Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Anchorage Sands Apartments, Anchorage, Alaska PWSID # 211198.001

DRINKING WATER PROTECTION PROGRAM REPORT 849

Alaska Department of Environmental Conservation

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The Drinking Water Protection Program 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. 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 Anchorage Sands Apartments Source of Public Drinking Water, Anchorage, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The public water system for Anchorage Sands Apartments is a Class A (community) water system consisting of one well in the Anchorage area. Identified potential and existing sources of contaminants for Anchorage Sands Apartments include: sewer lines, residential areas, roads, motor vehicle repair shops, underground fuel tanks, various commercial and industrial activities and Leaking Underground Storage Tank (LUST) sites. These identified potential and existing sources of contamination are considered sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals and other organic chemicals. Overall, Anchorage Sands Apartments received a vulnerability rating of **Low** for bacteria and viruses and synthetic organic chemicals and **Medium** for nitrate/nitrites, volatile organic chemicals, inorganic chemicals and other organic compounds.

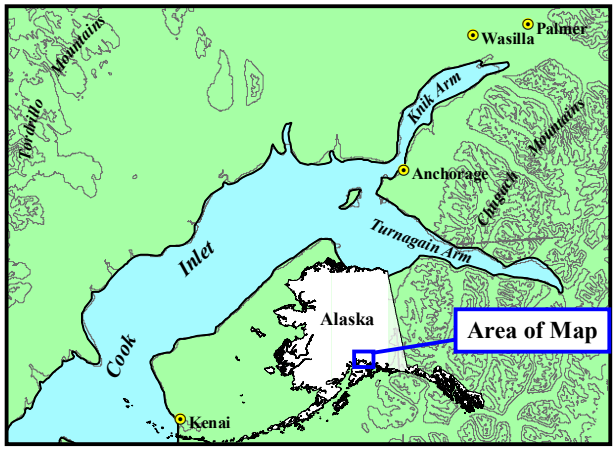

Figure 1. Index map showing the location of Anchorage, Alaska

INTRODUCTION

The Alaska Department of Environmental Conservation (ADEC) is completing source water assessments for all public drinking water sources in the State of Alaska. The purpose of this assessment is to provide public water system owners and/or operators, communities, and local governments with information they can use to preserve the quality of Alaska's public drinking water supplies. The results of this source water assessment can be used to decide where voluntary protection efforts are needed and feasible, and what efforts will be most effective in reducing contaminant risks to your water system.

This source water assessment combines a review of the natural conditions at the site and the potential and existing contaminant risks. These are combined to determine the overall vulnerability of the drinking water source to contamination.

DESCRIPTION OF THE ANCHORAGE AREA, ALASKA

Location

Anchorage, located in south-central Alaska, encompasses 1,698 square miles of land and 264 square miles of water. The area containing a majority of the urban development, commonly referred to as the Anchorage Bowl, encompasses approximately 180 square miles [*Partick, Brabets, and Glass, 1989*] and envelopes the low lands of the area. This area is bounded on the east by the Chugach Mountains and the north, west, and south by the Knik and Turnagain Arm of Cook Inlet (Figure 1). In recent times, urban development has extended eastward along the flanks of the Chugach Mountains. This area, known locally as the Anchorage Hillside, contains development at elevations exceeding 3,700 feet in elevation above sea level.

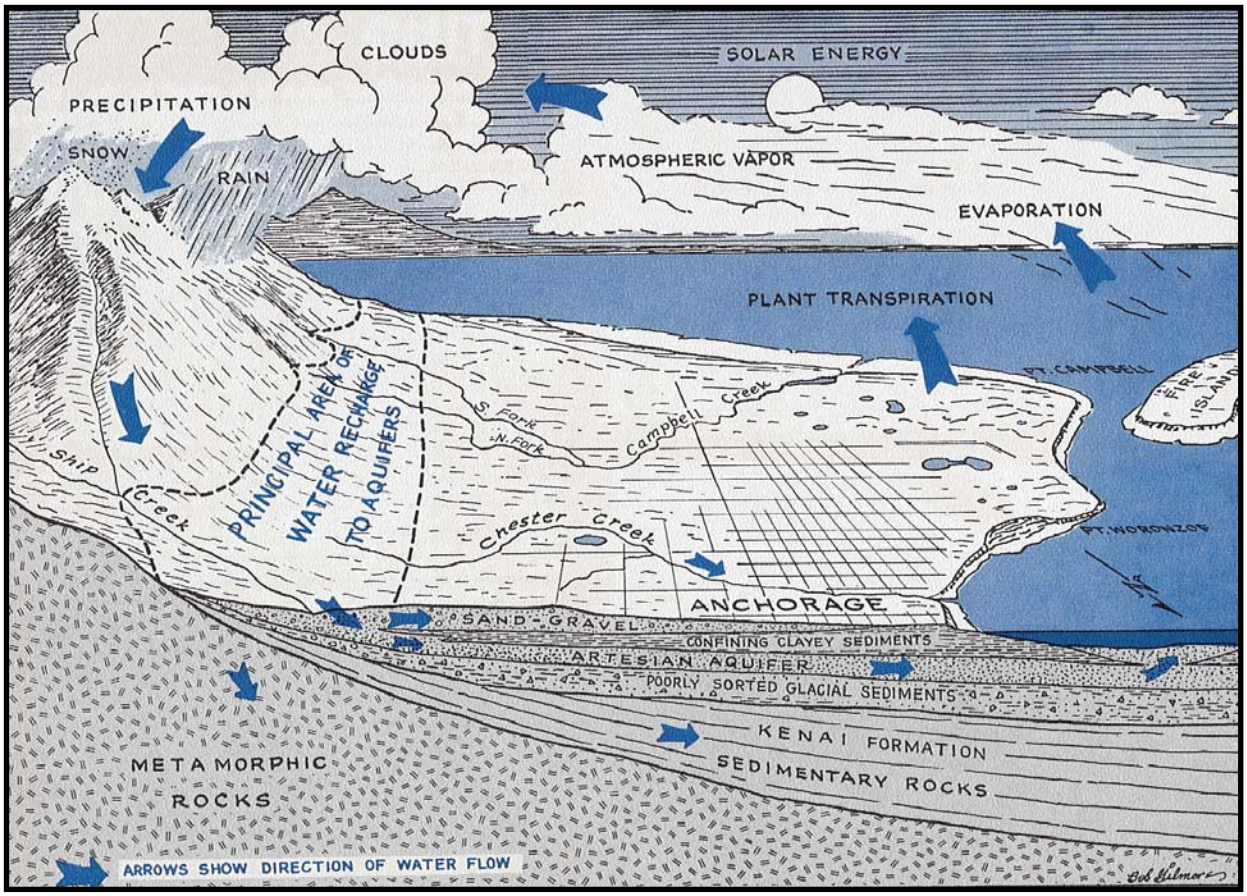

Figure 2. Generalized hydrologic cycle in the Anchorage area [*Barnwell, George, Dearborn,Weeks, and Zenone*, 1972].

Climate

The Anchorage area climate is somewhat transitional in that it does not experience large daily and annual temperature fluctuations like those experienced in the interior of Alaska nor does it experience high amounts of precipitation typified by gulf coast regions. Mean annual precipitation at the Anchorage International Airport is approximately 16 inches per year. On average, Anchorage receives a total snow accumulation of 69 inches per year. Precipitation generally increases inland toward the Chugach Mountains where annual precipitation may exceed 160 inches per year [*Barnwell, George, Dearborn, Weeks, and Zenone*, 1972]. Mean daily temperature ranges from 65^{o} F during July to 8^{o} F in January [*Western Regional Climate Center*, 2000].

Physiography and Groundwater Conditions

Surface elevations in the Anchorage area range from sea level at Knik and Turnagain Arms to well over 5,000 feet in the peaks that bound the area. Glacial moraine and outwash deposits primarily mantle the surface of the Anchorage Bowl.

The backbone of the Chugach Mountains is composed primarily of metamorphic marine and volcanic rocks (bedrock). These high peaks that bound Anchorage's east side are flanked with colluvium or slope deposits. These slope deposits eventually grade into the glacial and stream deposits at lower elevations in the Anchorage Bowl.

In the Anchorage area, two principal groundwater flow systems or aquifers exist (see Figure 2). The upper unconfined aquifer or water-table aquifer is separated from a lower confined aquifer system by layers of silty, clayey glacially derived sediments (confining layer) [*Ulery and Updike*, 1983]. The lower confined aquifer system consists of a series of hydrologically interconnected layers and lenses of gravel, sand and silt that, collectively, form the confined aquifer. The confining layer ranges from 0 to 270 feet thick throughout the Anchorage area and generally thins with increasing distance from Cook Inlet, thus pinching out at the mountain front [*Patrick, Brabets, and Glass*, 1989].

Water enters or recharges these two aquifer systems in several different ways. Along the front of the Chugach Mountains, groundwater seeps from fractures in

bedrock into the sediments. At these higher elevations, rain and snowmelt also enters the sediments. This area along the mountain front is considered the principal recharge area for wells in the Anchorage area. Precipitation in the low lands may also percolate directly into the ground. Lastly, aquifers may also be recharged by streams where surface water percolates into surrounding permeable sediments (losing reaches of streams). Groundwater flow in the confined aquifer is generally east to west from the mountain front toward Cook Inlet and Turnagain Arm, except in areas where the direction of flow is influenced by large municipal or industrial production wells. The direction of groundwater flow in the upper unconfined aquifer is more variable due to the influence from surfacial topography as well as its close connection with surface water bodies.

ANCHORAGE SANDS APARTMENTS PUBLIC DRINKING WATER SYSTEM

Anchorage Sands Apartments is a Class A (community) water system. The system consists of one well in the Anchorage area. (See Map 1 of Appendix A).

The well is located off of 32nd Ave and Minnesota Dr. Mall, at an elevation of approximately 75 feet above sea level.

The 2001 Sanitary Survey indicates that the well is installed with caps providing a sanitary seal. A properly installed sanitary seal may provide protection against contaminants from entering the source waters at the well casing. Since the well was completed pre-1970, it is suspected that the well was not grouted according to current ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing and into source waters.

No well is present for this well. However, records indicate that it is greater then 100 feet deep. Nearby well logs indicate a clay confining layer is present in the area. The confining layers may provide protection from contaminates entering the aquifer. However, the protectiveness of the clay layers tend to thin out towards the mountains allowing contaminants that enter the subsurface near the base of the mountains to enter the confined aquifer uninhibited by the absence of any protective layer.

This system operates 365 days per year and serves 100 residents through 1 service connection.

ANCHORAGE SANDS APARTMENTS 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. Some areas are more likely to allow contamination to reach the well than others. 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 outline of the immediate watershed was used to determine the size and shape of the DWPA for Anchorage Sands Apartments. Available geology was also considered 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 A Public Water Systems for additional information).

The DWPAs 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. 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 adopted from the U.S. Geological Survey (*Patrick, Brabets, and Glass, 1989*), and State of Alaska Department of Water Resources (*Jokela et. al., 1991*).

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 DWPA zones and the calculated time-of-travel for each:

Table 1. Definition of Zones

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

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within Anchorage Sands Apartments 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 Maps 2 -10 in 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.

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, synthetic organic chemicals, and other organic chemicals.

VULNERABILITY OF ANCHORAGE SANDS APARTMENTSDRINKING WATER SOURCE

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

- Natural susceptibility; and
- Contaminant risks.

Each of the six categories of drinking water contaminants has been analyzed and an overall vulnerability score of 0 to 100 is ultimately assigned:

Natural Susceptibility (0 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

Vulnerability of the

Drinking Water Source to Contamination (0 – 100).

A score for the Natural Susceptibility is achieved by analyzing the properties of the well and the aquifer.

Susceptibility of the Wellhead (0 – 25 Points)

+

Susceptibility of the Aquifer (0 – 25 Points)

=

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

Table 2 shows the Susceptibility scores and ratings for the well serving Anchorage Sands Apartments.

Table 2. Susceptibility of the well

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	7	Low
Natural Susceptibility	12	Low

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. This data 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. Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	25	Medium
Nitrates and/or Nitrites	31	High
Volatile Organic Chemicals	43	Very High
Heavy Metals, Cyanide, and Other Inorganic Chemicals	38	High
Synthetic Organic Chemicals	27	Medium
Other Organic Chemicals	37	High

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. Lastly, 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, synthetic organic chemicals, and other organic chemicals, respectively.
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	35	Low
Nitrates and Nitrites	45	Medium
Volatile Organic Chemicals	55	Medium
Heavy Metals, Cyanide and Other Inorganic Chemicals	50	Medium
Synthetic Organic Chemicals	35	Low
Other Organic Chemicals	50	Medium

Bacteria and Viruses
The contaminant risk for bacteria and viruses is medium with sewer lines presenting the most significant risk to the drinking water well
Recent sampling of the well indicates that no bacteria and viruses have been detected (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D)

After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability is low. .

Nitrates and Nitrites
The contaminant risk for nitrates and nitrites is high with sewer lines presenting the most significant risk to the drinking water well. (See Chart 5 – Contaminant Risks for Nitrate/Nitrites in Appendix D).

Recent historical sampling data indicates that nitrates have been detected at very levels. The most recent detection of nitrates was 0.13 mg/l. This is less than 1% of the Maximum Contaminant Level (MCL) of 10 mg/l.

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

Volatile Organic Chemicals
The contaminant risk for volatile organic chemicals is very high with gasoline stations and underground fuel tanks presenting the most significant risk to the drinking water source. (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

Recent sampling indicates that no volatile organic chemicals have been detected in the source waters.

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 medium.

Heavy Metals, Cyanide, and Other Inorganic Chemicals
The contaminant risk for heavy metals, cyanide and other inorganic chemicals is high with motor vehicle repair shops, underground fuel tanks, a photo supply shop and existing contamination presenting the most significant risk to the drinking water source (See Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D).

Sampling on 11/23/1999 indicates that barium was detected at 0.017 mg/l (less than 1 % of the current MCL of 2 mg/l) in source waters.

Combining the contaminant risk with the natural susceptibility of the well leads to an overall vulnerability to heavy metals and other inorganic chemical contamination of medium.

Synthetic Organic Chemicals
The contaminant risk for synthetic organic chemicals is medium with sewer lines, residential areas and lawn and garden services presenting the most significant risk. (See Chart 11 – Contaminant Risks for Synthetic Organic Chemicals in Appendix D, respectively).

Sampling of synthetic organic chemicals has not occurred. After combining the contaminant risk with the natural susceptibility of the well, the overall vulnerability to synthetic organic chemicals is low.

Other Organic Chemicals
The contaminant risk for other organic chemicals is very high with gasoline stations, motor vehicle repair shops and sewer lines, presenting the most significant risk.

Sampling of other organic chemicals has not occurred. After combining the contaminant risk with the natural susceptibility of the well, the overall vulnerability to other organic chemicals is medium. (See Chart 13 – Contaminant Risks for Other Organic Chemicals in Appendix D, respectively).

SUMMARY

A *Source Water Assessment* has been completed for the source of public drinking water serving Anchorage Sands Apartments. The overall vulnerability of this source to contamination is **Low** for bacteria and synthetic organic chemicals and **Medium** for nitrate/nitrites, volatile organic chemicals, inorganic chemicals and other organic chemicals**.** This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of Anchorage Sands Apartments 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 Anchorage Sands Apartments public drinking water source.

REFERENCES

Barnwell, W.W., George, R.S., Dearborn, L.L., Weeks, J.B., and Zenone, C., 1972, Water for Anchorage: an atlas of the water resources of the Anchorage area, Alaska: U.S. Geological Survey Open-File Report, 76 p.

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Ulery, C.A. and Updike, R.G, 1983, Subsurface structure of the cohesive facies of the Bootlegger Cove Formation, Southwest Anchorage, Alaska: Alaska Division of Geological and Geophysical Surveys Professional Report 84, 5 p.

Wang, B., Strelakos, P.M., and Jokela, B., 2000, Nitrate Source Indicators In Groundwater of the Scimitar Subdivision, Peters Creek Area, Anchorage Alaska: U.S. Geological Survey Water-Resources Investigations Report 00-4137, 25p.

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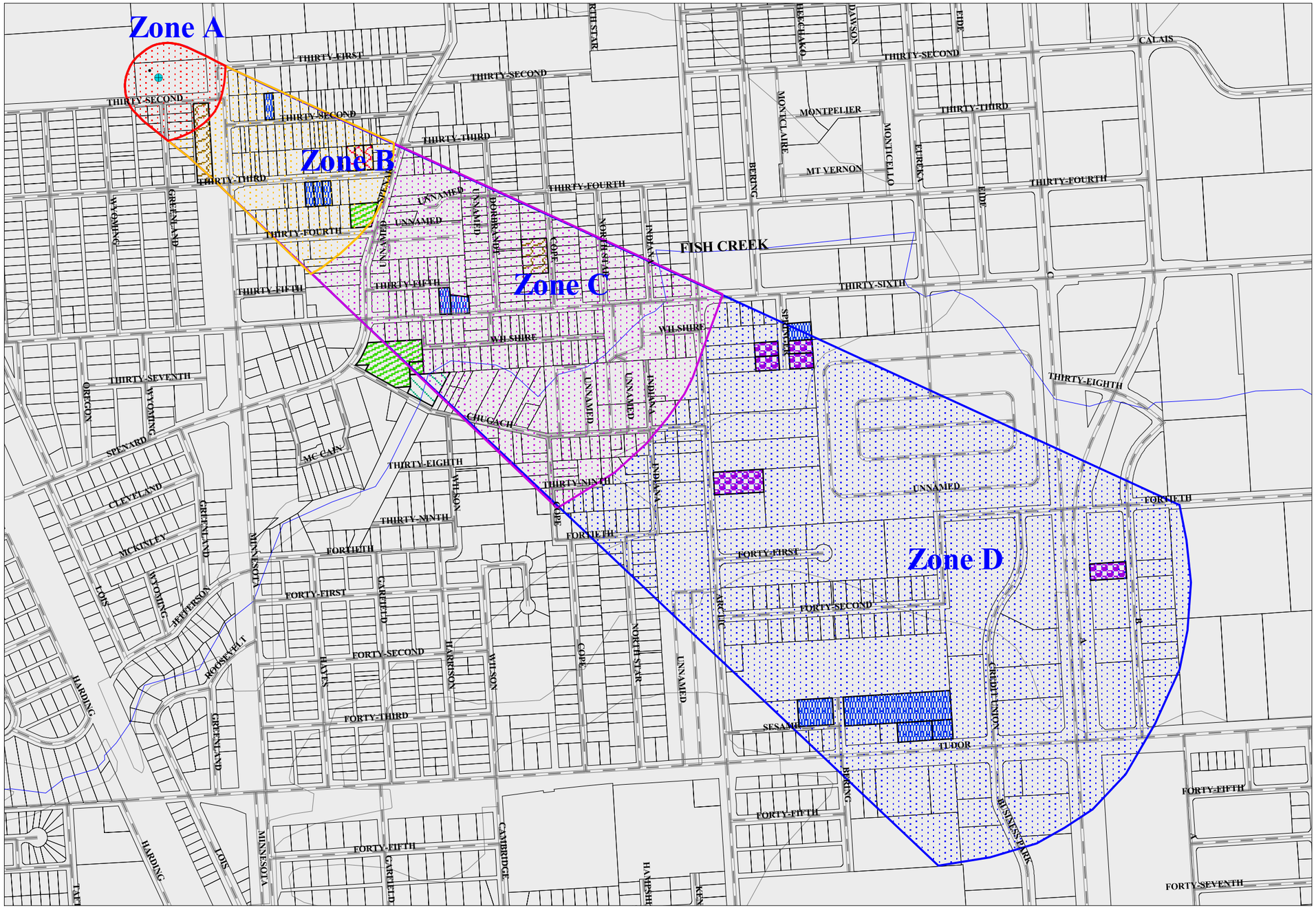
APPENDIX A

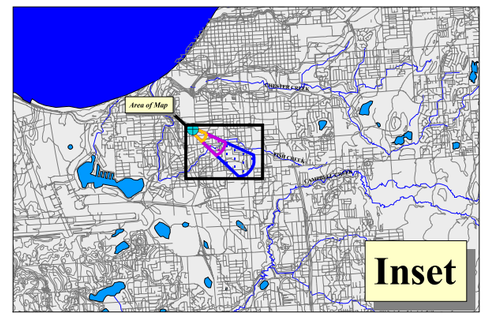
Anchorage Sands Apartments
Drinking Water Protection Area Location Map
(Map 1)

Drinking Water Protection Area for Anchorage Sands Apartments



Legend

- Anchorage Sands Public Water System
- Zone A Protection Area
  - Several Months Travel Time
- Zone B Protection Area
  - Less than 2 Years Travel Time
- Zone C Protection Area
  - Less than 5 Years Travel Time
- Zone D Protection Area
  - Less than 10 Years Travel Time
- Roads
- Streams
- Lakes
- MOA Land Parcels
- Elevation Contours



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Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments (Tables 1-7)

Table 1

Contaminant Source Inventory for ***Anchorage Sands Apartments***

PWSID 211198.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-4	A	2	Zone A has 4 sewer lines
Residential Areas	R01	R01-1	A	2	Zone A has 2 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	2	Zone A has 4 roads
Motor vehicle/general storage yards/facilities	X27	X27-01	A	2	
Construction trade areas and materials	C09	C09-1	B	2	
Construction trade areas and materials	C09	C09-2	B	2	
Gasoline stations (without repair shop)	C15	C15-1	B	2	
Gasoline stations (with repair shop)	C16	C16-1	B	2	
Hardware stores	C17	C17-01	B	2	
Heavy equipment rental/storage	C18	C18-1	B	2	
Laboratories (chemical, soils, and research)	C20	C20-1	B	2	
Laboratories (chemical, soils, and research)	C20	C20-2	B	2	
Motor /motor vehicle repair shops	C31	C31-1	B	2	
Motor /motor vehicle repair shops	C31	C31-2	B	2	
Pest extermination services/pesticide sales	C33	C33-1	B	2	
Photography supplies/photo processing laboratories	C36	C36-1	B	2	
Taxidermists	C41	C41-1	B	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-5-9	B	2	Zone B has 4 sewer lines
Residential Areas	R01	R01-2	B	2	Zone B has 5 acres
Tanks, diesel (underground)	T08	T8-4	B	2	
Tanks, gasoline (underground)	T12	T12-1	B	2	
Tanks, gasoline (underground)	T12	T12-2	B	2	
Tanks, gasoline (underground)	T12	T12-3	B	2	
Tanks, lubricants or other petroleum products (underground)	T20	T20-1	B	2	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-1	B	2	File No. L55.02 - 1401 W, 33rd
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-2	B	2	File No. L55.164 - 1603 W. 33rd
Municipal or city parks (with green areas)	X04	X04-1	B	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5-9	B	2	Zone B has 4 roads
Gasoline stations (without repair shop)	C15	C15-02	C	3	
Gasoline stations (without repair shop)	C15	C15-1	C	3	
Heavy equipment rental/storage	C18	C18-2	C	3	
Laboratories (chemical, soils, and research)	C20	C20-1	C	2	
Lawn and garden supplies/services	C23	C23-1	C	3	
Lawn and garden supplies/services	C23	C23-1	C	3/4	
Leather processing	C24	C24-1	C	3	
Motor/motor vehicle supplies stores	C28	C28-1	C	2	
Motor /motor vehicle repair shops	C31	C31-4	C	3	
Scrap, salvage, or junk yards	D59	D59-1	C	3	
Residential Areas	R01	R01	C	2	Zone C has 40 acres
Tanks, diesel (underground)	T08	T08-1	C	3	
Closed tanks, diesel (underground)	T09	T09-1	C	3/4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	C	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	C	2	
Orchards or nurseries	A10	A10-1	D	4	
Printers, publishers, copiers	C37	C37-1	D	3/4	
Printers, publishers, copiers	C37	C37-10	D	4	
Printers, publishers, copiers	C37	C37-2	D	3/4	
Printers, publishers, copiers	C37	C37-3	D	4	
Printers, publishers, copiers	C37	C37-4	D	4	
Printers, publishers, copiers	C37	C37-5	D	4	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Printers, publishers, copiers	C37	C37-6	D	4	
Printers, publishers, copiers	C37	C37-8	D	4	
Printers, publishers, copiers	C37	C37-9	D	4	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	D	4	
Asphalt and tar processing/storage	I03	I03-1	D	4	
Asphalt and tar processing/storage	I03	I03-2	D	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	D	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	D	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-3	D	4	
Closed tanks, gasoline (underground)	T13	T13-1	D	4	
Closed tanks, gasoline (underground)	T13	T13-2	D	4	
Closed tanks, gasoline (underground)	T13	T13-3	D	4	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-1	D	3/4	File No. L55.48-3719 Arctic Blvd.
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-2	D	4	File No. L69.43-4333 Bering Street
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-3	D	3/4	File No. L55.103 - 3707 Arctic Blvd
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U08-4	D	4	File No. L55.96 - 4300 B Street

Table 2

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments Sources of Bacteria and Viruses

PWSID 211198.001

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	D01-1-4	A	Medium	2	Zone A has 4 sewer lines
Residential Areas	R01	R01-1	A	Low	2	Zone A has 2 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	Zone A has 4 roads
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-5-9	B	Medium	2	Zone B has 4 sewer lines
Residential Areas	R01	R01-2	B	Low	2	Zone B has 5 acres
Municipal or city parks (with green areas)	X04	X04-1	B	Medium	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5-9	B	Low	2	Zone B has 4 roads
Residential Areas	R01	R01	C	Low	2	Zone C has 40 acres
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	C	Medium	3	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	D	Low	4	

Table 3

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments Sources of Nitrates/Nitrites

PWSID 211198.001

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	D01-1-4	A	Medium	2	Zone A has 4 sewer lines
Residential Areas	R01	R01-1	A	Low	2	Zone A has 2 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	Zone A has 4 roads
Hardware stores	C17	C17-01	B	Low	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-5-9	B	Medium	2	Zone B has 4 sewer lines
Residential Areas	R01	R01-2	B	Low	2	Zone B has 5 acres
Municipal or city parks (with green areas)	X04	X04-1	B	Medium	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5-9	B	Low	2	Zone B has 4 roads
Lawn and garden supplies/services	C23	C23-1	C	Medium	3	
Lawn and garden supplies/services	C23	C23-1	C	Medium	3/4	
Leather processing	C24	C24-1	C	Low	3	
Residential Areas	R01	R01	C	Low	2	Zone C has 40 acres
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	C	Low	3	
Orchards or nurseries	A10	A10-1	D	Medium	4	

Table 4

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments Sources of Volatile Organic Chemicals

PWSID 211198.001

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	D01-1-4	A	Low	2	Zone A has 4 sewer lines
Residential Areas	R01	R01-1	A	Low	2	Zone A has 2 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	Zone A has 4 roads
Motor vehicle/general storage yards/facilities	X27	X27-01	A	Low	2	
Construction trade areas and materials	C09	C09-1	B	Low	2	
Construction trade areas and materials	C09	C09-2	B	Low	2	
Gasoline stations (without repair shop)	C15	C15-1	B	High	2	
Gasoline stations (with repair shop)	C16	C16-1	B	High	2	
Hardware stores	C17	C17-01	B	Low	2	
Heavy equipment rental/storage	C18	C18-1	B	Medium	2	
Laboratories (chemical, soils, and research)	C20	C20-1	B	Low	2	
Laboratories (chemical, soils, and research)	C20	C20-2	B	Low	2	
Motor /motor vehicle repair shops	C31	C31-1	B	Medium	2	
Motor /motor vehicle repair shops	C31	C31-2	B	Medium	2	
Pest extermination services/pesticide sales	C33	C33-1	B	Low	2	
Photography supplies/photo processing laboratories	C36	C36-1	B	Medium	2	
Taxidermists	C41	C41-1	B	Medium	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-5-9	B	Low	2	Zone B has 4 sewer lines
Residential Areas	R01	R01-2	B	Low	2	Zone B has 5 acres

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Tanks, gasoline (underground)	T12	T12-1	B	High	2	
Tanks, gasoline (underground)	T12	T12-2	B	High	2	
Tanks, gasoline (underground)	T12	T12-3	B	High	2	
Tanks, diesel (underground)	T08	T8-4	B	High	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5-9	B	Low	2	Zone B has 4 roads
Gasoline stations (without repair shop)	C15	C15-02	C	High	3	
Gasoline stations (without repair shop)	C15	C15-1	C	High	3	
Heavy equipment rental/storage	C18	C18-2	C	Medium	3	
Laboratories (chemical, soils, and research)	C20	C20-1	C	Low	2	
Leather processing	C24	C24-1	C	Medium	3	
Motor/motor vehicle supplies stores	C28	C28-1	C	Low	2	
Motor /motor vehicle repair shops	C31	C31-4	C	Medium	3	
Scrap, salvage, or junk yards	D59	D59-1	C	Low	3	
Residential Areas	R01	R01	C	Low	2	Zone C has 40 acres
Tanks, diesel (underground)	T08	T08-1	C	High	3	
Closed tanks, diesel (underground)	T09	T09-1	C	Medium	3/4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	C	Low	3	
Printers, publishers, copiers	C37	C37-1	D	High	3/4	
Printers, publishers, copiers	C37	C37-10	D	High	4	
Printers, publishers, copiers	C37	C37-2	D	High	3/4	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Printers, publishers, copiers	C37	C37-3	D	High	4	
Printers, publishers, copiers	C37	C37-4	D	High	4	
Printers, publishers, copiers	C37	C37-5	D	High	4	
Printers, publishers, copiers	C37	C37-6	D	High	4	
Printers, publishers, copiers	C37	C37-8	D	High	4	
Printers, publishers, copiers	C37	C37-9	D	High	4	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	D	High	4	
Asphalt and tar processing/storage	I03	I03-1	D	Medium	4	
Asphalt and tar processing/storage	I03	I03-2	D	Medium	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	D	Very High	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	D	Very High	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-3	D	Very High	4	
Closed tanks, gasoline (underground)	T13	T13-1	D	Medium	4	
Closed tanks, gasoline (underground)	T13	T13-2	D	Medium	4	
Closed tanks, gasoline (underground)	T13	T13-3	D	Medium	4	

Table 5

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 211198.001

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	D01-1-4	A	Low	2	Zone A has 4 sewer lines
Residential Areas	R01	R01-1	A	Low	2	Zone A has 2 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	Zone A has 4 roads
Construction trade areas and materials	C09	C09-1	B	Low	2	
Construction trade areas and materials	C09	C09-2	B	Low	2	
Gasoline stations (without repair shop)	C15	C15-1	B	Low	2	
Gasoline stations (with repair shop)	C16	C16-1	B	Low	2	
Hardware stores	C17	C17-01	B	Low	2	
Heavy equipment rental/storage	C18	C18-1	B	Low	2	
Laboratories (chemical, soils, and research)	C20	C20-1	B	Low	2	
Laboratories (chemical, soils, and research)	C20	C20-2	B	Low	2	
Motor /motor vehicle repair shops	C31	C31-1	B	Medium	2	
Motor /motor vehicle repair shops	C31	C31-2	B	Medium	2	
Pest extermination services/pesticide sales	C33	C33-1	B	Low	2	
Photography supplies/photo processing laboratories	C36	C36-1	B	Medium	2	
Taxidermists	C41	C41-1	B	Low	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-5-9	B	Low	2	Zone B has 4 sewer lines
Residential Areas	R01	R01-2	B	Low	2	Zone B has 5 acres
Tanks, gasoline (underground)	T12	T12-1	B	Medium	2	

Table 5 (continued)

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 211198.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Tanks, gasoline (underground)	T12	T12-2	B	Medium	2	
Tanks, gasoline (underground)	T12	T12-3	B	Medium	2	
Tanks, lubricants or other petroleum products (underground)	T20	T20-1	B	Medium	2	
Municipal or city parks (with green areas)	X04	X04-1	B	Low	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5-9	B	Low	2	Zone B has 4 roads
Gasoline stations (without repair shop)	C15	C15-02	C	Low	3	
Gasoline stations (without repair shop)	C15	C15-1	C	Low	3	
Heavy equipment rental/storage	C18	C18-2	C	Low	3	
Laboratories (chemical, soils, and research)	C20	C20-1	C	Low	2	
Lawn and garden supplies/services	C23	C23-1	C	Low	3/4	
Lawn and garden supplies/services	C23	C23-1	C	Low	3	
Leather processing	C24	C24-1	C	Medium	3	
Motor/motor vehicle supplies stores	C28	C28-1	C	Low	2	
Motor /motor vehicle repair shops	C31	C31-4	C	Medium	3	
Scrap, salvage, or junk yards	D59	D59-1	C	High	3	
Residential Areas	R01	R01	C	Low	2	Zone C has 40 acres
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	C	Low	3	
Orchards or nurseries	A10	A10-1	D	Low	4	
Printers, publishers, copiers	C37	C37-1	D	Medium	3/4	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Printers, publishers, copiers	C37	C37-10	D	Medium	4	
Printers, publishers, copiers	C37	C37-2	D	Medium	3/4	
Printers, publishers, copiers	C37	C37-3	D	Medium	4	
Printers, publishers, copiers	C37	C37-4	D	Medium	4	
Printers, publishers, copiers	C37	C37-5	D	Medium	4	
Printers, publishers, copiers	C37	C37-6	D	Medium	4	
Printers, publishers, copiers	C37	C37-8	D	Medium	4	
Printers, publishers, copiers	C37	C37-9	D	Medium	4	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	D	High	4	
Asphalt and tar processing/storage	I03	I03-1	D	Low	4	
Asphalt and tar processing/storage	I03	I03-2	D	Low	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	D	High	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	D	High	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-3	D	High	4	

Table 6

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments Sources of Synthetic Organic Chemicals

PWSID 211198.001

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	D01-1-4	A	Low	2	Zone A has 4 sewer lines
Residential Areas	R01	R01-1	A	Low	2	Zone A has 2 acres
Pest extermination services/pesticide sales	C33	C33-1	B	Low	2	
Photography supplies/photo processing laboratories	C36	C36-1	B	Low	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-5-9	B	Low	2	Zone B has 4 sewer lines
Residential Areas	R01	R01-2	B	Low	2	Zone B has 5 acres
Municipal or city parks (with green areas)	X04	X04-1	B	Low	2	
Lawn and garden supplies/services	C23	C23-1	C	Medium	3	
Lawn and garden supplies/services	C23	C23-1	C	Medium	3/4	
Scrap, salvage, or junk yards	D59	D59-1	C	Medium	3	
Residential Areas	R01	R01	C	Low	2	Zone C has 40 acres
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-02	C	Low	3	
Orchards or nurseries	A10	A10-1	D	High	4	
Printers, publishers, copiers	C37	C37-1	D	Low	3/4	
Printers, publishers, copiers	C37	C37-10	D	Low	4	
Printers, publishers, copiers	C37	C37-2	D	Low	3/4	
Printers, publishers, copiers	C37	C37-3	D	Low	4	
Printers, publishers, copiers	C37	C37-4	D	Low	4	
Printers, publishers, copiers	C37	C37-5	D	Low	4	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Printers, publishers, copiers	C37	C37-6	D	Low	4	
Printers, publishers, copiers	C37	C37-8	D	Low	4	
Printers, publishers, copiers	C37	C37-9	D	Low	4	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	D	Low	4	

Table 7

Contaminant Source Inventory and Risk Ranking for Anchorage Sands Apartments Sources of Other Organic Chemicals

PWSID 211198.001

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	D01-1-4	A	Low	2	Zone A has 4 sewer lines
Residential Areas	R01	R01-1	A	Low	2	Zone A has 2 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1-4	A	Low	2	Zone A has 4 roads
Motor vehicle/general storage yards/facilities	X27	X27-01	A	Low	2	
Construction trade areas and materials	C09	C09-1	B	Low	2	
Construction trade areas and materials	C09	C09-2	B	Low	2	
Gasoline stations (without repair shop)	C15	C15-1	B	Low	2	
Gasoline stations (with repair shop)	C16	C16-1	B	Medium	2	
Hardware stores	C17	C17-01	B	Low	2	
Heavy equipment rental/storage	C18	C18-1	B	Medium	2	
Motor /motor vehicle repair shops	C31	C31-1	B	Medium	2	
Motor /motor vehicle repair shops	C31	C31-2	B	Medium	2	
Photography supplies/photo processing laboratories	C36	C36-1	B	Low	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-5-9	B	Low	2	Zone B has 4 sewer lines
Residential Areas	R01	R01-2	B	Low	2	Zone B has 5 acres
Highways and roads, paved (cement or asphalt)	X20	X20-5-9	B	Low	2	Zone B has 4 roads
Gasoline stations (without repair shop)	C15	C15-02	C	Low	3	
Gasoline stations (without repair shop)	C15	C15-1	C	Low	3	
Heavy equipment rental/storage	C18	C18-2	C	Medium	3	

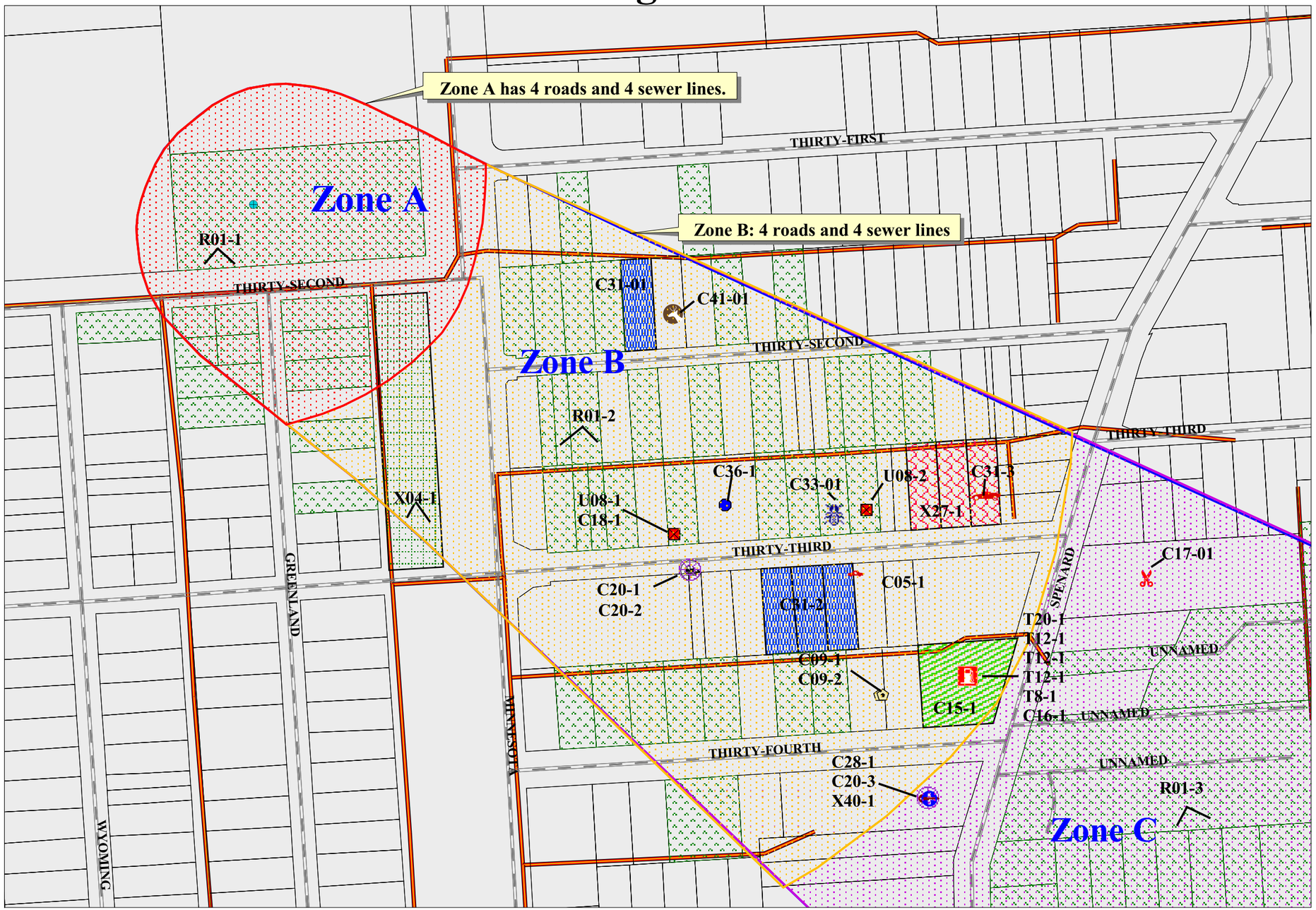
Sources of Other Organic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Leather processing	C24	C24-1	C	Medium	3	
Motor /motor vehicle repair shops	C31	C31-4	C	Medium	3	
Scrap, salvage, or junk yards	D59	D59-1	C	High	3	
Residential Areas	R01	R01	C	Low	2	Zone C has 40 acres
Orchards or nurseries	A10	A10-1	D	Low	4	
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	D	Medium	4	
Asphalt and tar processing/storage	I03	I03-1	D	High	4	
Asphalt and tar processing/storage	I03	I03-2	D	High	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	D	Very High	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	D	Very High	4	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-3	D	Very High	4	

APPENDIX C

Anchorage Sands Apartments
Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Maps 2 - 4)

Drinking Water Protection Area for Anchorage Sands Apartments with Potential and Existing Sources of Contamination



Legend

- Anchorage Sands Public Water System

Zone A Protection Area
- Several Months Travel Time

Zone B Protection Area
- Less than 2 Years Travel Time

Zone C Protection Area
- Less than 5 Years Travel Time

Zone D Protection Area
- Less than 10 Years Travel Time

Potential and Existing Sources of Contamination
- Body shops (automotive)
- Closed Leaking Underground Fuel Storage Tank (LUST) Site
- Construction trade areas and materials
- Gasoline stations (with repair shop)
- Gasoline stations (without repair shop)
- Hardware stores
- Heavy equiptment rental/storage
- Jewelers
- Laboratories (chemical, soils, and research)
- Medical/veterinary facilities
- Motor / motor vehicle repair shops
- Motor/motor vehicle supplies stores
- Pest extermination services/pesticide sales
- Photography supplies/photo processing laboratories
- Tanks, gasoline (underground)
- Tanks, lubricants or other petroleum products (underground)
- Taxidermists
- Textile manufacturing
- Anchorage_sand_residential.shp

Potential and Existing Sources of Contamination
- Construction trade areas and materials
- Gasoline stations (without repair shop)
- Motor /motor vehicle repair shops
- Motor vehicle/general storage yards/facilit
- Parks (with green areas)
- Scrap, salvage, or junk yards
- Roads
- Streams
- Lakes
- MOA Land Parcels
- Elevation Contours
- Roads
- Sewers (D1)
- MOA Land Parcels

200 0 200 Feet

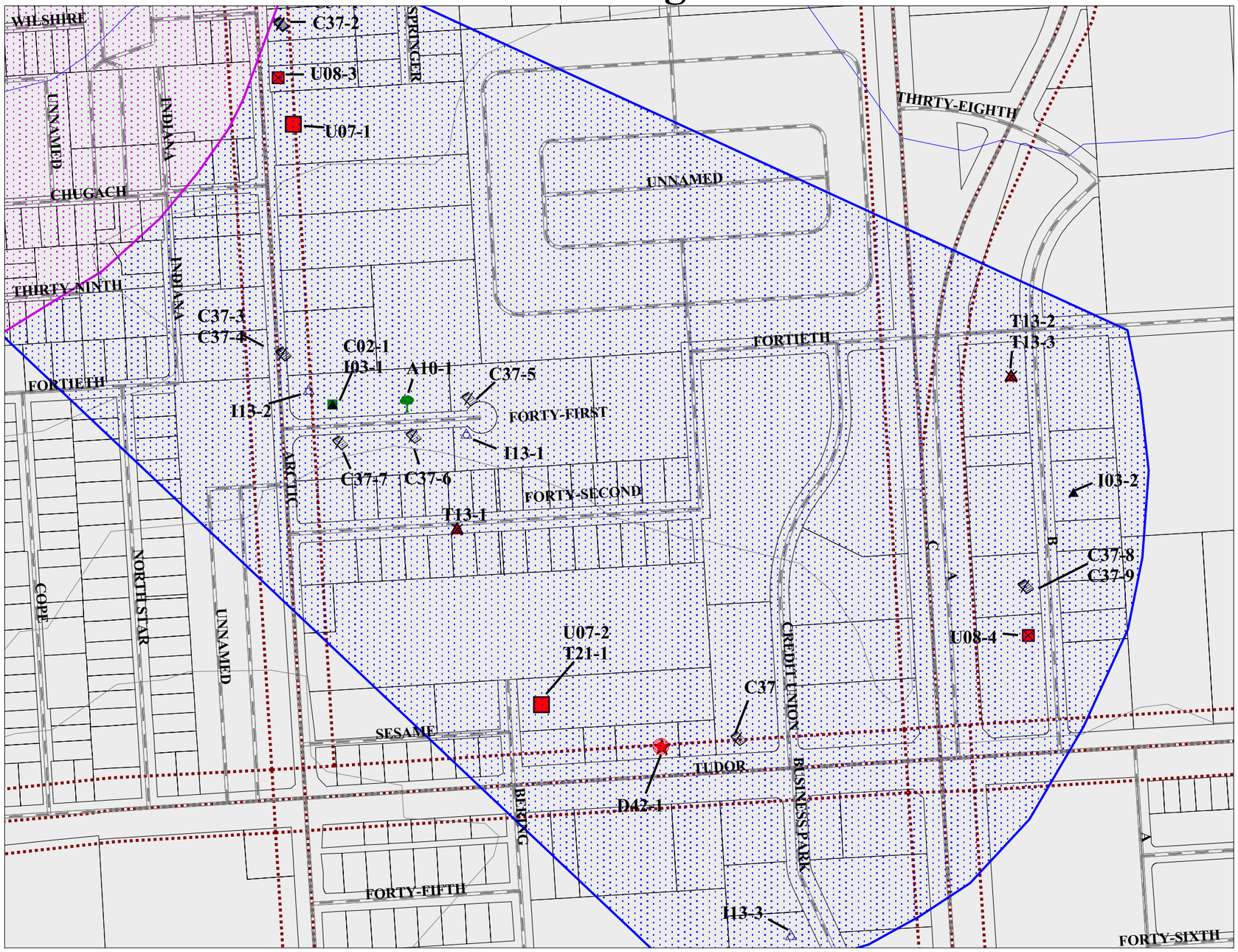
1: 2,760

PWSID 211198.001

N W E S

Map 2

Drinking Water Protection Area for Anchorage Sands Apartments with Potential and Existing Sources of Contamination



Legend

- Anchorage Sands Public Water System

Zone A Protection Area
- Several Months Travel Time

Zone B Protection Area
- Less than 2 Years Travel Time

Zone C Protection Area
- Less than 5 Years Travel Time

Zone D Protection Area
- Less than 10 Years Travel Time

Potential and Existing Sources of Contamination
- Agricultural chemical sales/storage
- Asphalt and tar processing/storage
- Closed Leaking Underground Fuel Storage Tank (LUST) Site
- Closed tanks, gasoline (underground)
- Closed tanks, lubricants or other petroleum products (underground)
- Contaminated sites, DEC recognized, non-Superfund, non-RCRA
- Electrical manufacturing
- Injection wells (Class V) Motor Vehicle Waste Disposal Well
- Leaking Underground Fuel Storage Tank (LUST) Site
- Leather processing
- Motor / motor vehicle repair shops
- Motor vehicle dealerships (with service department)
- Motor vehicle dealerships (without service department)
- Motor vehicle rental facilities (with service department)
- Motor/motor vehicle supplies stores
- Orchards or nurseries
- Printers, publishers, copiers
- Roads
- Streams
- Lakes
- Elevation Contours
- Roads
- Trails (X46)
- MOA Land Parcels

300 0 300 Feet

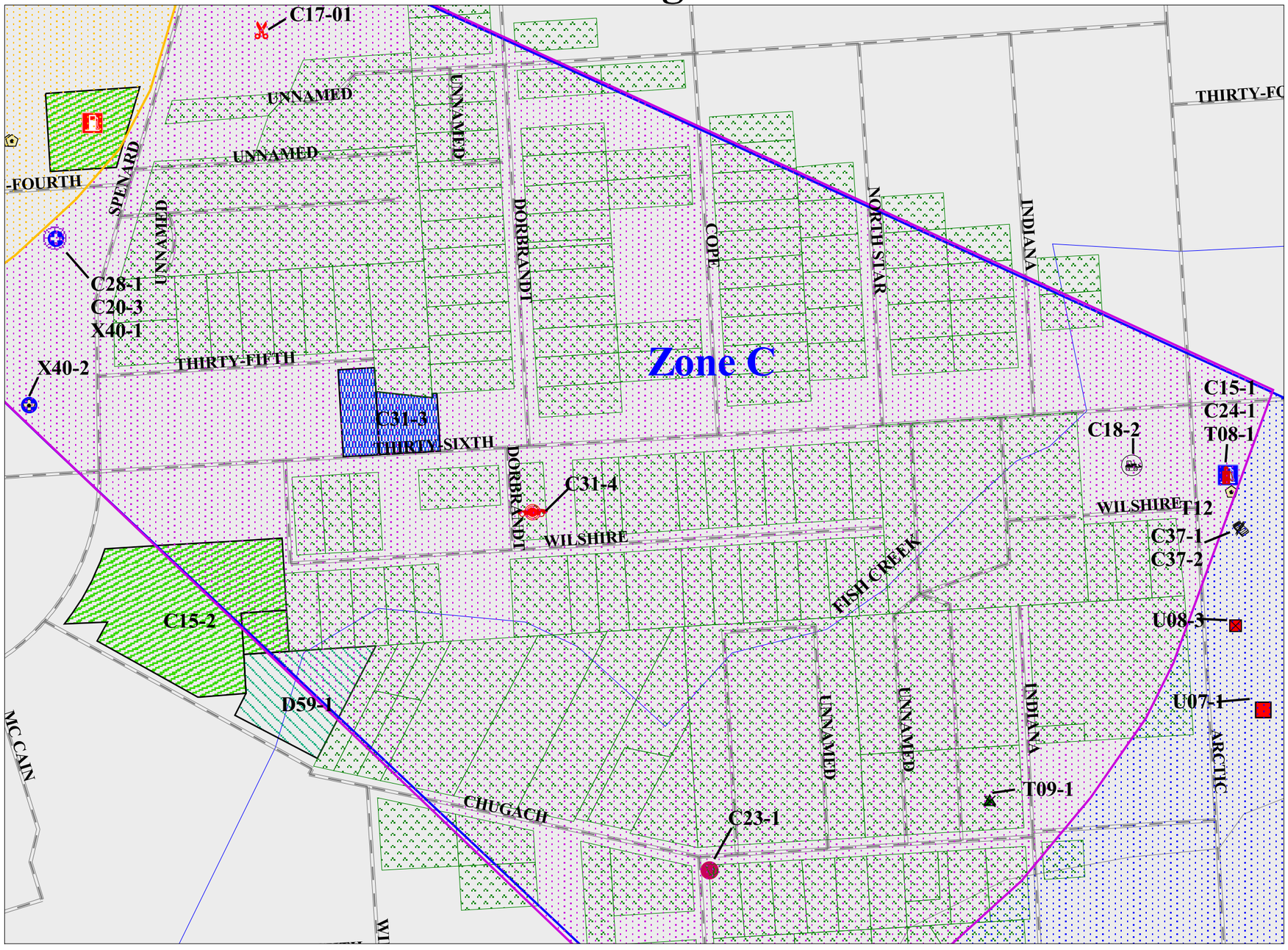
1: 3,000

PWSID 210396.001

N W E S

Map 4

Drinking Water Protection Area for Anchorage Sands Apartments with Potential and Existing Sources of Contamination



Legend

- Anchorage Sands Public Water System

Zone A Protection Area
- Several Months Travel Time

Zone B Protection Area
- Less than 2 Years Travel Time

Zone C Protection Area
- Less than 5 Years Travel Time

Zone D Protection Area
- Less than 10 Years Travel Time

Potential and Existing Sources of Contamination
- Closed Leaking Underground Fuel Storage Tank (LUST) Site
- Closed tanks, diesel (underground)
- Construction trade areas and materials
- Gasoline stations (with repair shop)
- Gasoline stations (without repair shop)
- Government vehicle maintenance facilities
- Hardware stores
- Heavy equiptment rental/storage
- Injection wells (Class V) Motor Vehicle Waste Disposal Well
- Laboratories (chemical, soils, and research)
- Lawn and garden supplies/services
- Leaking Underground Fuel Storage Tank (LUST) Site
- Leather processing
- Medical/veterinary facilities
- Motor / motor vehicle repair shops
- Motor vehicle rental facilities (with service department)
- Motor vehicle rental facilities (without service department)
- Printers, publishers, copiers
- Tanks, diesel (underground)
- Tanks, gasoline (underground)
- Windshield/glass repair shops
- Anchorage_sand_residential.shp

Potential and Existing Sources of Contamination
- Construction trade areas and materials
- Gasoline stations (without repair shop)
- Motor /motor vehicle repair shops
- Motor vehicle/general storage yards/facilit
- Scrap, salvage, or junk yards
- Roads
- Streams
- Lakes
- Elevation Contours

200 0 200 Feet

1: 3,000

PWSID 211198.001

N W E S

Map 3

APPENDIX D

Vulnerability Analysis for Anchorage Sands Apartments

(Charts 1-14)

Chart 1. Susceptibility of the wellhead - Anchorage Sands Apartments

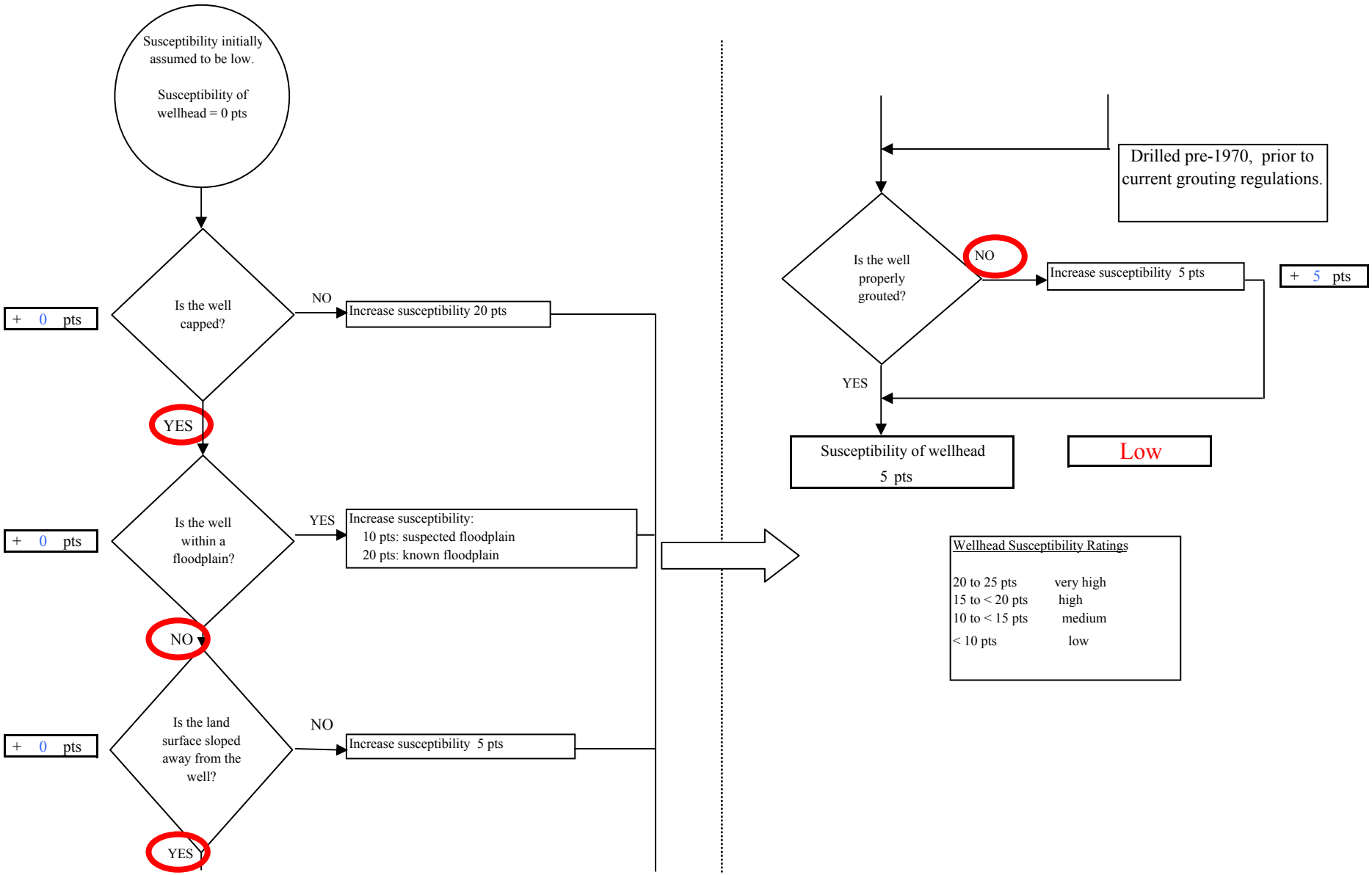


Chart 2. Susceptibility of the aquifer - Anchorage Sands Apartments

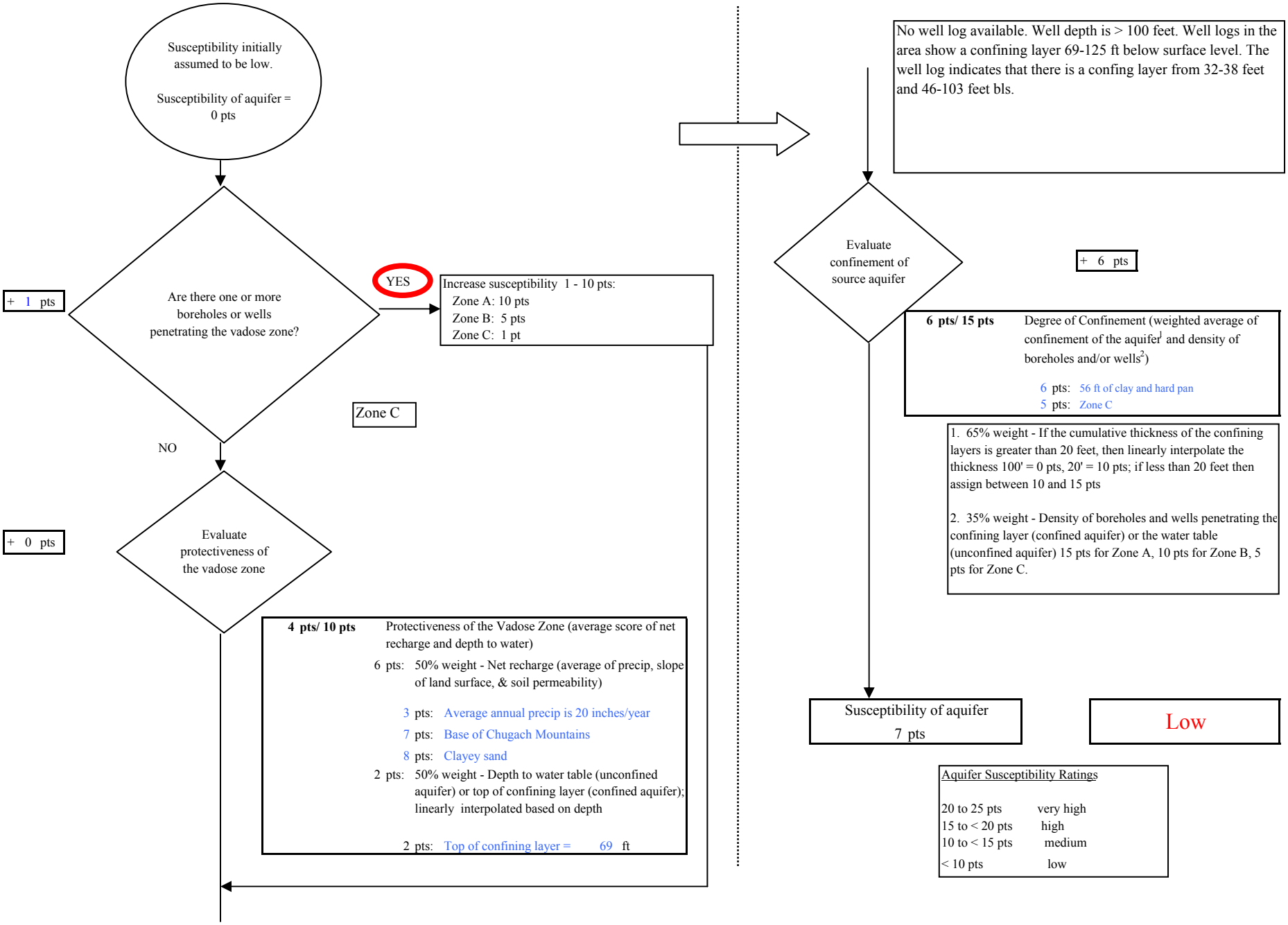
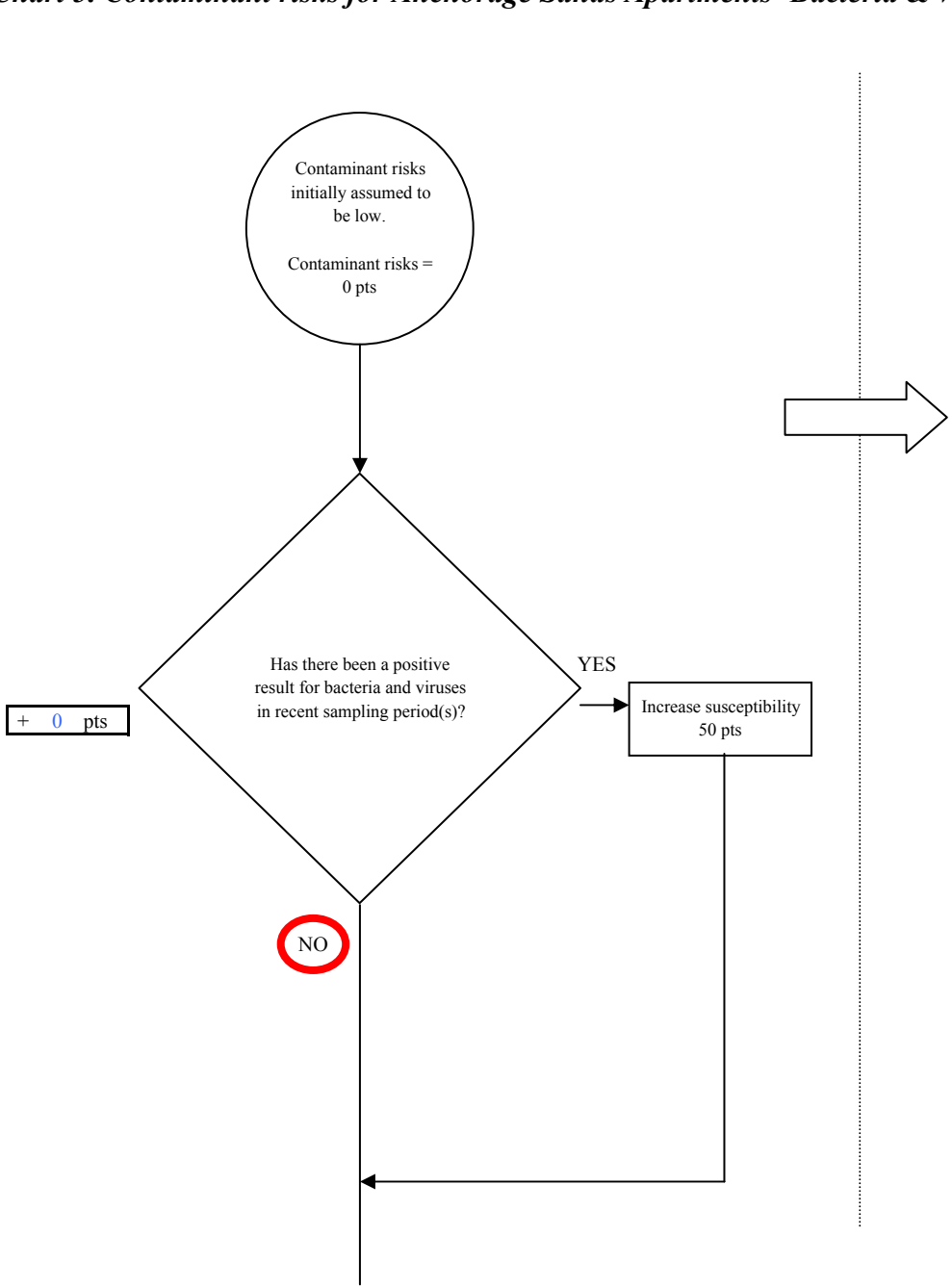
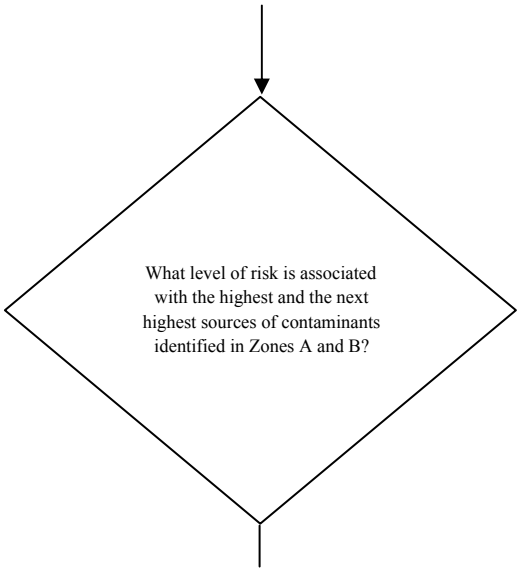


Chart 3. Contaminant risks for Anchorage Sands Apartments- Bacteria & Viruses





+ 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)	1	1	2
Low(s)	3	7	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 3. Contaminant risks for Anchorage Sands Apartments- Bacteria & Viruses

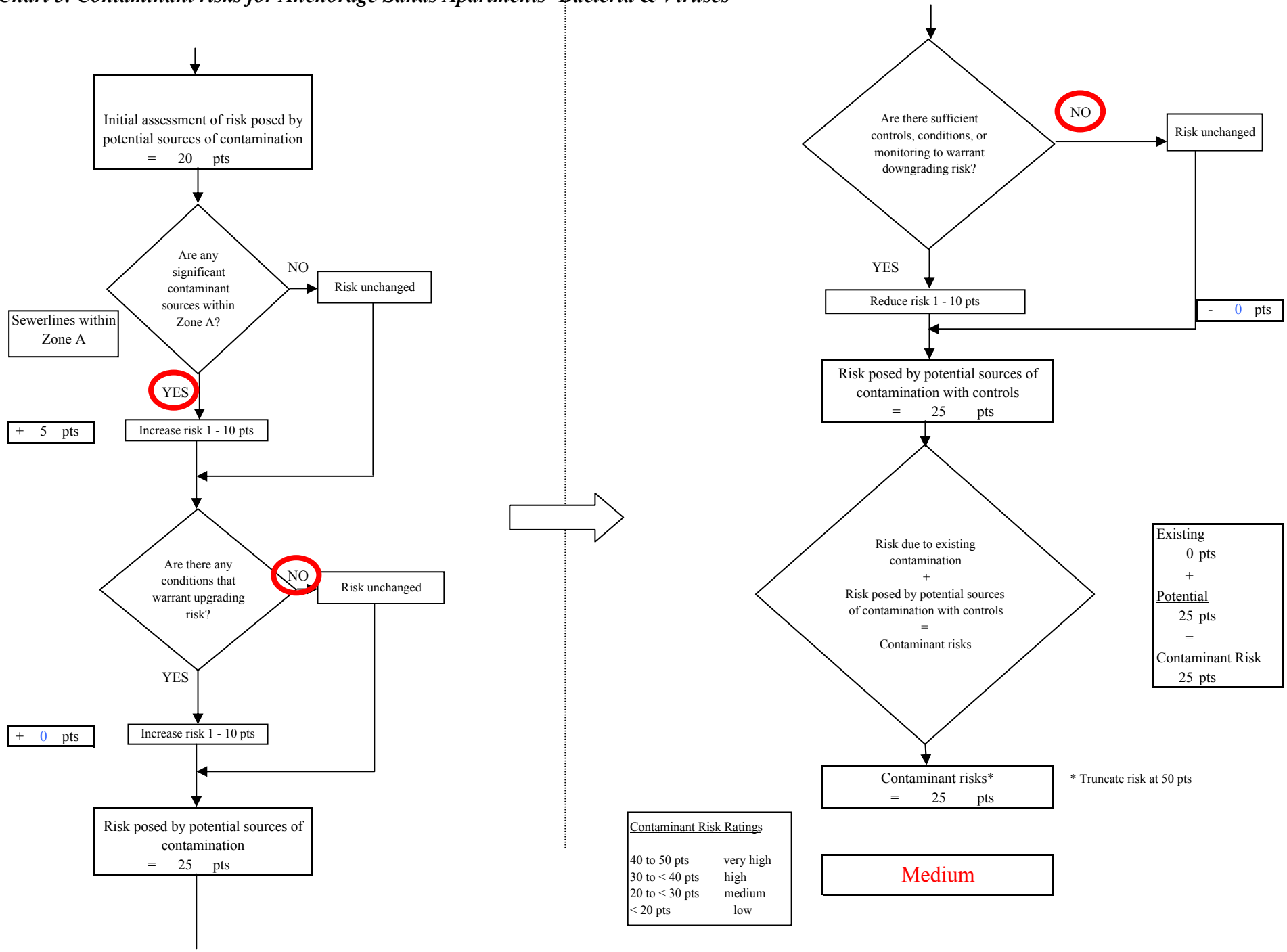


Chart 4. Vulnerability analysis for Anchorage Sands Apartments- Bacteria & Viruses

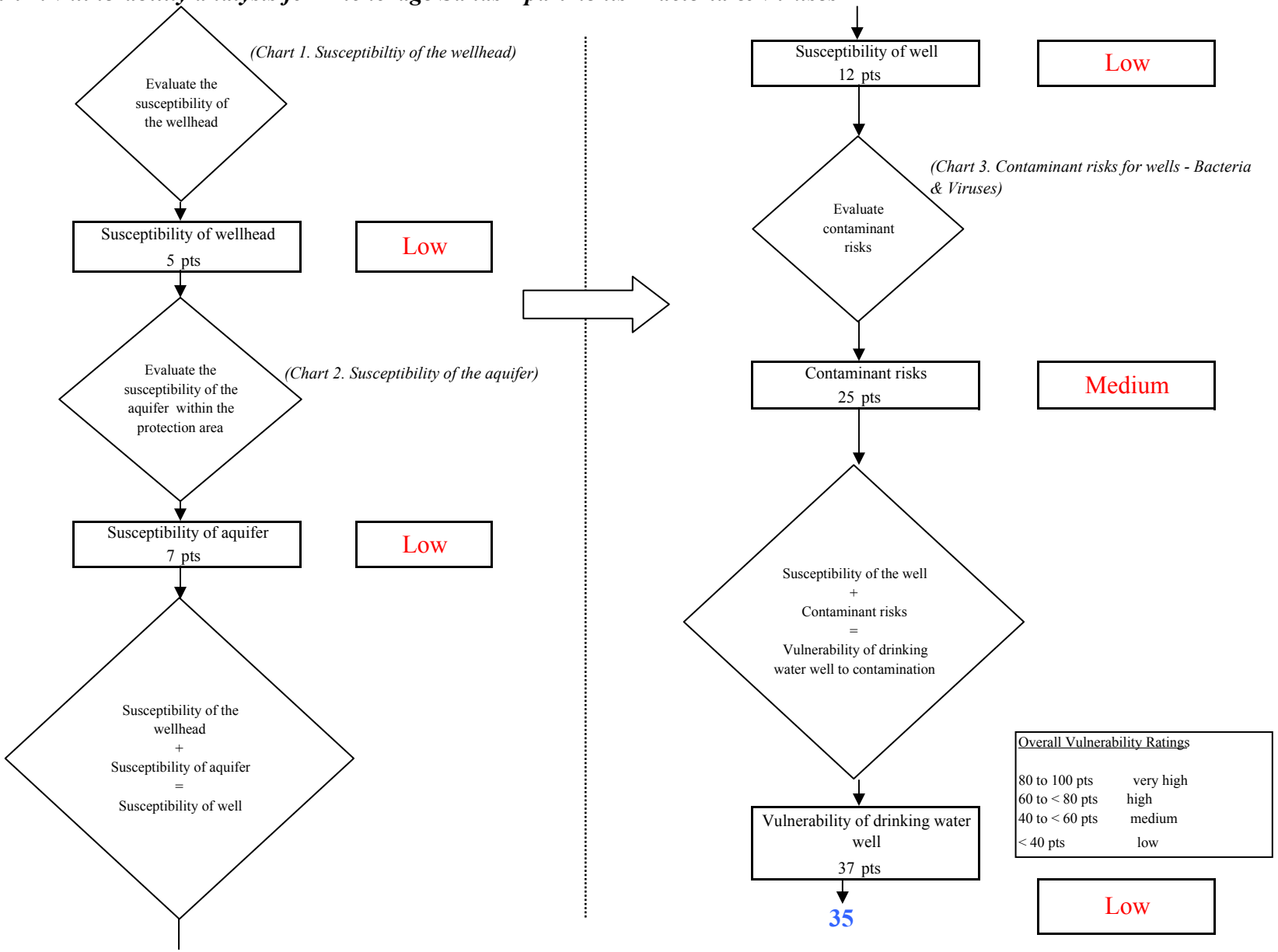


Chart 5. Contaminant risks for Anchorage Sands Apartments- Nitrates and Nitrites

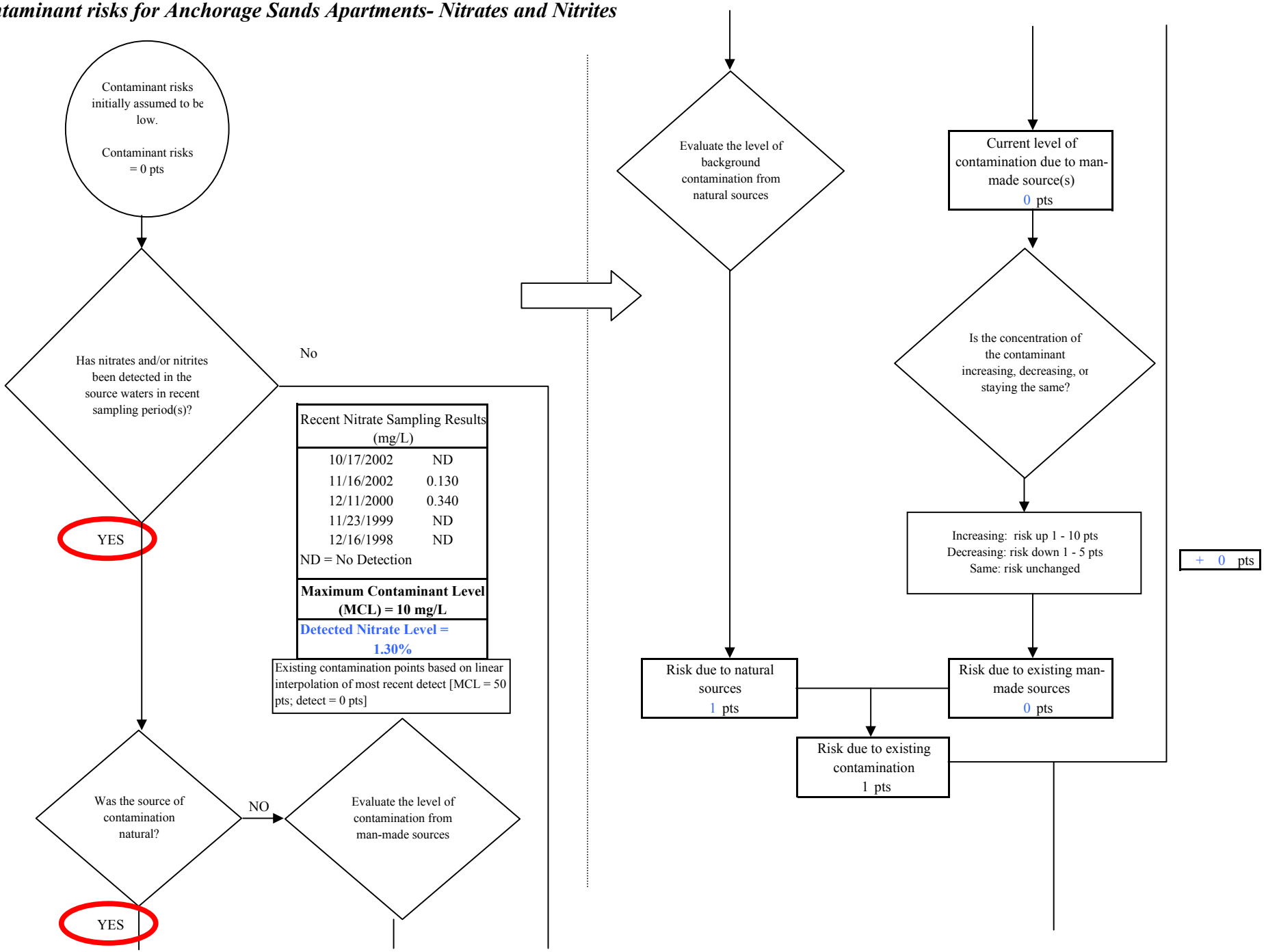


Chart 5. Contaminant risks for Anchorage Sands Apartments- Nitrates and Nitrites

+ 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)	1	3	4
Low(s)	3	14	17

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

Matrix Score 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.

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

Sewer lines

YES

Increase risk 1 - 10 pts

+ 5 pts

Chart 5. Contaminant risks for Anchorage Sands Apartments- Nitrates and Nitrites

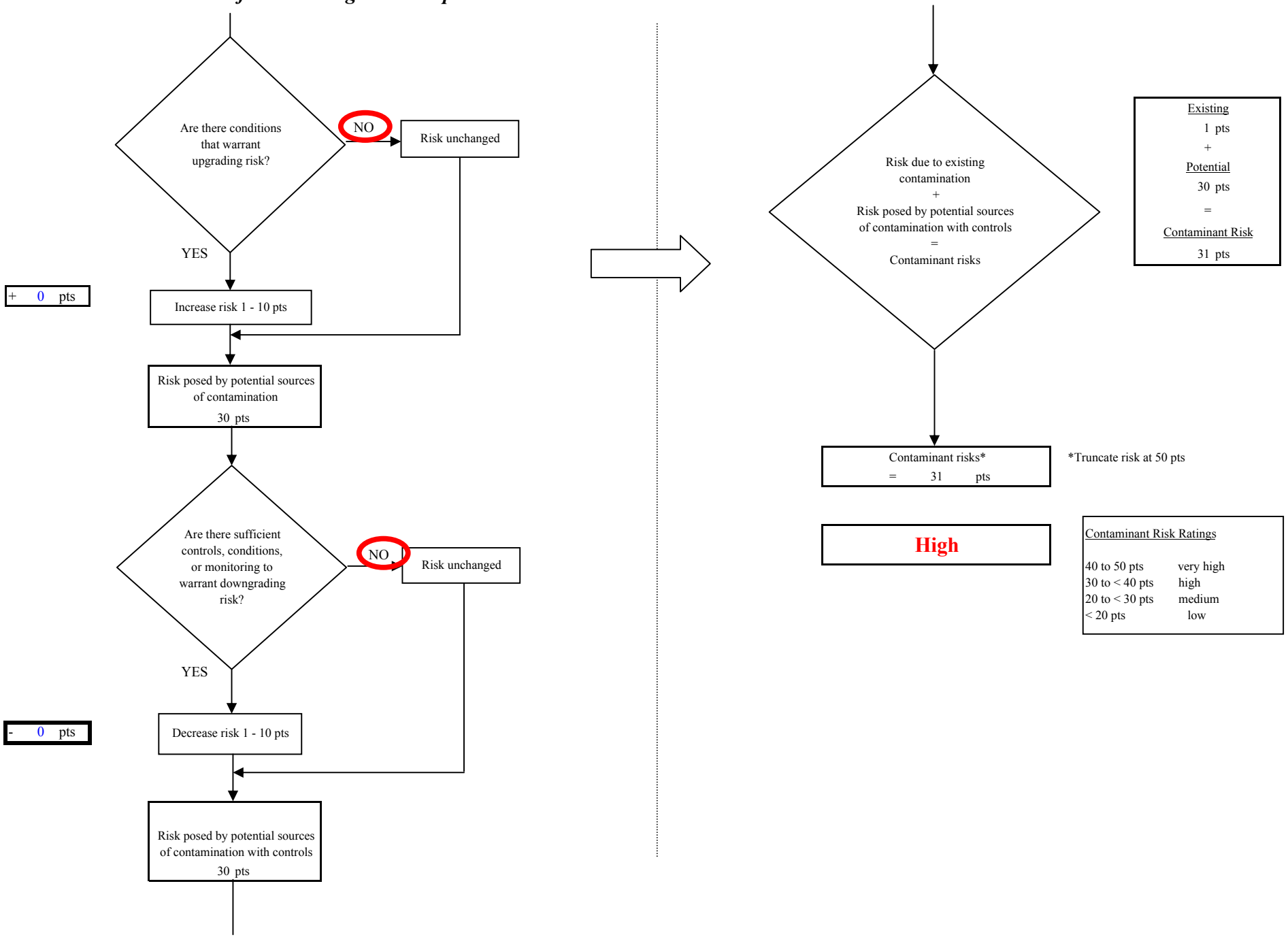


Chart 6. Vulnerability analysis for Anchorage Sands Apartments- Nitrates and Nitrites

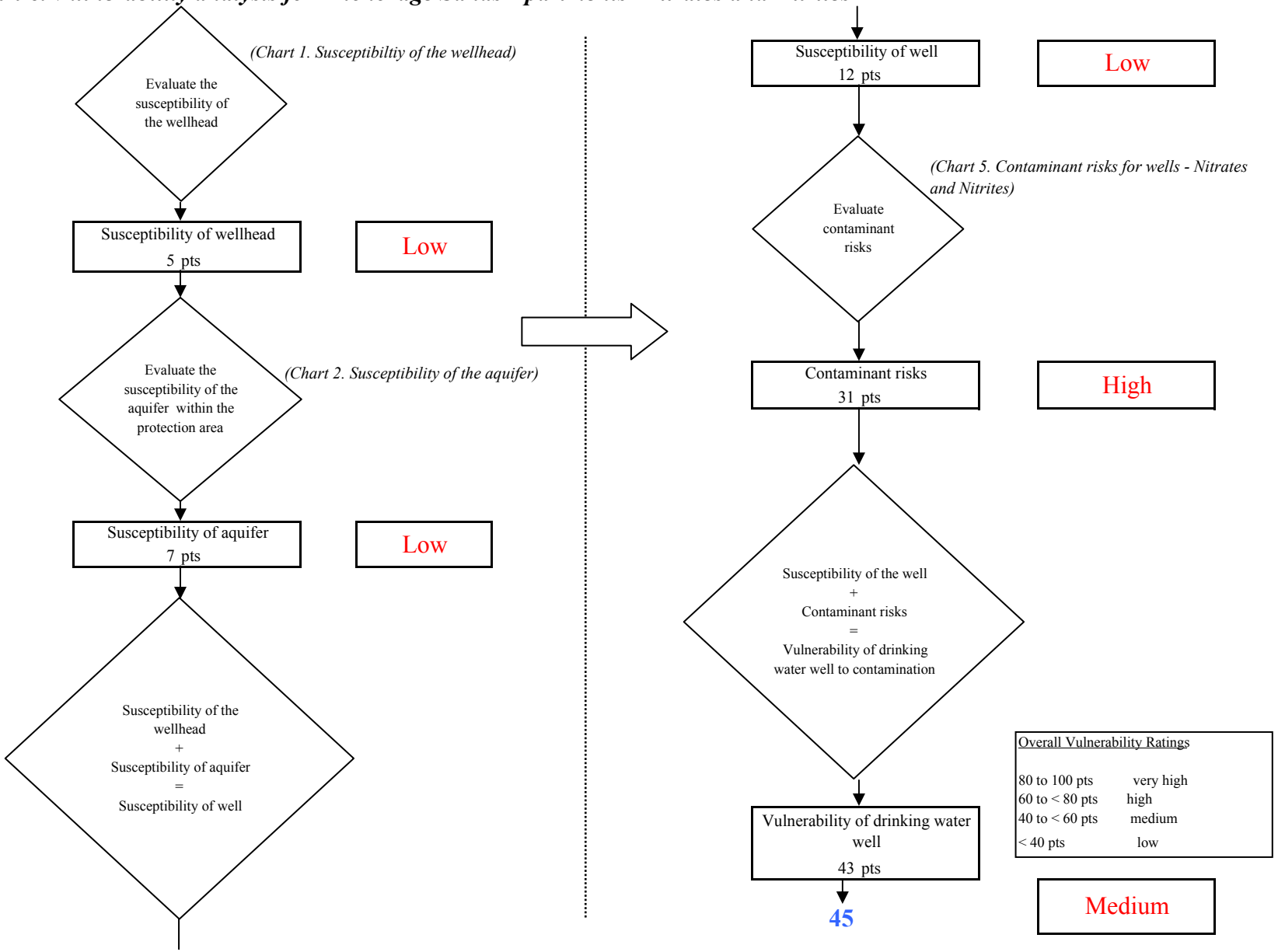


Chart 7. Contaminant risks for Anchorage Sands Apartments- Volatile Organic Chemicals

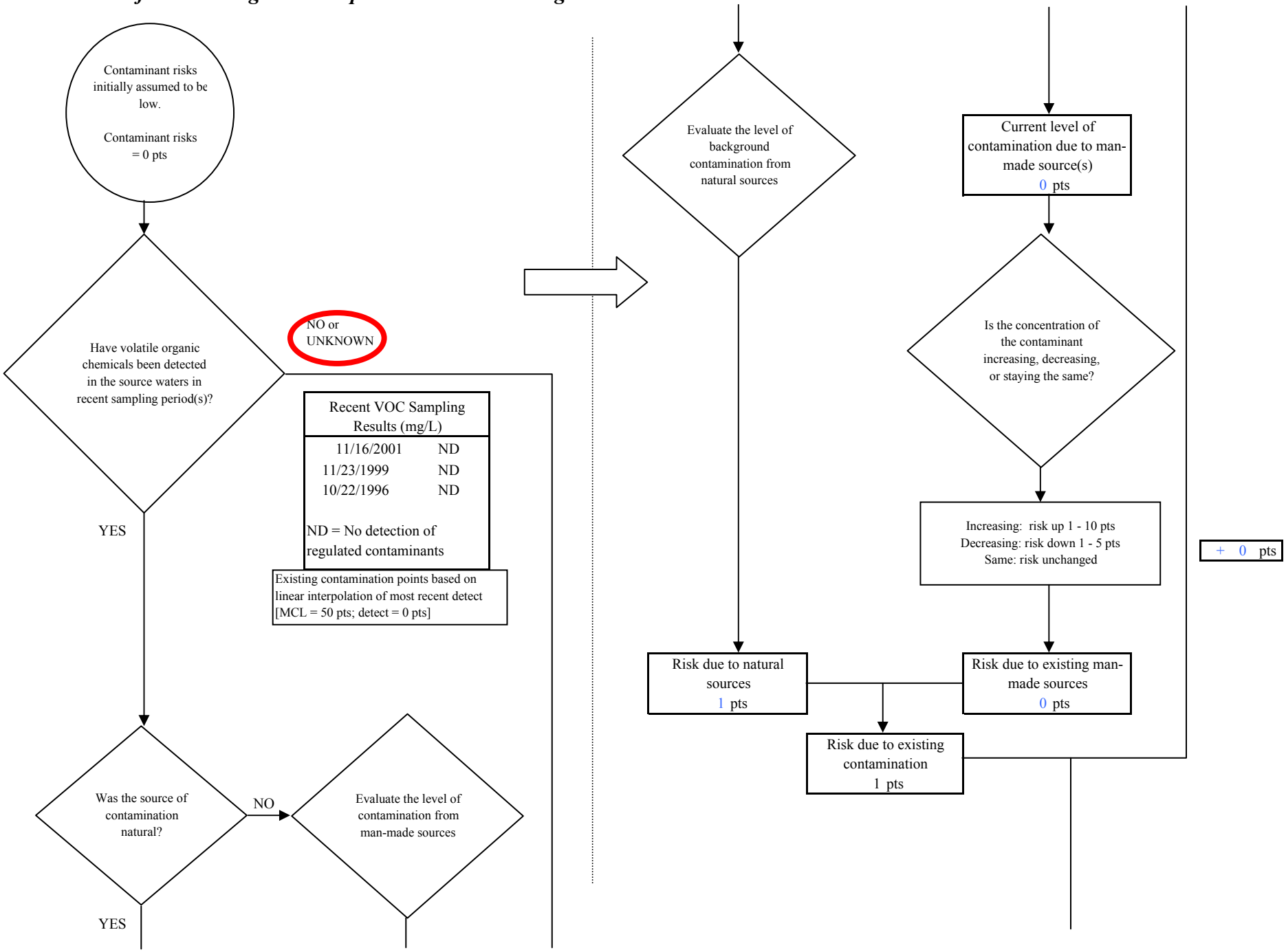


Chart 7. Contaminant risks for Anchorage Sands Apartments- Volatile Organic Chemicals

+ 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)	0	9	9
Medium(s)	0	9	9
Low(s)	5	14	19

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

Matrix Score 40

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

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

Sewerlines and roads

Increase risk 1 - 10 pts

+ 2 pts

Chart 7. Contaminant risks for Anchorage Sands Apartments- Volatile Organic Chemicals

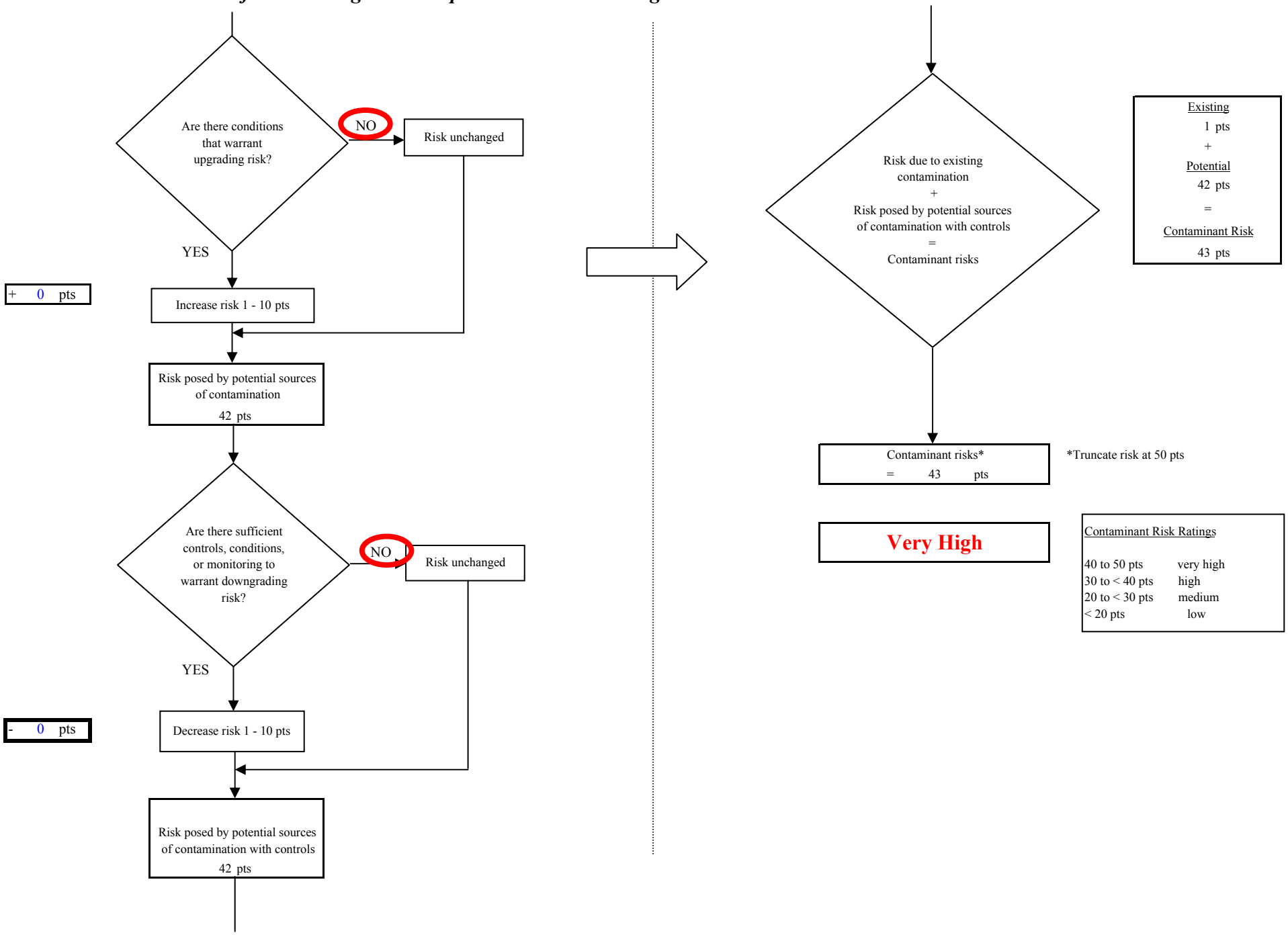


Chart 8. Vulnerability analysis for Anchorage Sands Apartments- Volatile Organic Chemicals

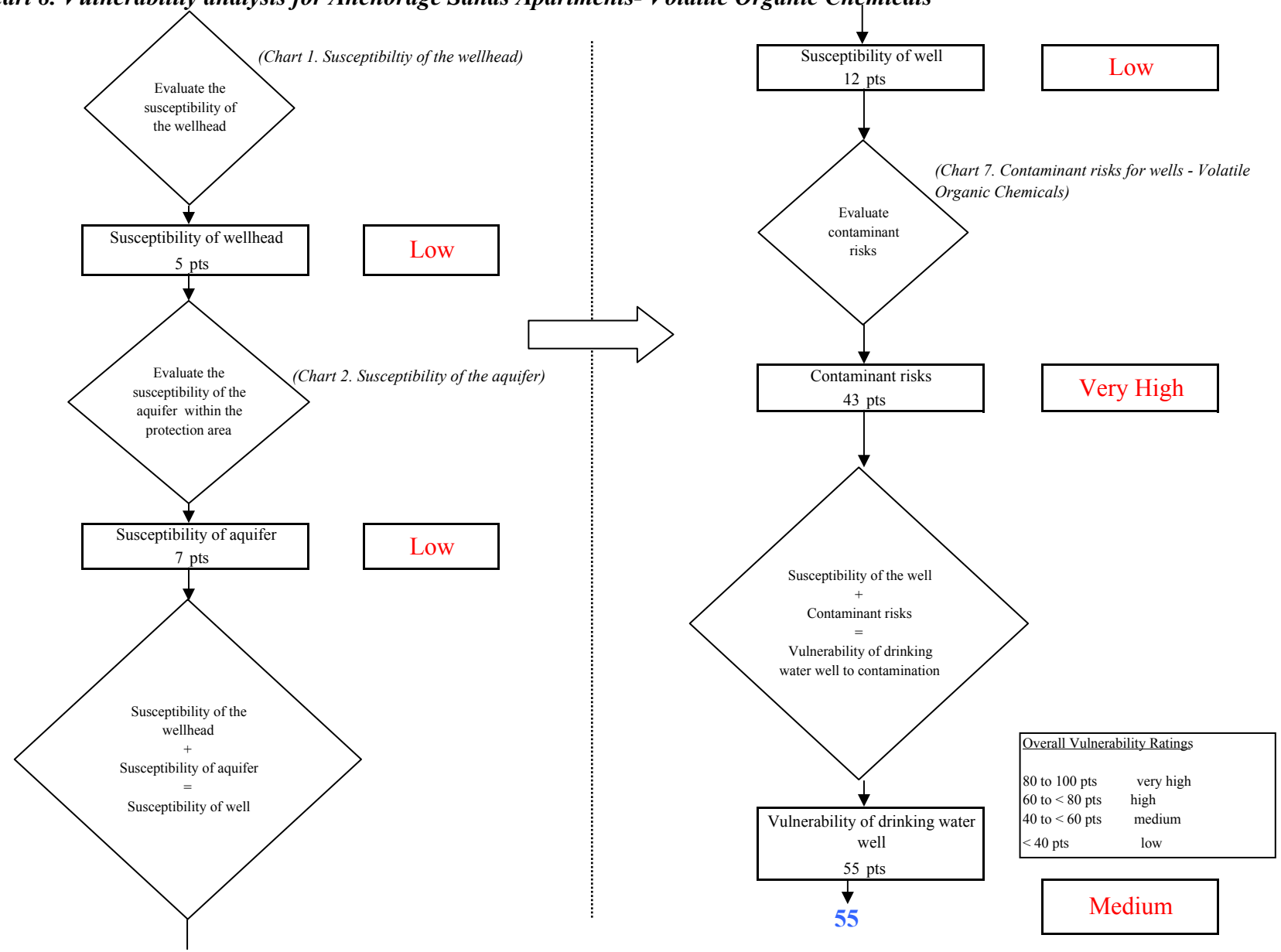


Chart 9. Contaminant risks for Anchorage Sands Apartments- Heavy Metals, Cyanide and Other Inorganic Chemicals

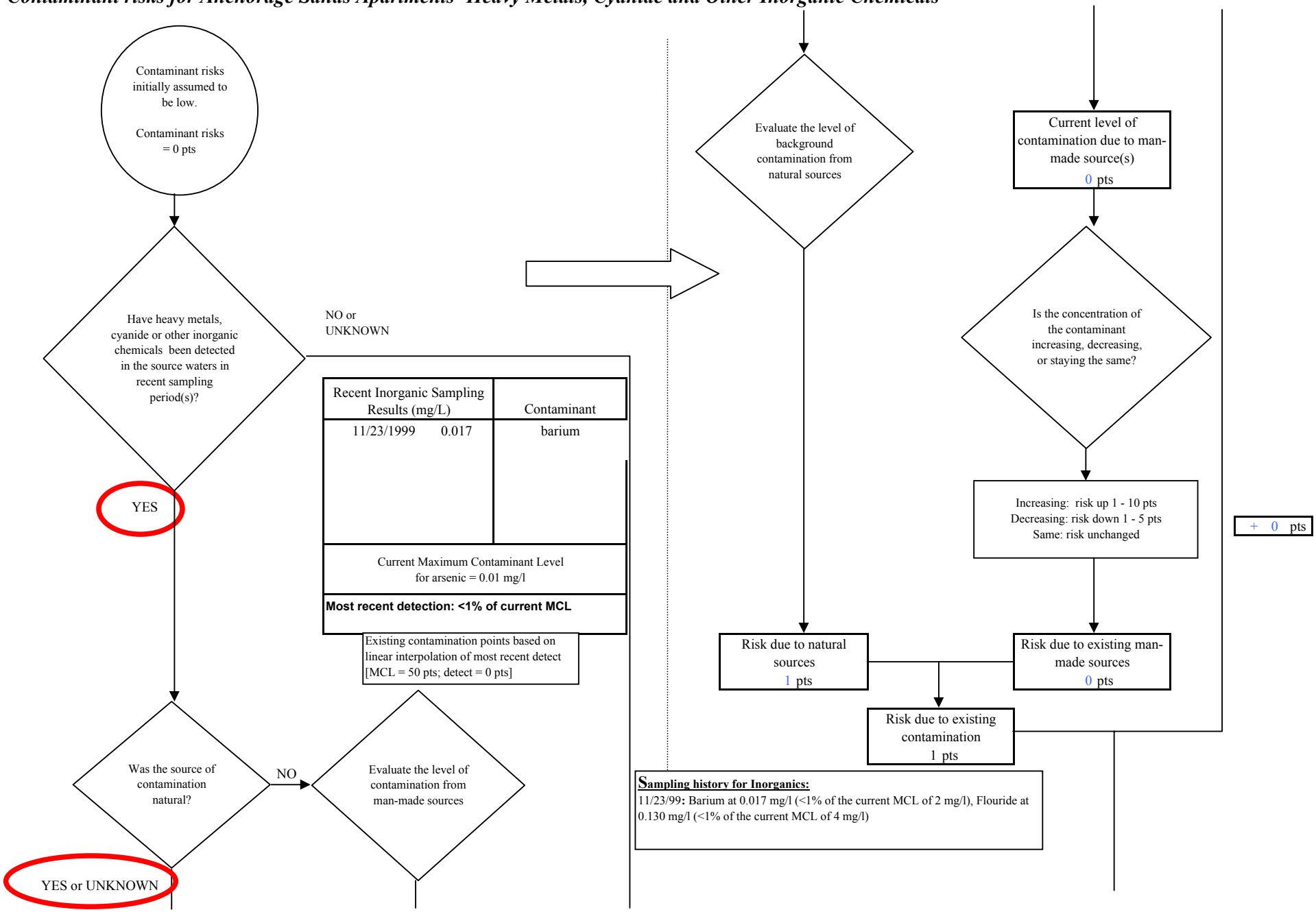


Chart 9. Contaminant risks for Anchorage Sands Apartments- Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 35 pts

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

Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	1	1
Medium(s)	0	9	9
Low(s)	4	23	27

	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	35

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 = 35 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 → Roads → Increase risk 1 - 10 pts

+ 2 pts

Chart 9. Contaminant risks for Anchorage Sands Apartments- Heavy Metals, Cyanide and Other Inorganic Chemicals

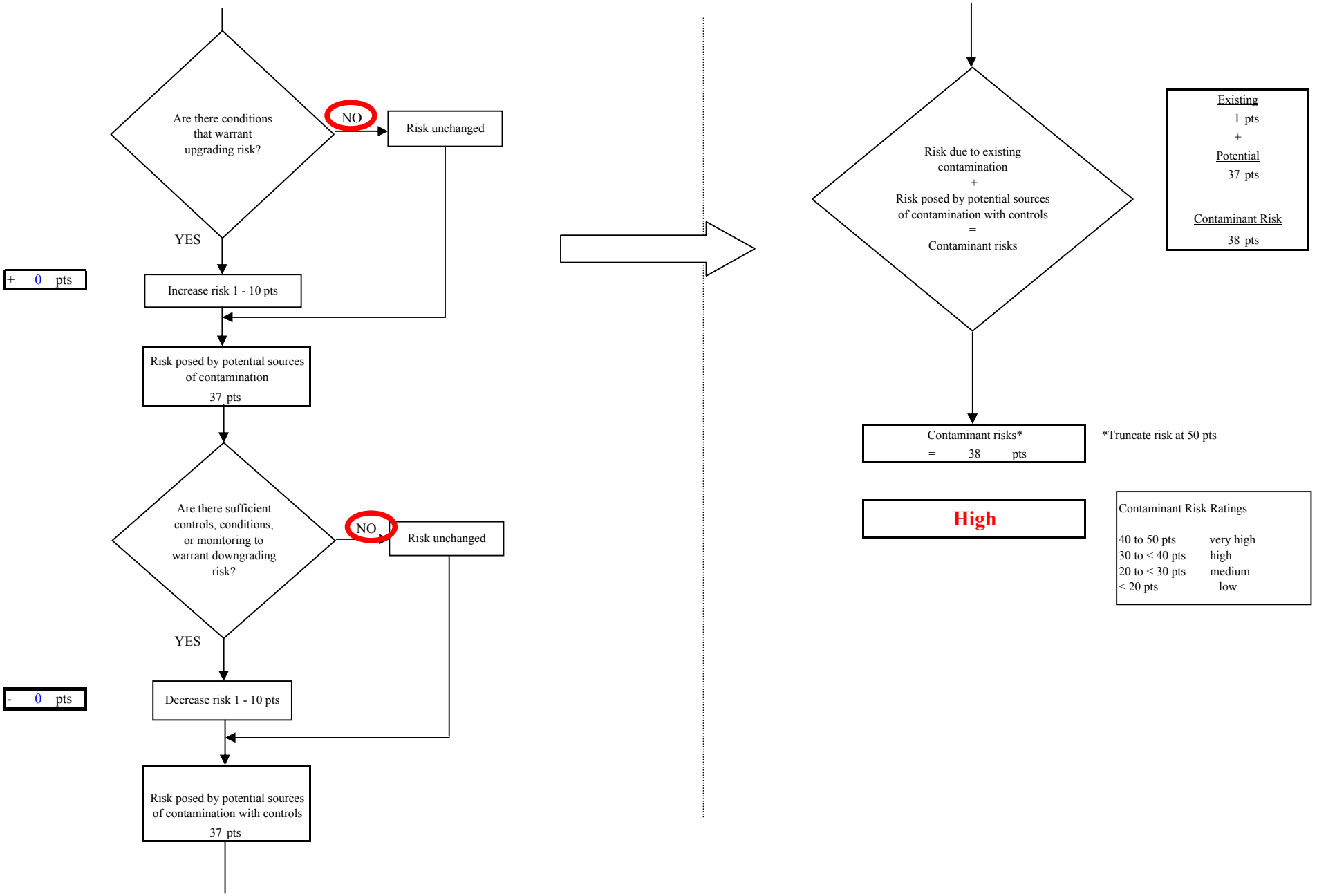


Chart 10. Vulnerability analysis for Anchorage Sands Apartments- Heavy Metals, Cyanide and Other Inorganic Chemicals

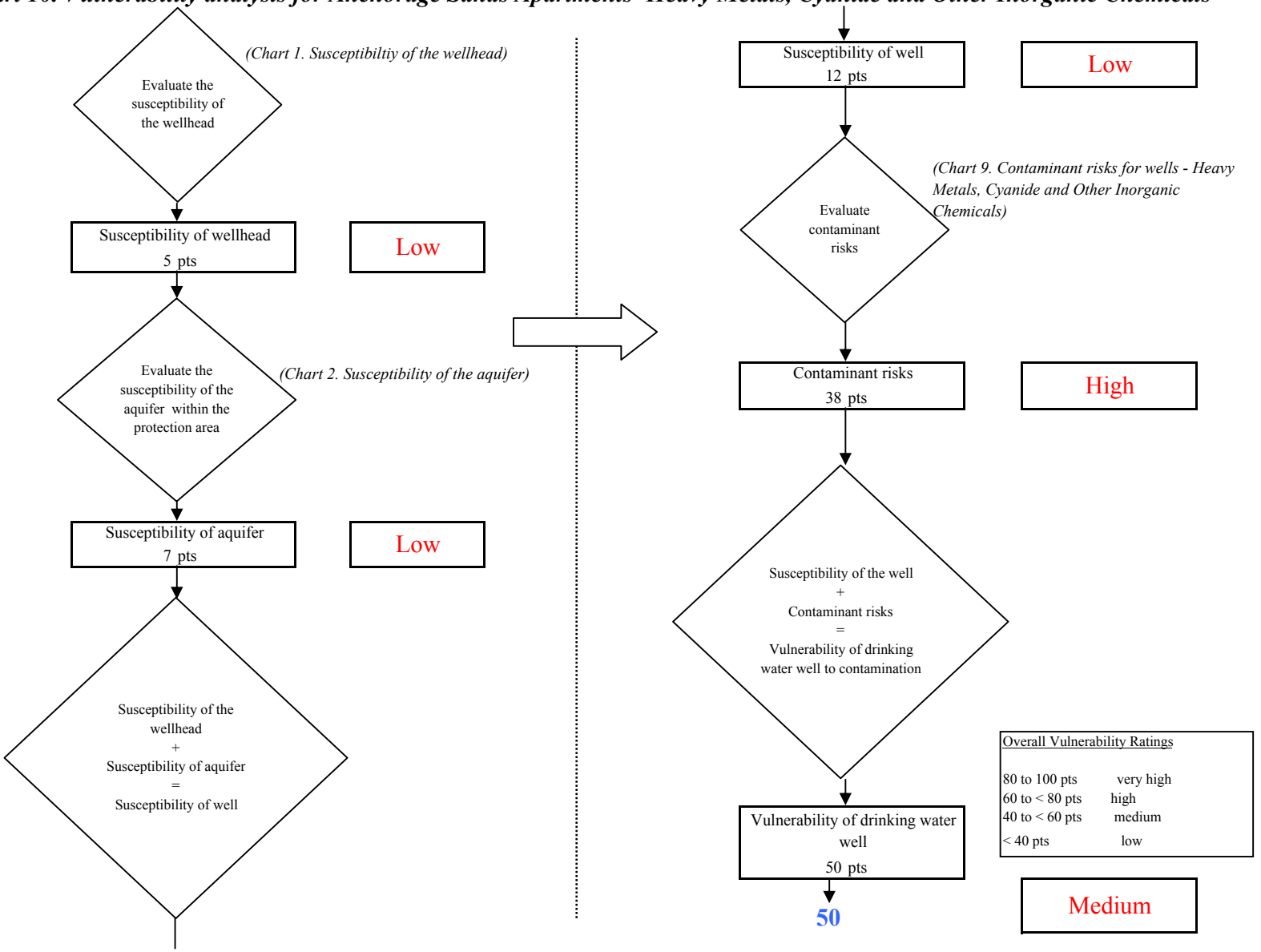


Chart 11. Contaminant risks for Anchorage Sands Apartments- Synthetic Organic Chemicals

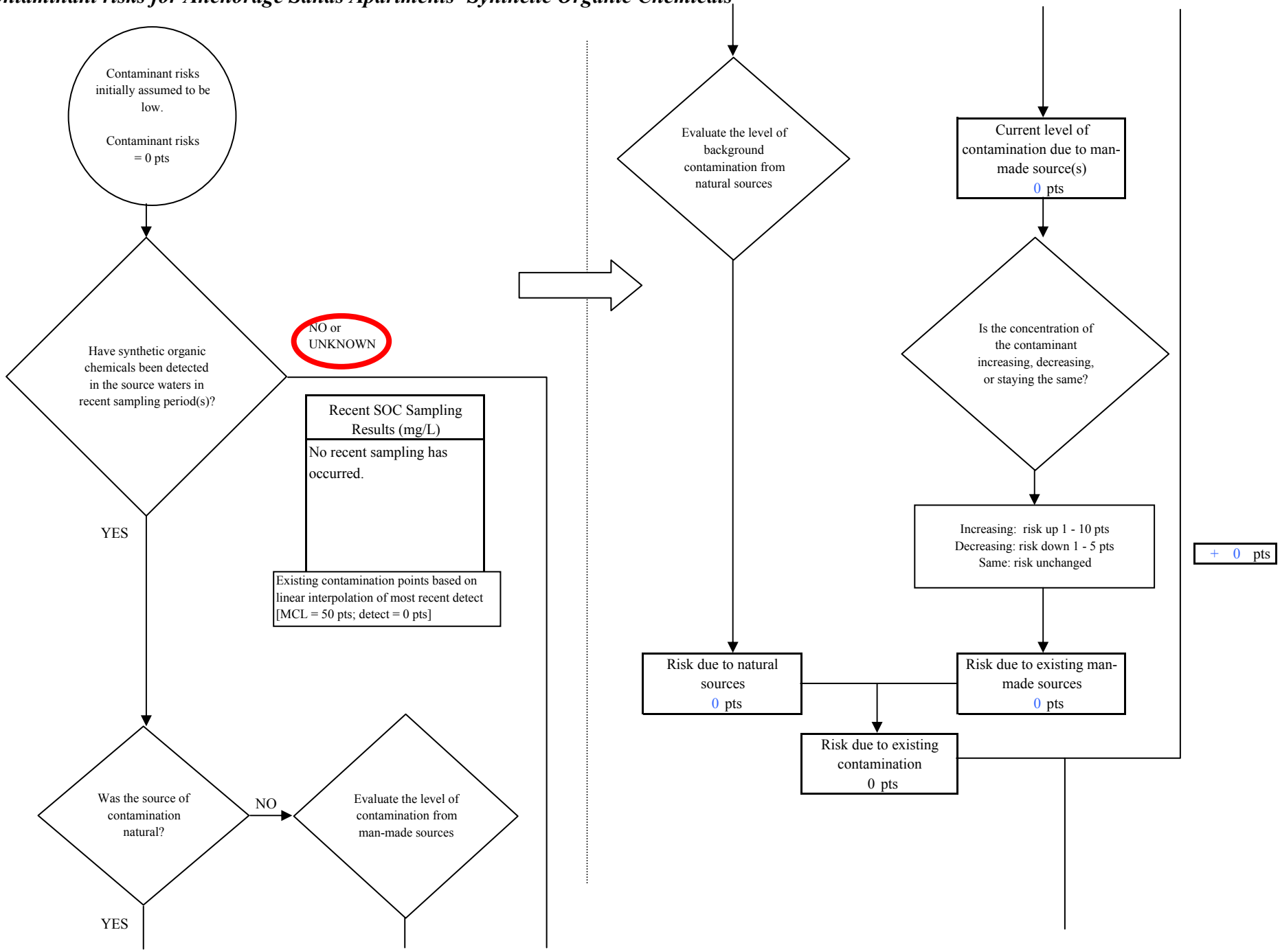


Chart 11. Contaminant risks for Anchorage Sands Apartments- Synthetic Organic Chemicals

+ 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)	3	7	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 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.

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

Roads and residential areas

Increase risk 1 - 10 pts

+ 2 pts

Chart 11. Contaminant risks for Anchorage Sands Apartments- Synthetic Organic Chemicals

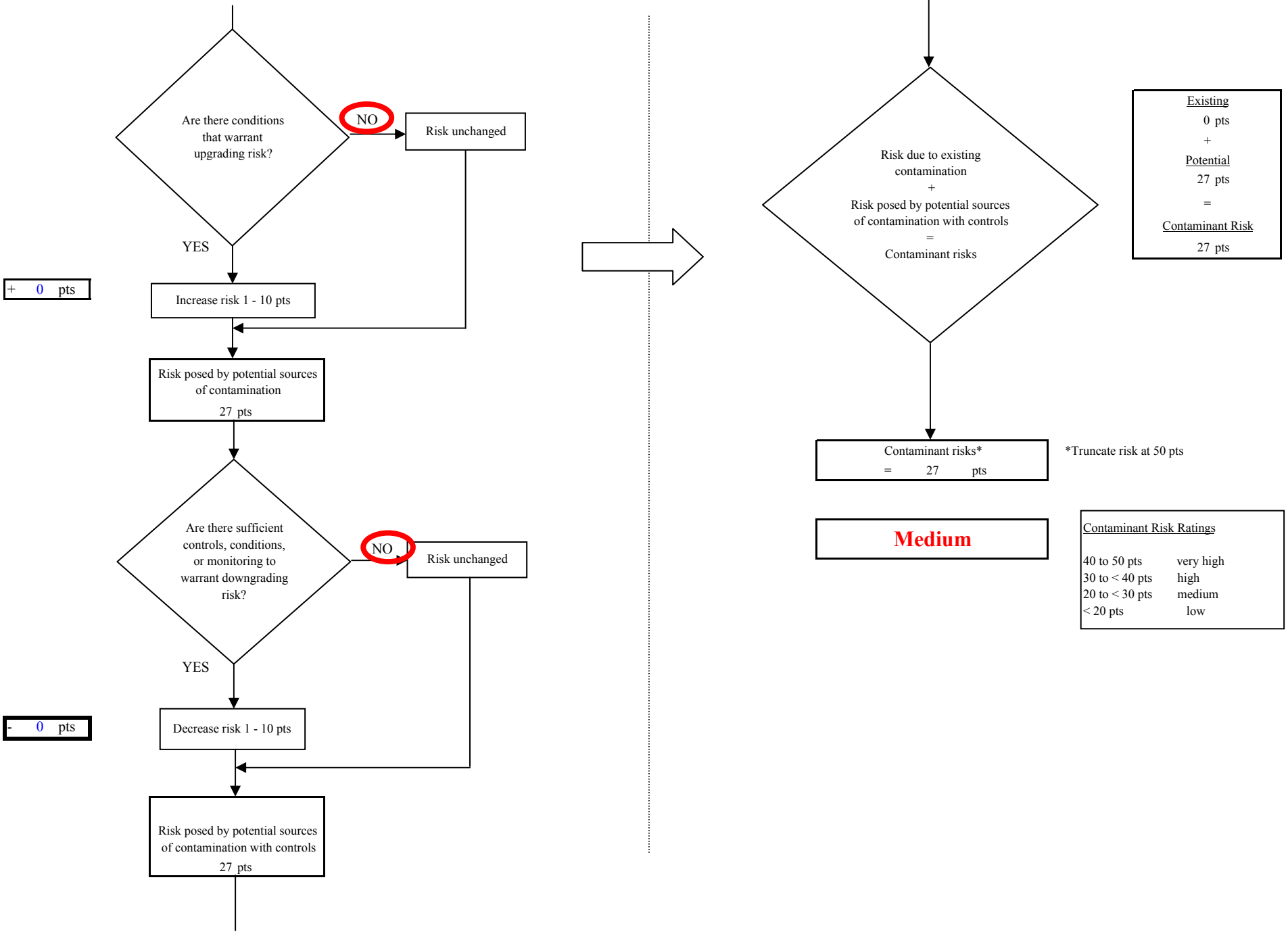


Chart 12. Vulnerability analysis for Penland Park Mobile Home Park- Synthetic Organic Chemicals

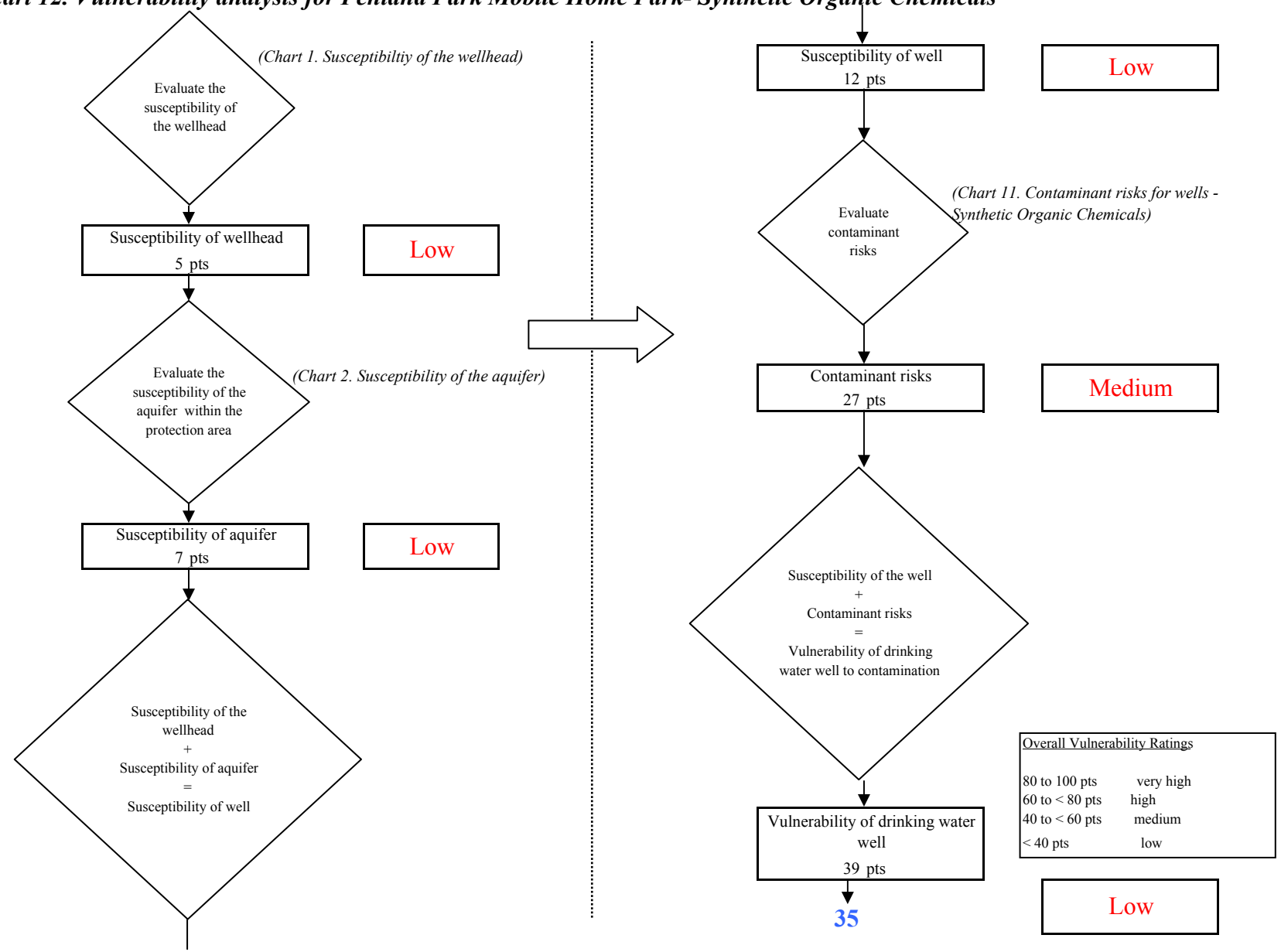


Chart 13. Contaminant risks for Penland Park Mobile Home Park- Other Organic Chemicals

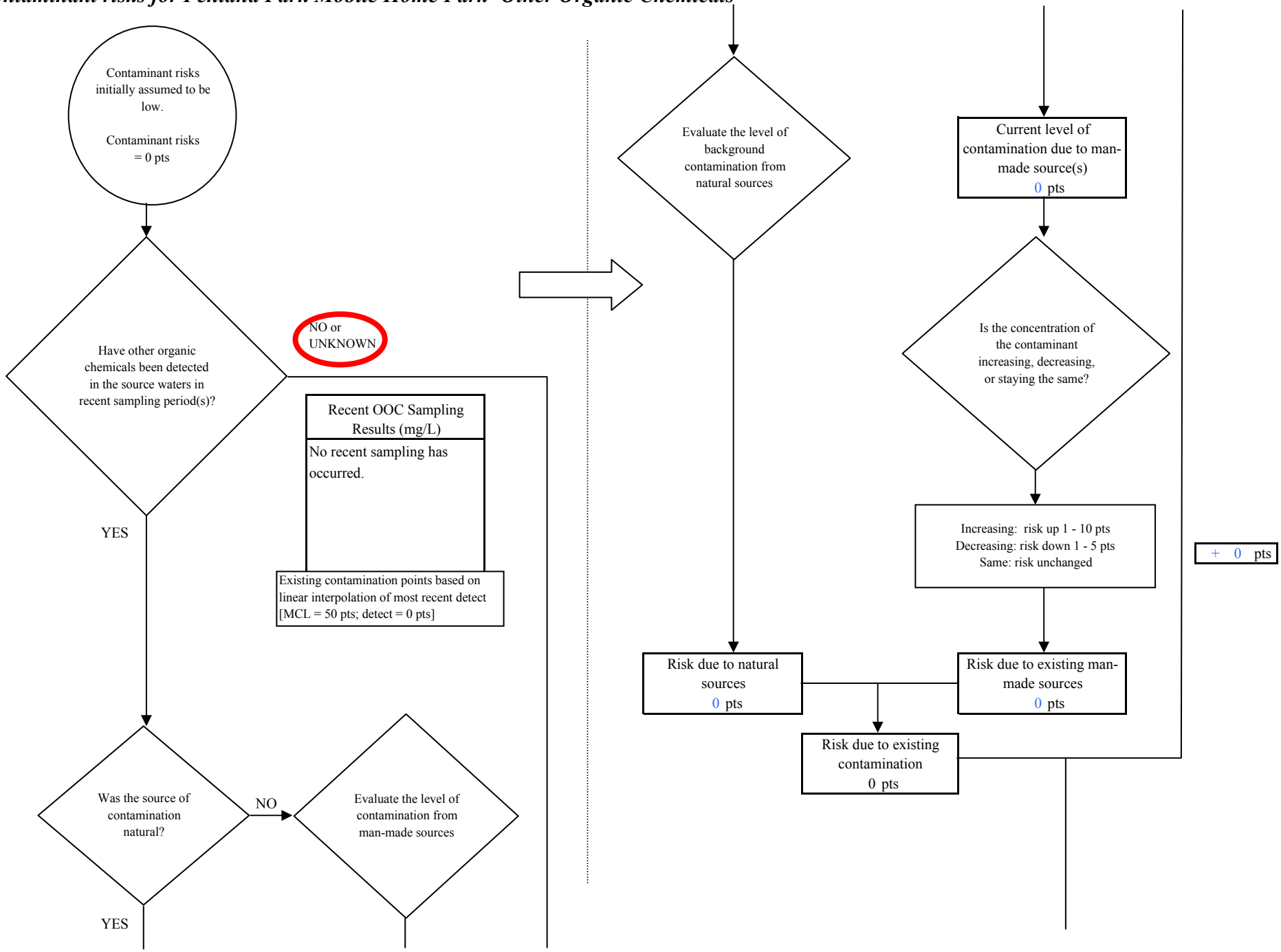
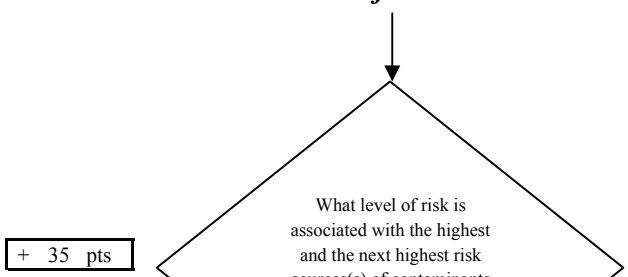


Chart 13. Contaminant risks for Penland Park Mobile Home Park- Other Organic Chemicals



+ 35 pts

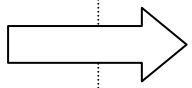
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	1	1
Medium(s)	0	7	7
Low(s)	5	10	15

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

Matrix Score 35

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.



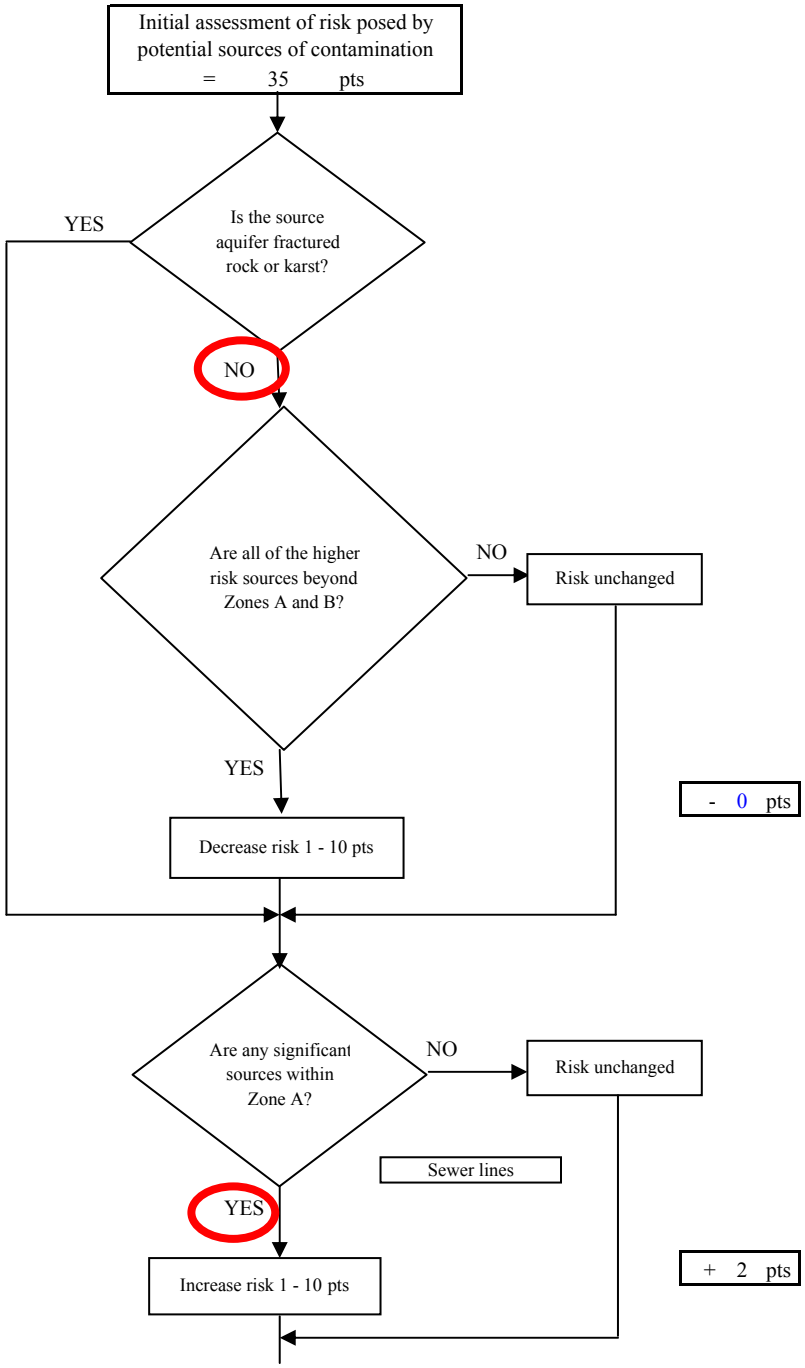


Chart 13. Contaminant risks for Penland Park Mobile Home Park- Other Organic Chemicals

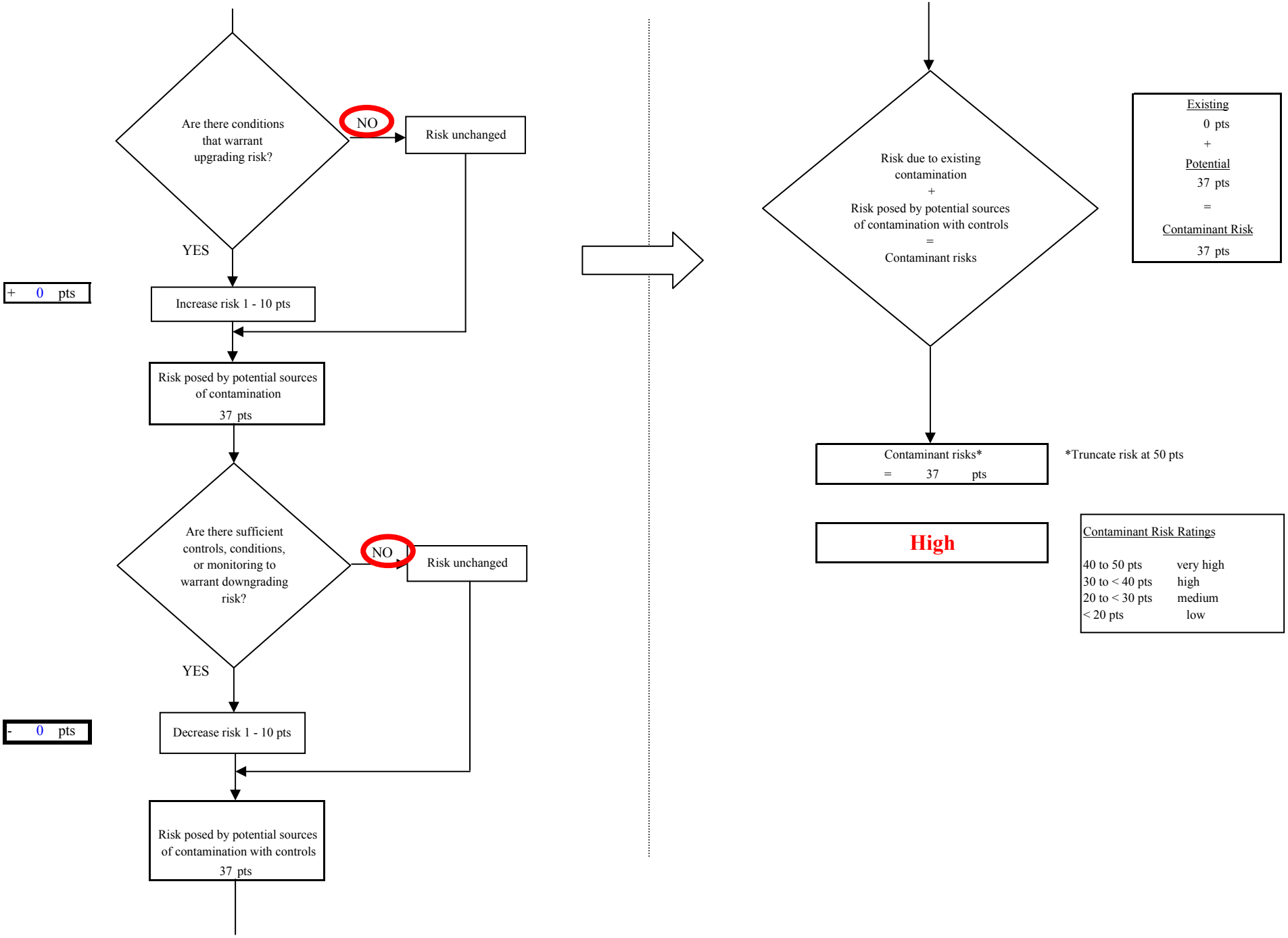


Chart 14. Vulnerability analysis for Penland Park Mobile Home Park- Other Organic Chemicals