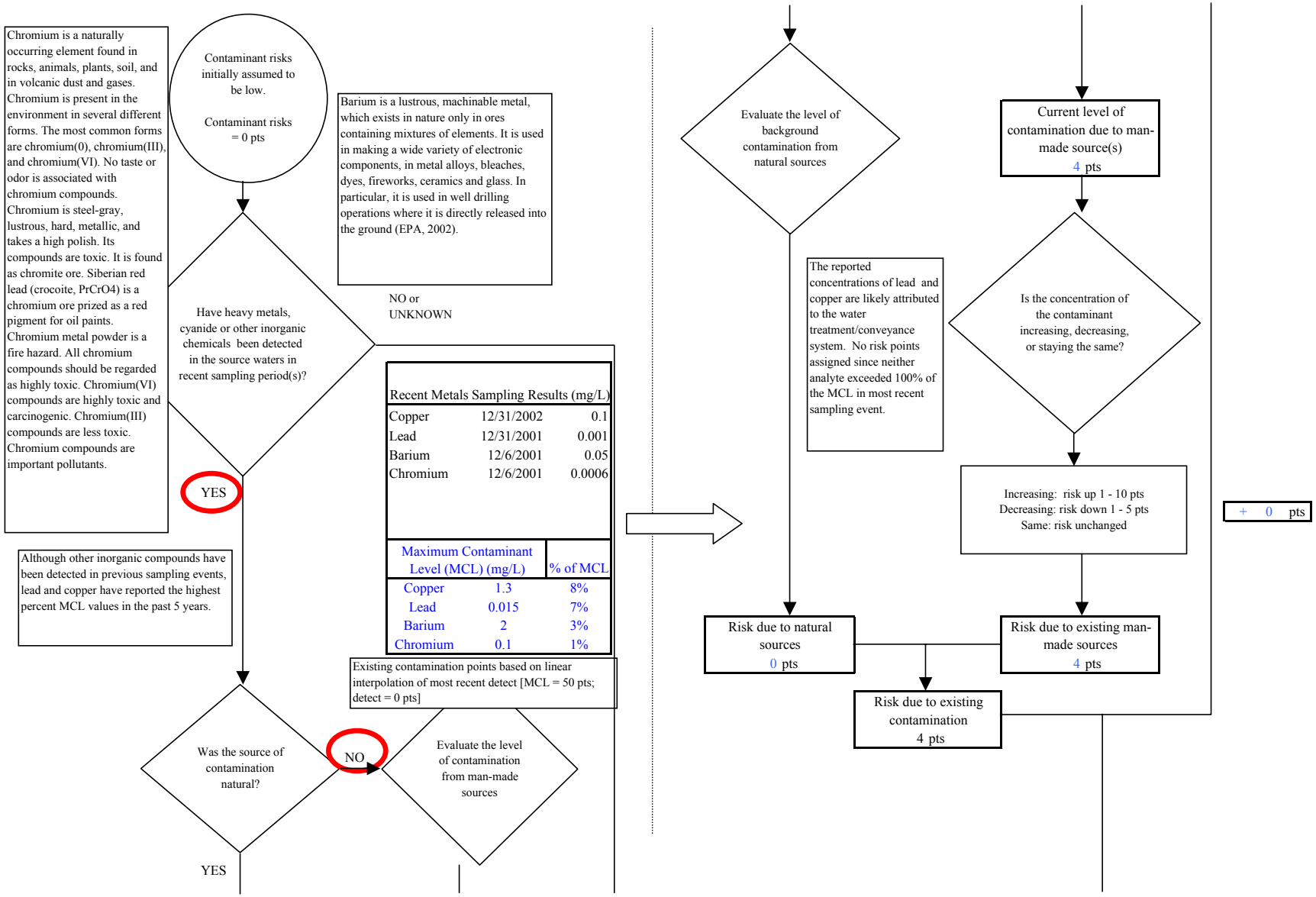
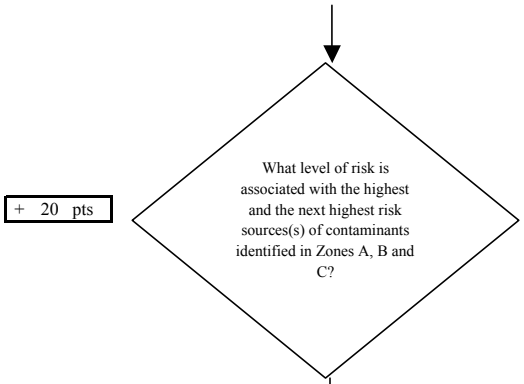


Chart 9. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals



+ 20 pts

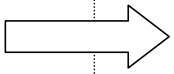
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	1	1	2
Low(s)	7	3	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 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.



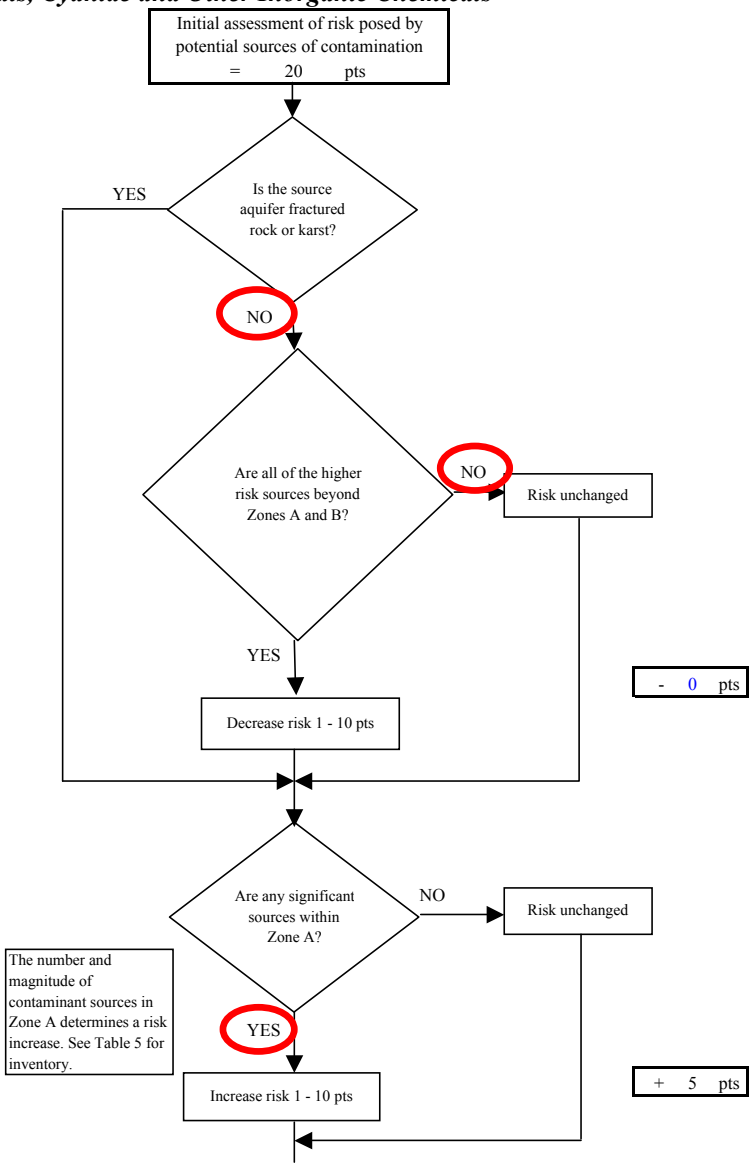


Chart 9. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

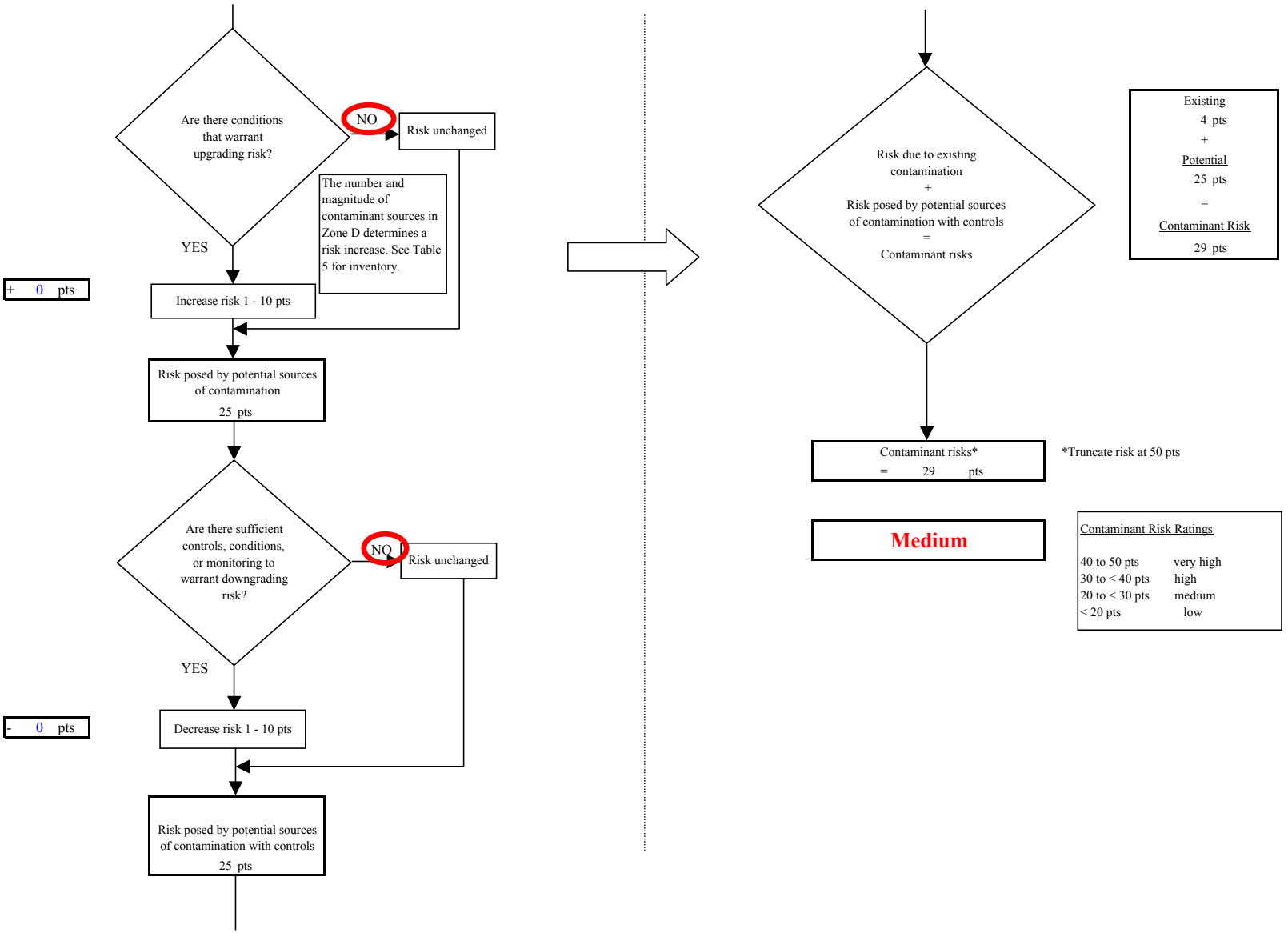


Chart 10. Vulnerability analysis for Larry's Apartments (PWS No. 370879.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

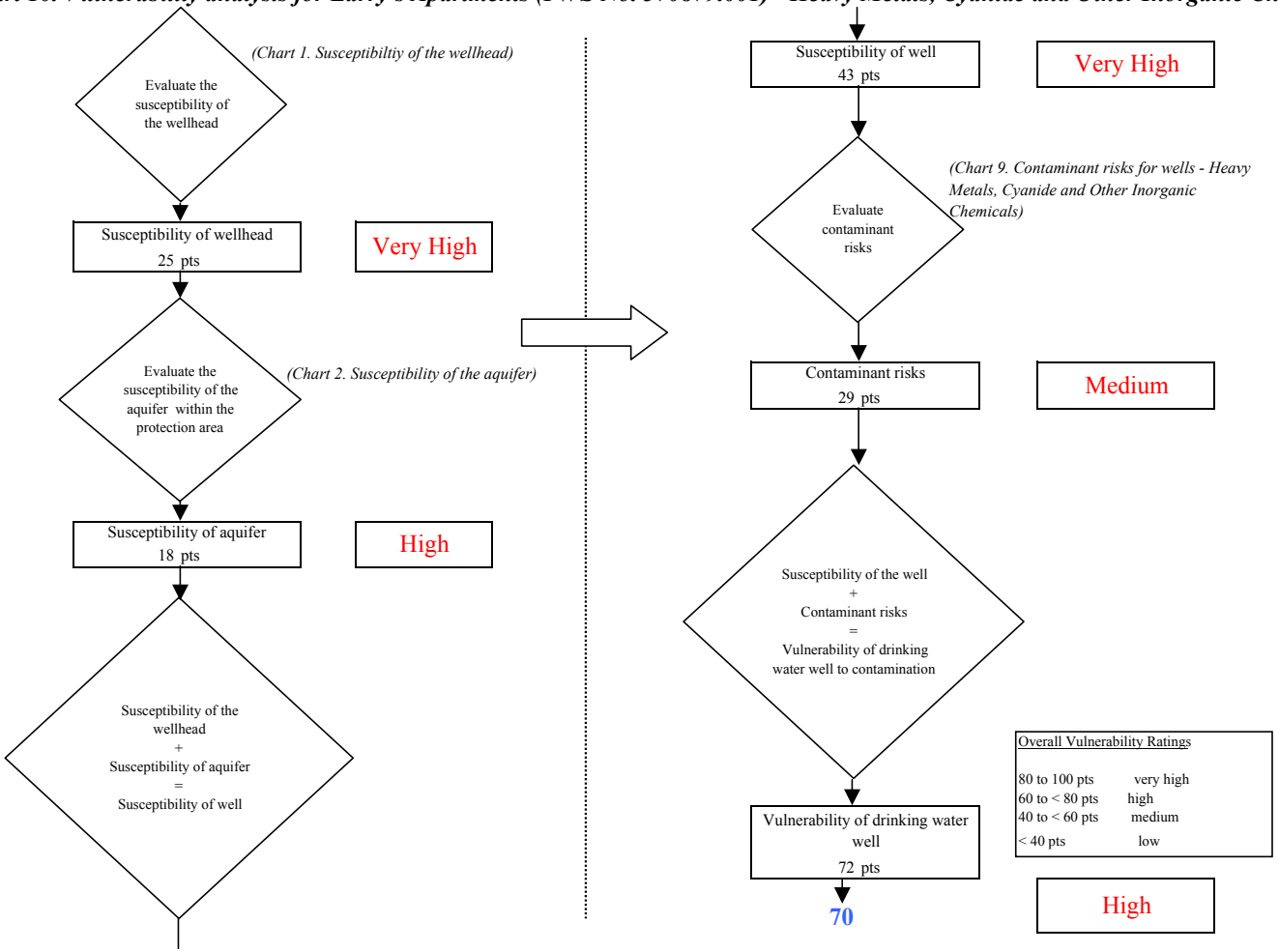


Chart 11. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Synthetic Organic Chemicals

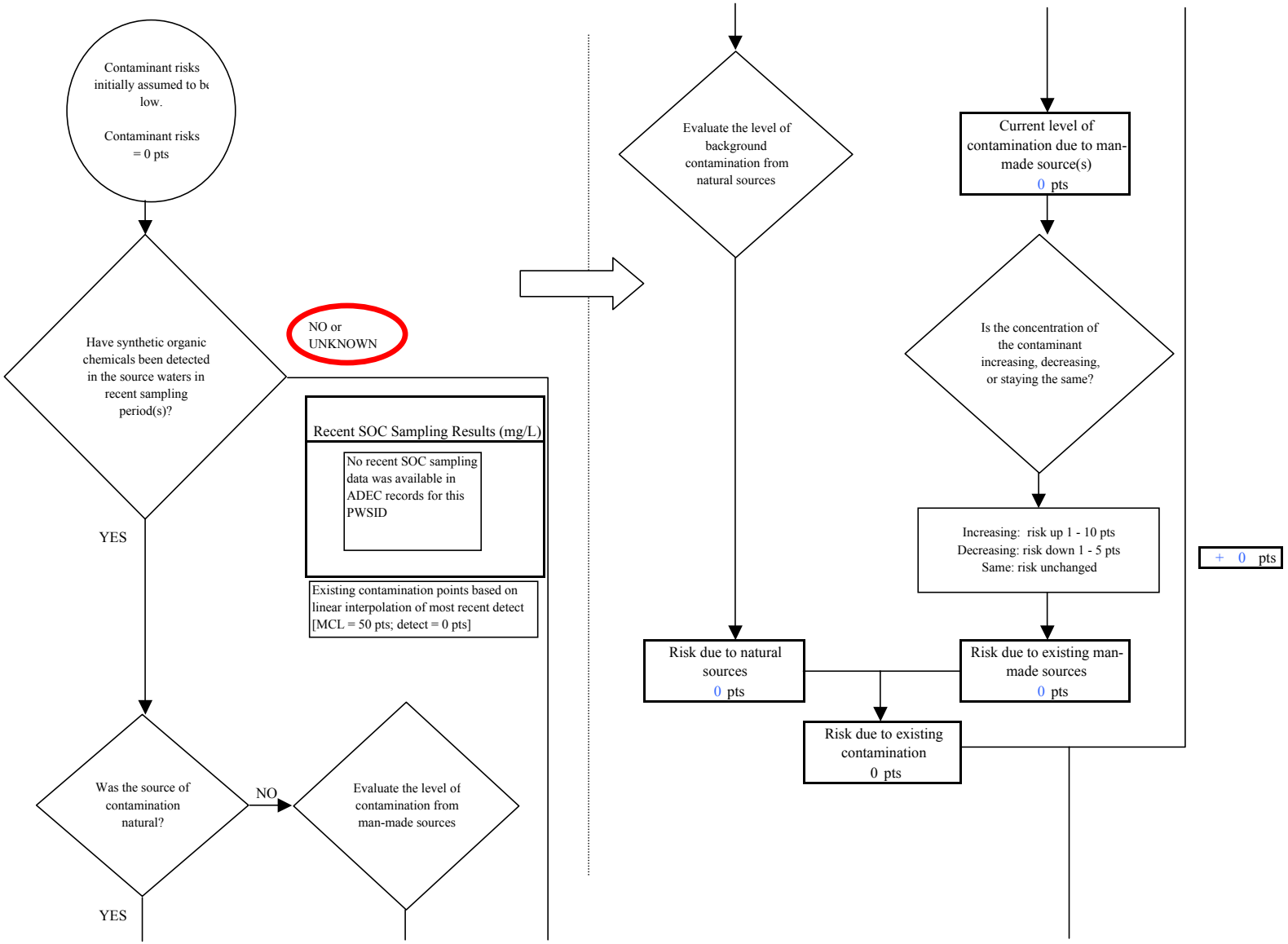
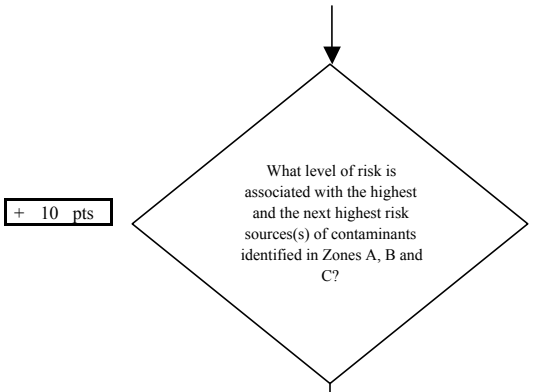


Chart 11. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Synthetic Organic Chemicals



+ 10 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)	0	0	0
Medium(s)	0	0	0
Low(s)	4	3	7

	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 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.

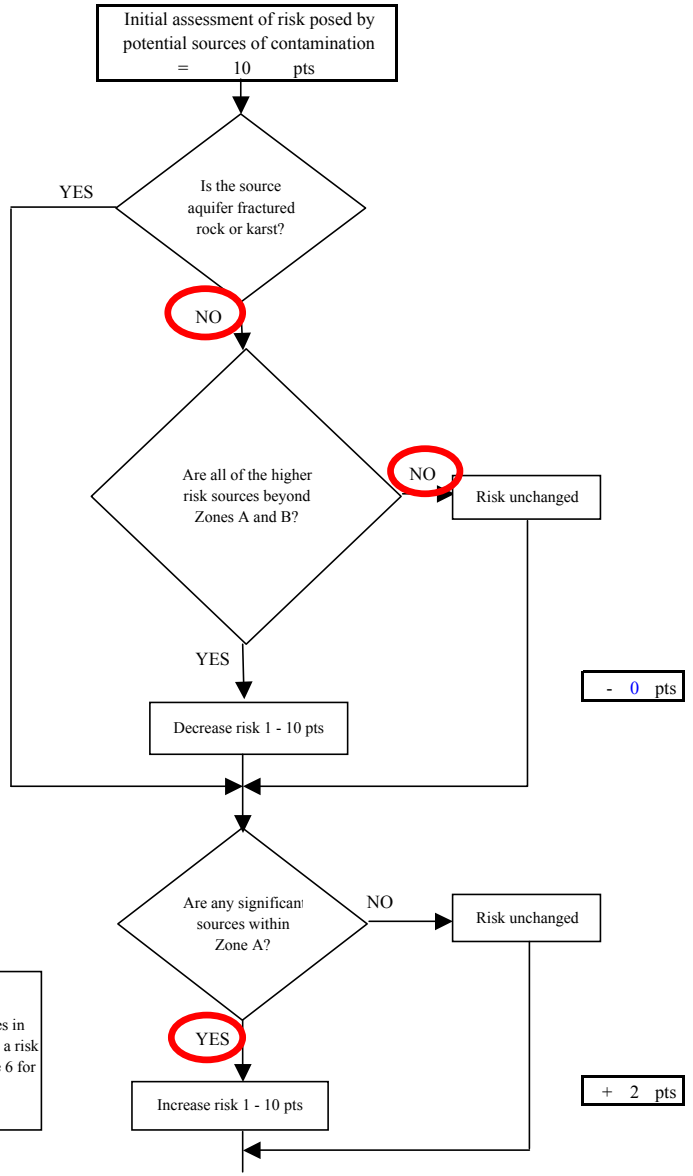


Chart 11. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Synthetic Organic Chemicals

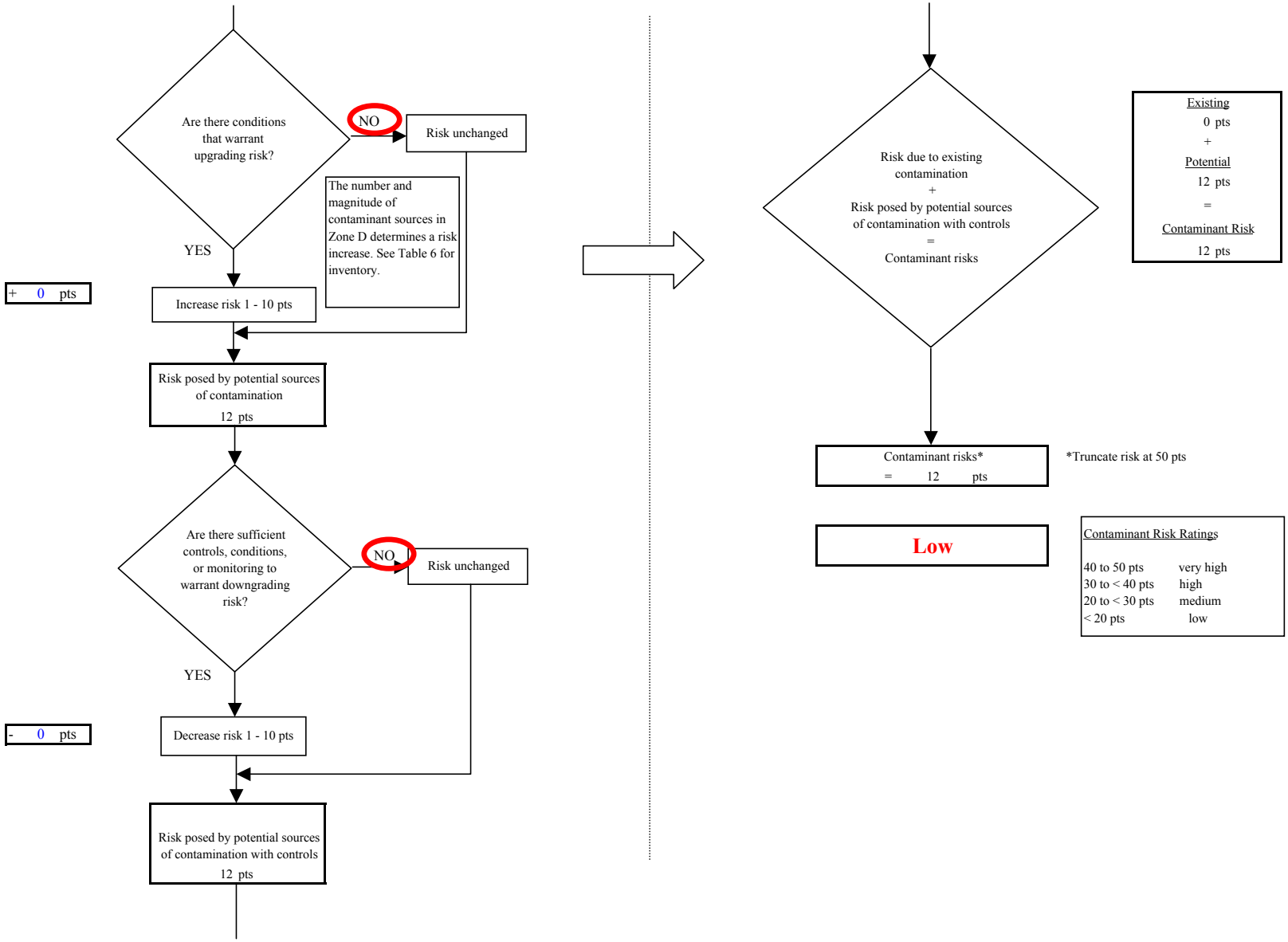


Chart 12. Vulnerability analysis for Larry's Apartments (PWS No. 370879.001) - Synthetic Organic Chemicals

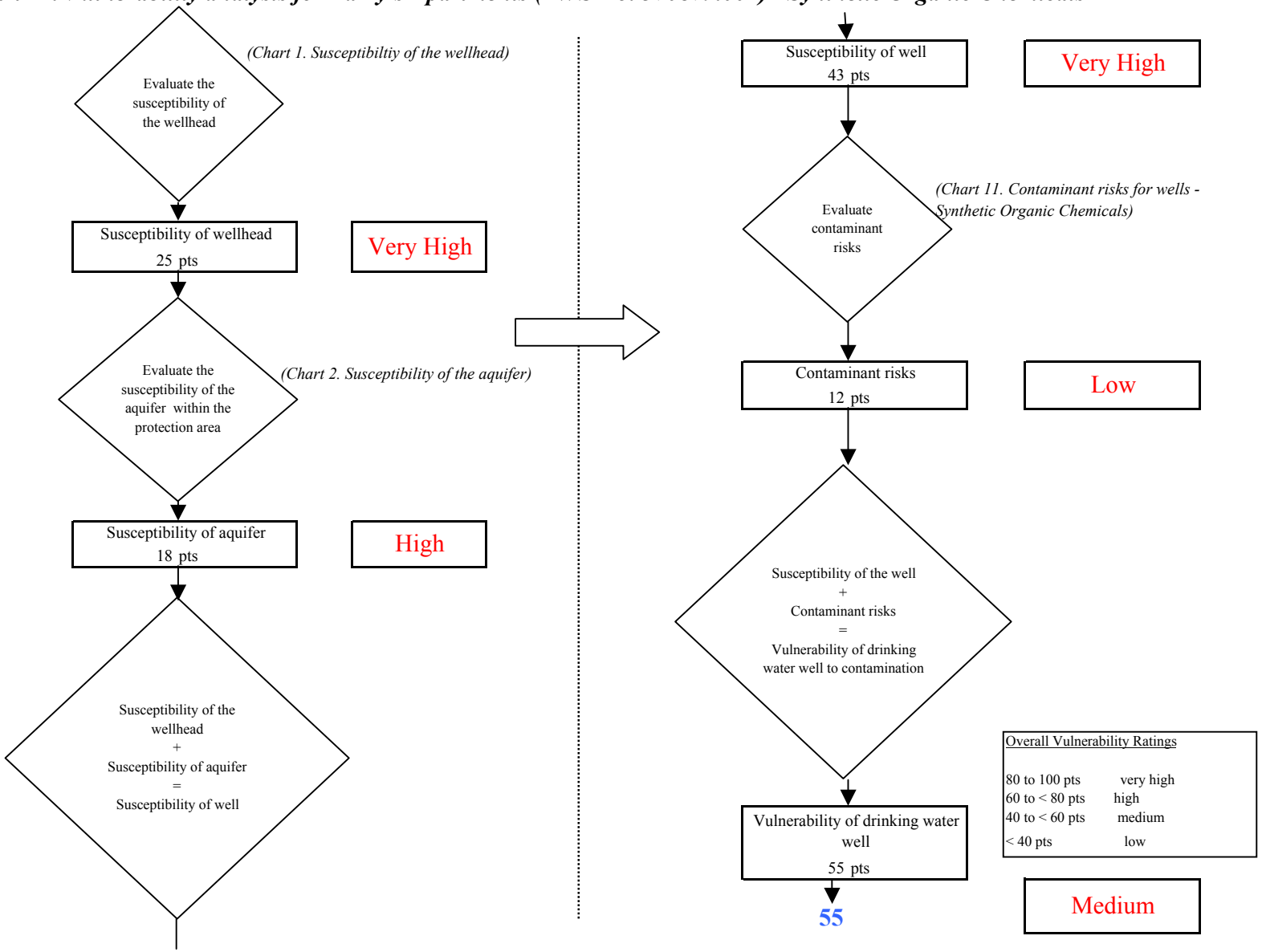


Chart 13. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Other Organic Chemicals

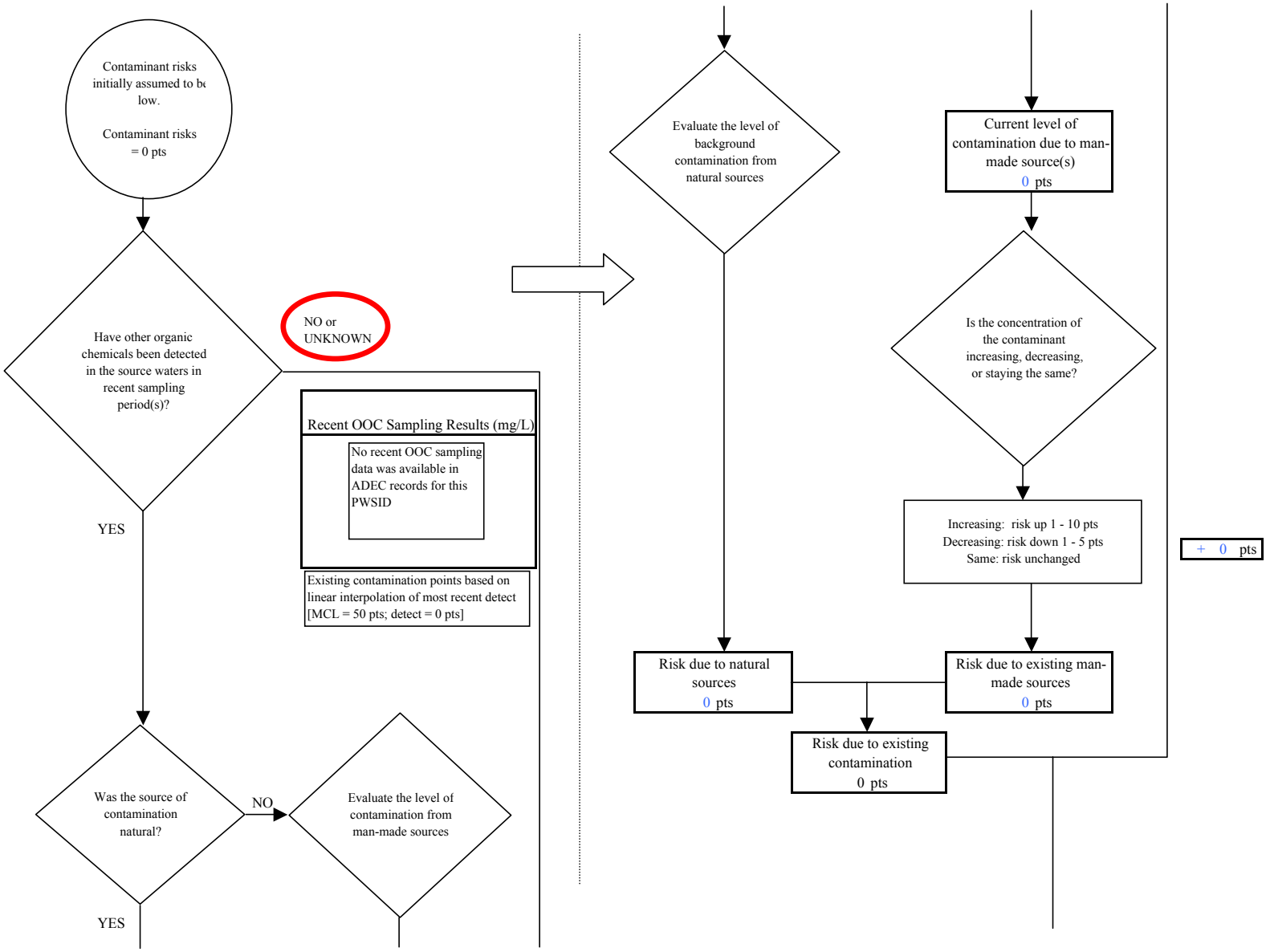
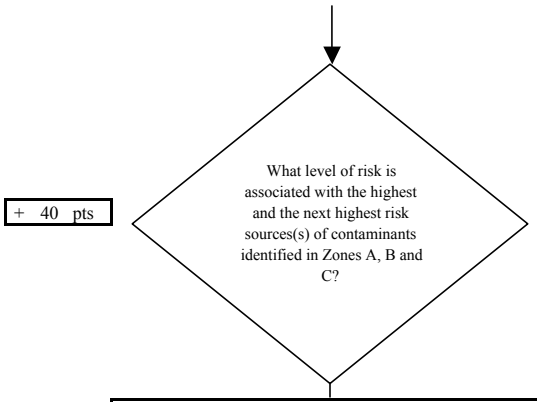


Chart 13. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Other Organic Chemicals



+ 40 pts

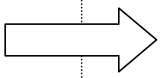
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	2	0	2
Medium(s)	1	1	2
Low(s)	5	3	8

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

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.



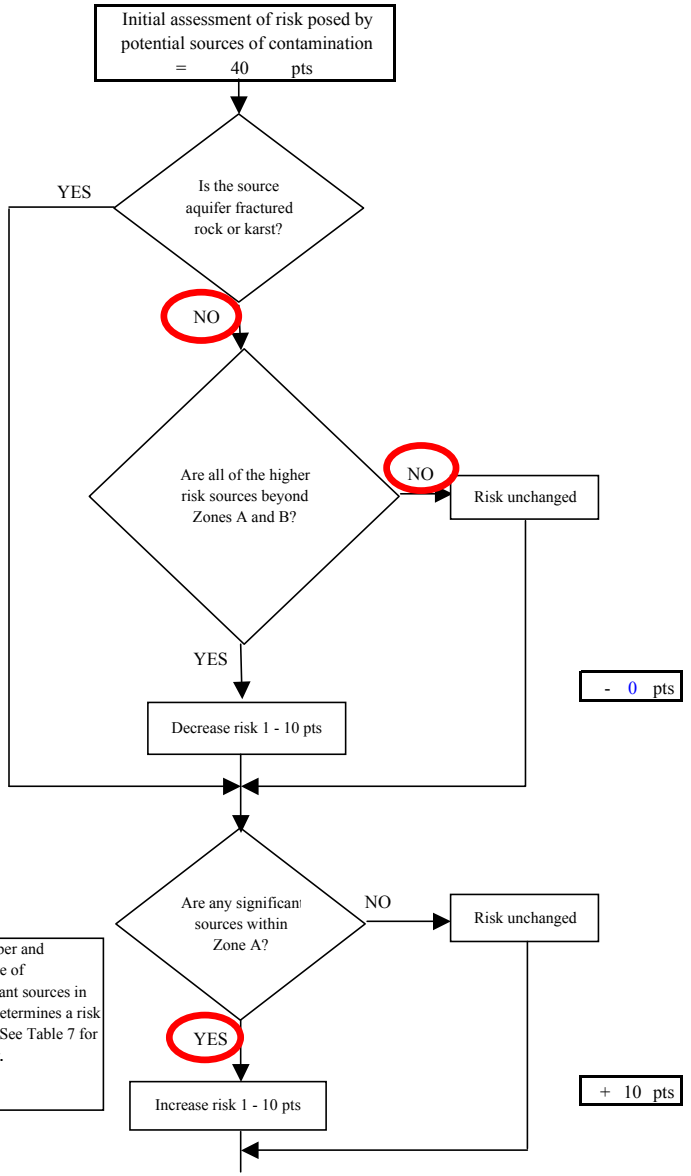


Chart 13. Contaminant risks for Larry's Apartments (PWS No. 370879.001) - Other Organic Chemicals

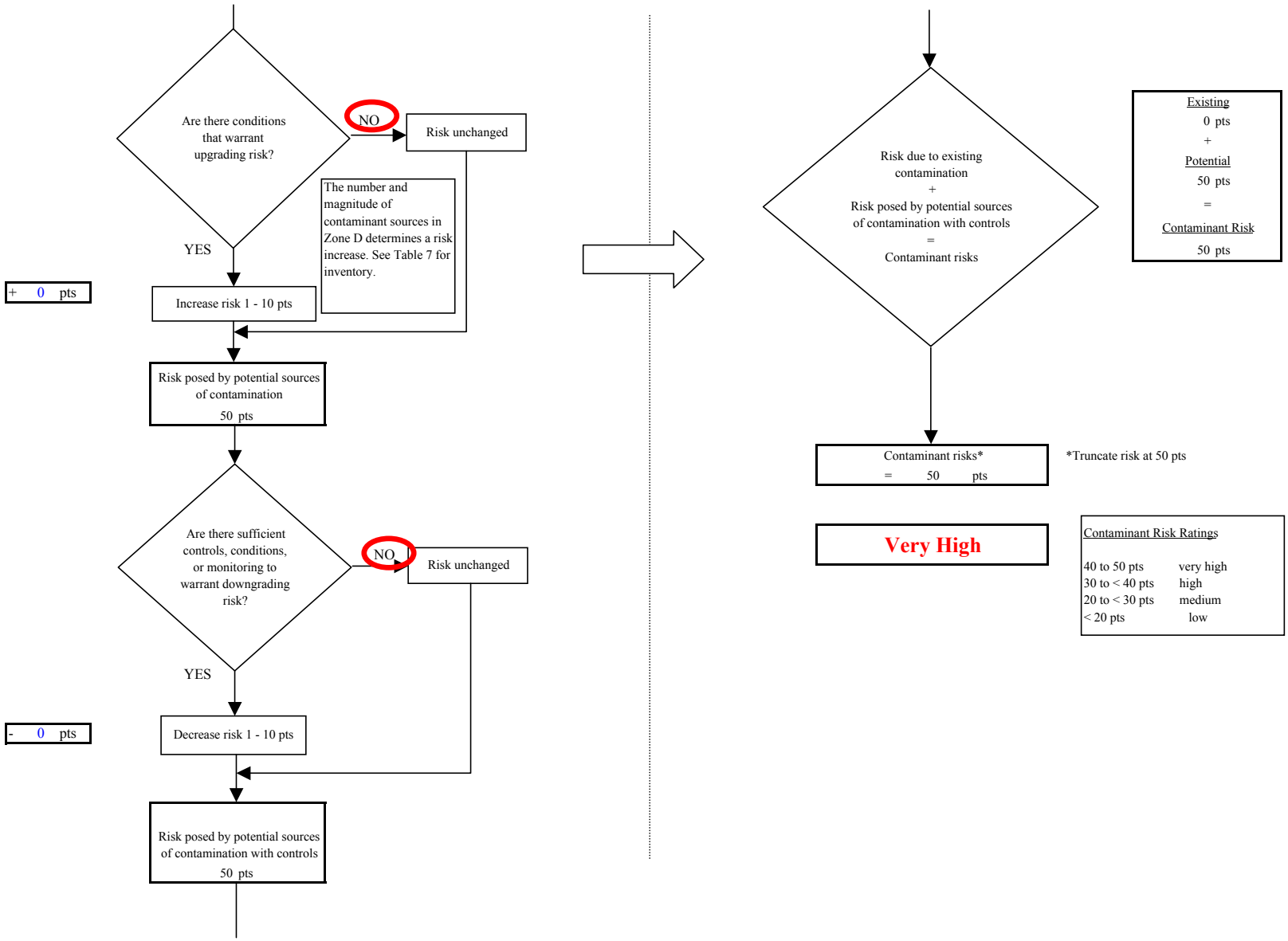


Chart 14. Vulnerability analysis for Larry's Apartments (PWS No. 370879.001) - Other Organic Chemicals