Source Water Assessment for Eagle Crest Condominiums Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

DRINKING WATER PROTECTION PROGRAM REPORT 420
PWSID 213792.001

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Source Water Assessment for Eagle Crest Condominiums, Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

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Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Public Water System for Eagle Crest Condominiums is a Class A (community) water system consisting of one well in the Anchorage area. Identified potential and current sources of contaminants that present the most significant risk to the source of public drinking water serving Eagle Crest Condominiums includes approximately 17 acres of residential area, residential septic systems, sewer lines, roads, recreation trails, a construction trade area, a lawn and garden supply distributor, and an ADEC recognized contaminated site. 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, the public drinking water source for Eagle Crest Condominiums received a vulnerability rating of **medium** for nitrates and/or nitrites, and synthetic organic chemicals; and **low** for bacteria and viruses, volatile organic chemicals, heavy metals and other organic chemicals.

INTRODUCTION

The purpose of this environmental 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. This assessment was completed for the source of public drinking water serving Eagle Crest Condominiums. This water system consists of one well in the Anchorage area (see Figure 1). This assessment, known under the Alaska Drinking Water Protection Program as the *Source Water Assessment*, has combined a review of the natural hydrogeologic sensitivity with potential and existing contaminant risks to arrive at an overall vulnerability of the drinking water source to contamination. This assessment has been completed as a basis for local voluntary protection efforts and to assist agencies in their efforts to reduce risk to this public drinking water supply.

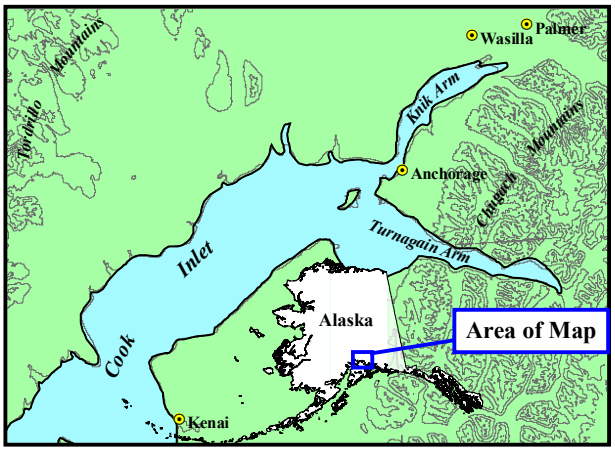


Figure 1. Index map showing the location of Anchorage, Alaska

DESCRIPTION OF THE ANCHORAGE AREA, ALASKA

Location

Anchorage, located in southcentral 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.

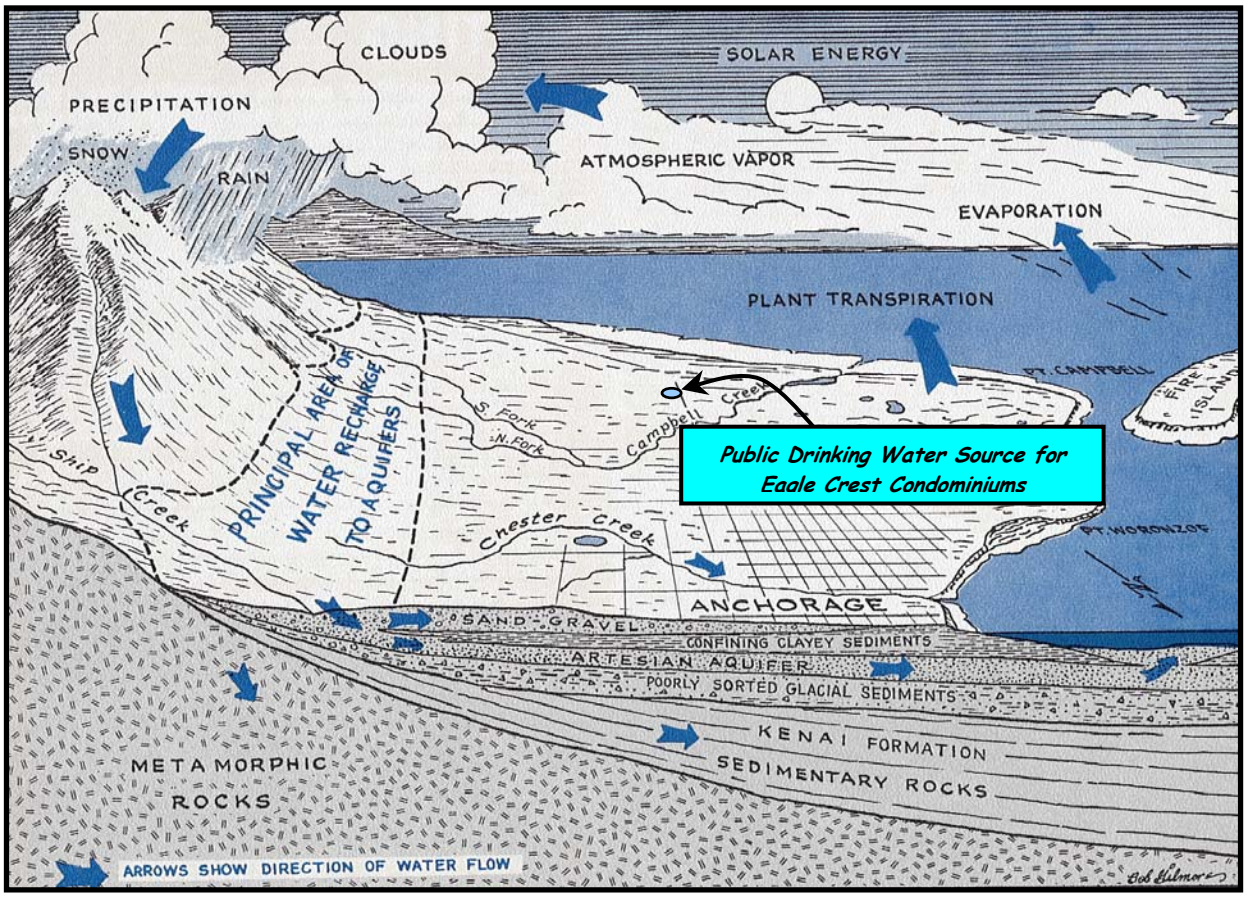


Figure 2. Generalized hydrologic cycle in the Anchorage area [*Barnwell, George, Dearborn,Weeks, and Zenone*, 1972].

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.

PUBLIC DRINKING WATER SYSTEM SERVING EAGLE CREST CONDOMINIUMS

Eagle Crest Condominium's Public Drinking Water System is a Class A (community) water system consisting of one well, which is located off of Pyramid Road (Tract A-2A, Parkside Subdivision) at an elevation of approximately 250 feet above sea level (see Figure 3).

Installation of the well occurred November 3, 1977 to a total depth of 267 feet below ground surface and was completed in a 6-inch well casing. According to the most recent Sanitary Survey (01/27/97) there is no grouting or concrete pad surrounding the well casing. A concrete pad which extends a minimum of two feet laterally in all directions from the well casing and proper grouting can provide added protection against contaminants traveling from the ground surface and along the well casing into source waters. Proper grading of the land surface away from the well casing can also provided added protection by diverting surface water from entering source waters along the well casing.

This system operates year round and serves approximately 120 residents through 48 service connections.

ASSESSMENT AND PROTECTION AREA FOR THE PUBLIC DRINKING WATER SOURCE SERVING EAGLE CREST CONDOMINIUMS

The Drinking Water Protection and Assessment Area that has been established for the source of public drinking water serving Eagle Crest Condominiums is the area that

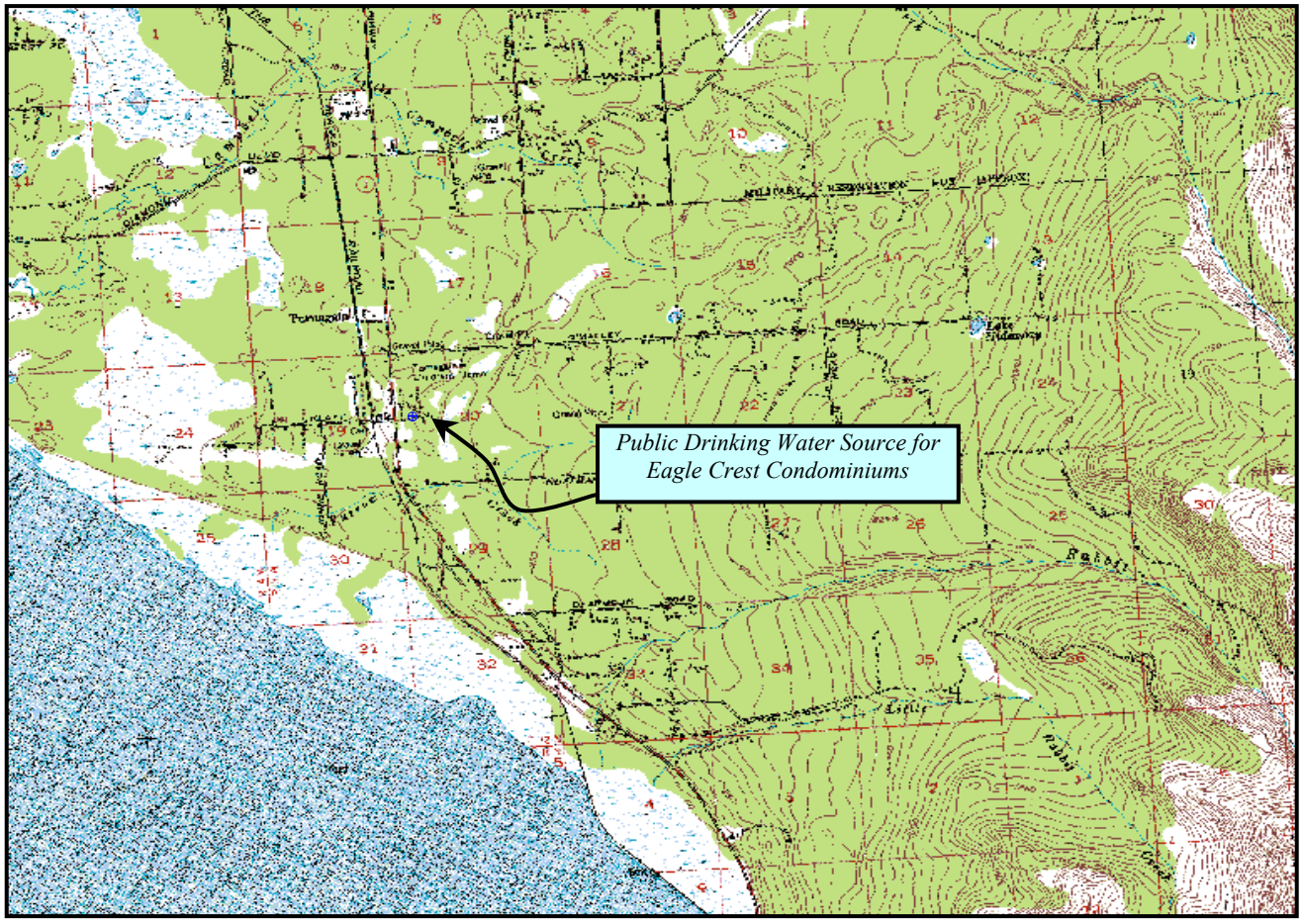


Figure 3. Map showing the location of the drinking water sources for Eagle Crest Condominiums [Base: USGS Anchorage A8].

is most sensitive to contamination. This area serves as a basis for assessing the risk of the drinking water source to contamination. The zones around the drinking water source outline the most critical area for the preservation of the quality of the drinking water for this system. For simplicity, this area will be known as your Drinking Water Protection Area and will serve as the focus for voluntary protection efforts.

Conceptually, groundwater enters the aquifer systems along the front range of the Chugach Mountains (Figure 2) and flows toward Cook Inlet. An analytical calculation was used to determine the size and shape of the area that contributes water to the well. 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*]. This analytical calculation was used as a guide as the first step in establishing the protection area for each public drinking water source in Anchorage. Additional methods were further employed to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at meaningful and conservative protection areas with respect to public health (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

The Drinking Water Protection Areas established for wells by the Alaska Department of Environmental Conservation are separated into zones. These zones correspond to a time-of-travel. Time-of-travel is the time required for water to move in the saturated zone of the ground from a specific point to the well. The Drinking Water Protection Area for Eagle Crest Condominiums contains four zones, Zone A through Zone D (See Map 1 in Appendix A). Zone A corresponds to the area between the wells and the distance equal to ¼ of the distance of the 2-year time-of-travel. Depending on where a contaminant source is located within Zone A, travel time for a contaminant to the wells may be on the order of several days to several hours. Zone A also extends downgradient from the wells to take into account the area of the aquifer that is influenced by pumping of the wells. Zone B corresponds to a time-of-travel of less than two years. Zones C and D correspond to those areas between 5 years and 10 years time-of-travel, respectively.

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 Drinking Water Protection Area for Eagle Crest Condominiums. This survey was completed through a search of agency records and other publicly available information. Potential sources of contamination to drinking water supplies cover 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 this assessment and 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
- Other organic chemicals

Maps 2 and 3 in Appendix C depict the Contaminant Source Inventory for Eagle Crest Condominiums. Table 1 in Appendix B lists the inventoried potential sources of contamination within Zones A through D. Below is a summary of the contaminant sources inventoried:

- Approximately 17 acres of residential area;
- residential septic systems;
- sewer lines;
- roads;
- recreation trails;
- a construction trade area;
- a lawn and garden supply distributor;
- an ADEC recognized contaminated site.

These potential and existing contaminant sources present the most significant risk for all six categories, respectively.

RANKING OF CONTAMINANT RISKS

Potential and existing sources of contamination have been identified, sorted, and ranked 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. Contaminant risks are further a function of the number and density of those types of contaminant sources as well as the proximity of those sources to the public drinking water wells.

VULNERABILITY OF THE PUBLIC DRINKING WATER SOURCE SERVING EAGLE CREST CONDOMINIUMS

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 have been analyzed and an overall vulnerability score of 0 to 100 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)

According to the well log the well was completed in a confined aquifer to a total depth of 267 feet below ground surface and had a static water level of 169 feet below ground surface at the time of drilling. The depth to the top of the confining layer is approximately 8 feet below ground surface and consists of a layer of hardpan and has a thickness of approximately 7 feet. This confining layer may provide a protective barrier against the movement of contaminants in the subsurface. However, near the base of the Chugach Mountains, these clay layers tend to be discontinuous and thin toward the mountains. Therefore, contaminants that enter the subsurface near the base of the mountains may enter the confined aquifer uninhibited by the absence of any protective layer.

Combining the susceptibility of the wellhead and the aquifer to contamination leads to a score (0 – 50 points) and rating of overall Susceptibility of the well to contamination (See Appendix D). Table 1 depicts the overall Susceptibility score and rating for the source of public drinking water serving Eagle Crest Condominiums.

Table 1. Natural Susceptibility - Susceptibility of the Wellhead and Aquifer to Contamination

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	16	High
Natural Susceptibility	21	Medium

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. A score (0 – 50 points) and rating of Contaminant Risks (See Appendix D) is assigned based on the findings of the Contaminant Source Inventory (See Appendix B - Table 1 – Table 7). This portion of the analysis examines any existing or historical contamination that has been detected at the drinking water source through routine sampling. It also reviews contamination that has or may have occurred but has not arrived or been detected at the well. Table 2 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 2. Contaminant Risks to Eagle Crest Condominiums Public Drinking Water Source

Contaminant Risks	Score	Rating
Bacteria and Viruses	12	Low
Nitrates and/or Nitrites	25	Medium
Volatile Organic Chemicals	12	Low
Heavy Metals, Cyanide, And Other Inorganic Chemicals	13	Low
Synthetic Organic Chemicals	22	Medium
Other Organic Chemicals	12	Low

Appendix D contains fourteen charts, which together form the 'Vulnerability Analysis' for a Class A public drinking water system. 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 Analysis for nitrates and nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

Vulnerability of drinking water sources to contamination is the combination of susceptibility of the aquifer and the well with contaminant risks. Table 3 contains the overall vulnerability scores (0 – 100) and ratings for each of the six categories of drinking water contaminants (See Appendix D). Note: scores are rounded off to the nearest five.

Table 3. Overall Vulnerability of Eagle Crest Condominiums Public Drinking Water Source to Contamination by Category

Category	Score	Rating
Bacteria and Viruses	35	Low
Nitrates and Nitrites	45	Medium
Volatile Organic Chemicals	35	Low
Heavy Metals, Cyanide, and Other Inorganic Chemicals	35	Low
Synthetic Organic Chemicals	42	Medium
Other Organic Chemicals	35	Low

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, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

The contaminant risk for bacteria and viruses is low and nitrates and/or nitrites is medium with residential areas, sewer lines, and septic systems presenting the most significant risk to the drinking water well. After combining the contaminant risk for bacteria and viruses and nitrates and/or nitrites with the susceptibility of the well, the overall vulnerability of the well to contamiantion is low from bacteria and viurses and medium from nitrates and/or nitrtites.

Review of the historical sampling data indicates that no bacteria and viruses have been detected in Eagle Crest Condominiums drinking water within the past 5 years (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D).

Nitrates and/or nitrites are found in natural background concentration at this site, as elsewhere throughout Alaska. Nitrate concentrations in uncontaminanted groundwater are typically less than 2 milligrams per liter (mg/L) and are derived primarily from the decomposition of organic matter in soils [Wang, Strelakos, Jokela, 2000].

Sampling history for Eagle Crest Condominiums indicates that low concentrations of nitrates have been detected in source waters. Nitrates were detected at the well in December of 1999 with a concentration of approximately 6% of the Maximum Contaminant Level or MCL. The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful health effects. Due to the high solubility and weak retention by soil, nitrates are very mobile, moving at approximately the same rate as water. Though existing nitrate contamination was detected at the site, concentrations remain at very safe levels with respect to human health.

The contaminant risk for volatile organic chemicals is low with residential areas, roads and an ADEC recognized contaminated site presenting the most significant risk to the drinking water well. After combining the contaminant risk for volatile organic chemicals with the susceptibility of the well, the overall vulnerability of the well to contamiantion is low from volatile organic chemicals.

In February of 1994 a Site Assessment report prepared by Shannon and Wilson for the Municipality of Anchorage related to the Lake Otis Parkway Improvement Project identified gasoline and diesel range contamination within and adjacent to the roadway (CS ID Tag U4-1). The report noted the presence of groundwater contamination and soils contaminated with high levels of diesel and gasoline. The sources of the contamination have been related to two regulated underground storage tanks which were removed from an adjacent property and to the spraying of roads ways for dust control.

Review of the historical sampling data indicates that no volatile organic chemical contamination has been detected in Eagle Crest Condominiums source waters at this time (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

The contaminant risk for heavy metals is low with residential areas, roads, sewer lines and a construction trade area presenting the most significant risk to the drinking water well. Combining the contaminant risk for heavy metals with the susceptibility of the well, the overall vulnerability of the well to contamination from heavy metals is low.

The contaminant risk for synthetic organic chemicals is medium with residential areas, lawn and garden supply distributors, sewer lines and residential septic systems presenting the most significant risk to the drinking water well. Combining the contaminant risk for synthetic organic chemicals with the susceptibility of the well, the overall vulnerability of the well to contamiantion from synthetic organic chemicals is medium.

The contaminant risk for other organic chemicals is low with residential areas, roads, and a construction trade area presenting the most significant risk to the drinking water well. Combining the contaminant risk for other organic chemicals with the susceptibility of the well, the overall vulnerability of the well to contamiantion from other organic chemicals is low.

SUMMARY

A *Source Water Assessment* has been completed for the source of public drinking water serving Eagle Crest Condominiums. The overall vulnerability of this water source to contamination is **medium** for nitrates and/or nitrites, and synthetic organic chemicals; and **low** for bacterial and viruses, volatile organic chemicals, heavy metals 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 continuous efforts on the part of Eagle Crest Condominiums 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 public drinking water source serving Eagle Crest Condominiums.

REFERENCES CITED

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.

Patrick, L.D., Brabets, T.P., and Glass, R.L., 1989, Simulation of ground-water flow at Anchorage, Alaska: U.S. Geological Survey Water-Resources Investigations Report 88-4139, 41p.

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.

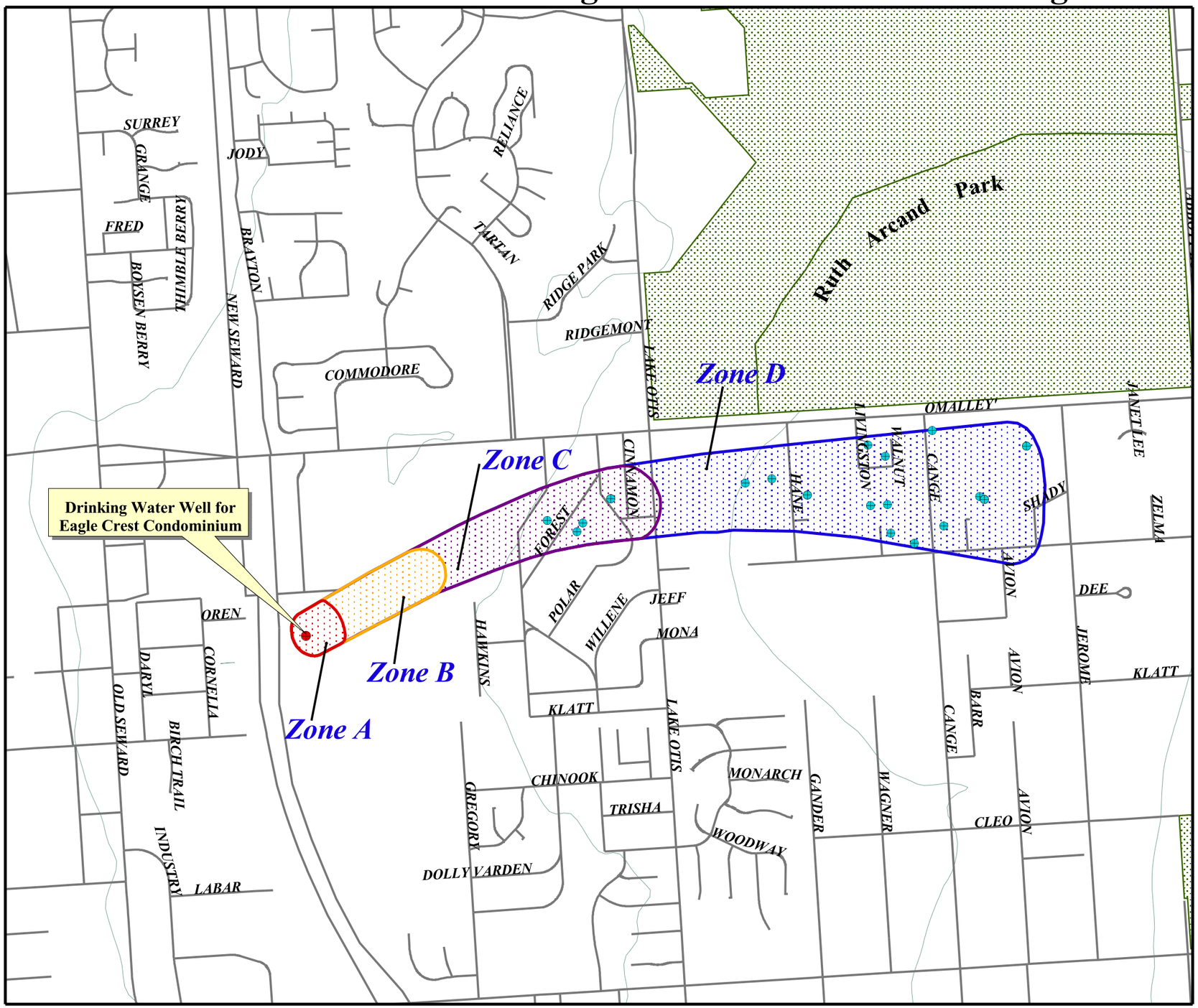
Wang, B., Strelakos, P.M., and Jokela, B., 2000, Nitrate Source Indicators In Groundwater of the Scimitar Subdivision, Peters Creek Area, Anchorage Alaska: U.S. Geological Survey Water-Resources Investigations Report 00-4137, 25p.

Western Regional Climate Center, 2000, August 24, Web extension to the *Western Regional Climate Center* [WWW document]. URL http://www.wrcc.dri.edu/index.html

APPENDIX A

Drinking Water Protection Area for Eagle Crest Condominiums

Drinking Water Protection Area and
Potential & Existing Contaminant Sources for Eagle Crest Condominiums



- Eagle Crest Condominium's DW Well
- Public and Private DW Wells

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
- Ruth Arcand Park
- Elevation Contours

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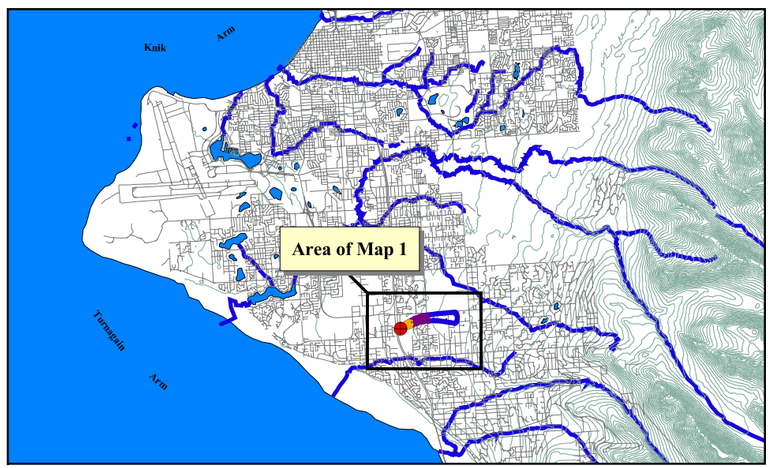

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Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominiums

Table 1

Contaminant Source Inventory for ***Eagle Crest Condominims***

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Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-1	A	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	One-hundred-twelfth Ave.	2	
Lawn and garden supplies/services	C23	C23-1	C	Off of Reader Road	2	
Construction trade areas and materials	C09	C9-1	C	Off of Lake Otis Parkway	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D1-1	C	Running along Lake Otis Parkway	2	
Residential Areas	R01	R1-2	C	Residential area located within Zone C	2	Approximately 16 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-1	C	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-10	C	Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-11	C	Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-12	C	Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-13	C	Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-14	C	Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-15	C	Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-2	C	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-3	C	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-4	C	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-5	C	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-6	C	Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-7	C	Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-8	C	Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-9	C	Off of Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	C	Reader Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	C	Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	C	Polar Drive	2	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Location*	*Map Number*	*Comments*
Highways and roads, paved (cement or asphalt)	X20	X20-5	C	One-hundred-tenth Ave.	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	C	Cinnamon Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	C	Lake Otis Parkway	2	
Dog walking areas/foot trails	X46	X46-1	C	Trail intersecting Zone C	2	
Dog walking areas/foot trails	X46	X46-2	C	Trail running along the west side of Lake Otis Parkway	2	
Dog walking areas/foot trails	X46	X46-3	C	Trail running along the east side of Lake Otis Parkway	2	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U4-1	D	Off of Lake Otis Parkway	3	Presence of GW contamination and soils contaminated with high levels of diesel and gasoline.

Table 2

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims Sources of Bacteria and Viruses

PWSID 213792.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Residential Areas	R01	R1-2	C	Low	2	Residential area located within Zone C	2	Approximately 16 acres of residential area.
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D1-1	C	Medium	3	Running along Lake Otis Parkway	2	
Septic systems (serves one single-family home)	R02	R2-1	C	Low	4	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-2	C	Low	5	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-3	C	Low	6	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-4	C	Low	7	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-5	C	Low	8	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-6	C	Low	9	Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-7	C	Low	10	Off of Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		One-hundred-twelfth Ave.	2	
Septic systems (serves one single-family home)	R02	R2-10	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-11	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-12	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-13	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-14	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-15	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-8	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-9	C	Low		Off of Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	C	Low		Reader Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	C	Low		Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	C	Low		Polar Drive	2	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Highways and roads, paved (cement or asphalt)	X20	X20-5	C	Low		One-hundred-tenth Ave.	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	C	Low		Cinnamon Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	C	Low		Lake Otis Parkway	2	
Dog walking areas/foot trails	X46	X46-1	C	Low		Trail intersecting Zone C	2	
Dog walking areas/foot trails	X46	X46-2	C	Low		Trail running along the west side of Lake Otis Parkway	2	
Dog walking areas/foot trails	X46	X46-3	C	Low		Trail running along the east side of Lake Otis Parkway	2	

Table 3

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims Sources of Nitrates/Nitrites

PWSID 213792.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Residential Areas	R01	R1-2	C	Low	2	Residential area located within Zone C	2	Approximately 16 acres of residential area.
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D1-1	C	Medium	3	Running along Lake Otis Parkway	2	
Septic systems (serves one single-family home)	R02	R2-1	C	Low	4	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-2	C	Low	5	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-3	C	Low	6	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-4	C	Low	7	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-5	C	Low	8	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-6	C	Low	9	Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-7	C	Low	10	Off of Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low		One-hundred-twelfth Ave.	2	
Septic systems (serves one single-family home)	R02	R2-10	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-11	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-12	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-13	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-14	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-15	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-8	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-9	C	Low		Off of Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	C	Low		Reader Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	C	Low		Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	C	Low		Polar Drive	2	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Highways and roads, paved (cement or asphalt)	X20	X20-5	C	Low		One-hundred-tenth Ave.	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	C	Low		Cinnamon Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	C	Low		Lake Otis Parkway	2	
Dog walking areas/foot trails	X46	X46-1	C	Low		Trail intersecting Zone C	2	
Dog walking areas/foot trails	X46	X46-2	C	Low		Trail running along the west side of Lake Otis Parkway	2	
Dog walking areas/foot trails	X46	X46-3	C	Low		Trail running along the east side of Lake Otis Parkway	2	

Table 4

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims Sources of Volatile Organic Chemicals

PWSID 213792.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	One-hundred-twelfth Ave.	2	
Residential Areas	R01	R1-2	C	Low	3	Residential area located within Zone C	2	Approximately 16 acres of residential area.
Highways and roads, paved (cement or asphalt)	X20	X20-2	C	Low	4	Reader Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	C	Low	5	Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	C	Low	6	Polar Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5	C	Low	7	One-hundred-tenth Ave.	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	C	Low	8	Cinnamon Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	C	Low	9	Lake Otis Parkway	2	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U4-1	D	High	10	Off of Lake Otis Parkway	3	Presence of GW contamination and soils contaminated with high levels of diesel and gasoline.
Construction trade areas and materials	C09	C9-1	C	Low		Off of Lake Otis Parkway	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D1-1	C	Low		Running along Lake Otis Parkway	2	
Septic systems (serves one single-family home)	R02	R2-1	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-10	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-11	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-12	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-13	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-14	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-15	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-2	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-3	C	Low		Off of Reader Road	2	

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims

Sources of Volatile Organic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Septic systems (serves one single-family home)	R02	R2-4	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-5	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-6	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-7	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-8	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-9	C	Low		Off of Forest Drive	2	

Table 5

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 213792.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	One-hundred-twelfth Ave.	2	
Residential Areas	R01	R1-2	C	Low	3	Residential area located within Zone C	2	Approximately 16 acres of residential area.
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D1-1	C	Low	4	Running along Lake Otis Parkway	2	
Construction trade areas and materials	C09	C9-1	C	Low	5	Off of Lake Otis Parkway	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	C	Low	6	Reader Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	C	Low	7	Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	C	Low	8	Polar Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5	C	Low	9	One-hundred-tenth Ave.	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	C	Low	10	Cinnamon Drive	2	
Lawn and garden supplies/services	C23	C23-1	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-1	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-10	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-11	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-12	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-13	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-14	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-15	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-2	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-3	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-4	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-5	C	Low		Off of Reader Road	2	

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Septic systems (serves one single-family home)	R02	R2-6	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-7	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-8	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-9	C	Low		Off of Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	C	Low		Lake Otis Parkway	2	

Table 6

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims
Sources of Synthetic Organic Chemicals

PWSID 213792.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Lawn and garden supplies/services	C23	C23-1	C	Medium	2	Off of Reader Road	2	
Residential Areas	R01	R1-2	C	Low	3	Residential area located within Zone C	2	Approximately 16 acres of residential area.
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D1-1	C	Low	4	Running along Lake Otis Parkway	2	
Septic systems (serves one single-family home)	R02	R2-1	C	Low	5	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-2	C	Low	6	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-3	C	Low	7	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-4	C	Low	8	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-5	C	Low	9	Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-6	C	Low	10	Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-10	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-11	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-12	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-13	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-14	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-15	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-7	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-8	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-9	C	Low		Off of Forest Drive	2	

Table 7

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims Sources of Other Organic Chemicals

PWSID 213792.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	One-hundred-twelfth Ave.	2	
Residential Areas	R01	R1-2	C	Low	3	Residential area located within Zone C	2	Approximately 16 acres of residential area.
Highways and roads, paved (cement or asphalt)	X20	X20-2	C	Low	4	Reader Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	C	Low	5	Forest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	C	Low	6	Polar Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5	C	Low	7	One-hundred-tenth Ave.	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	C	Low	8	Cinnamon Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	C	Low	9	Lake Otis Parkway	2	
Construction trade areas and materials	C09	C9-1	C	Low	10	Off of Lake Otis Parkway	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D1-1	C	Low		Running along Lake Otis Parkway	2	
Septic systems (serves one single-family home)	R02	R2-1	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-10	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-11	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-12	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-13	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-14	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-15	C	Low		Off of Polar Drive	2	
Septic systems (serves one single-family home)	R02	R2-2	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-3	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-4	C	Low		Off of Reader Road	2	
Septic systems (serves one single-family home)	R02	R2-5	C	Low		Off of Reader Road	2	

Contaminant Source Inventory and Risk Ranking for Eagle Crest Condominims

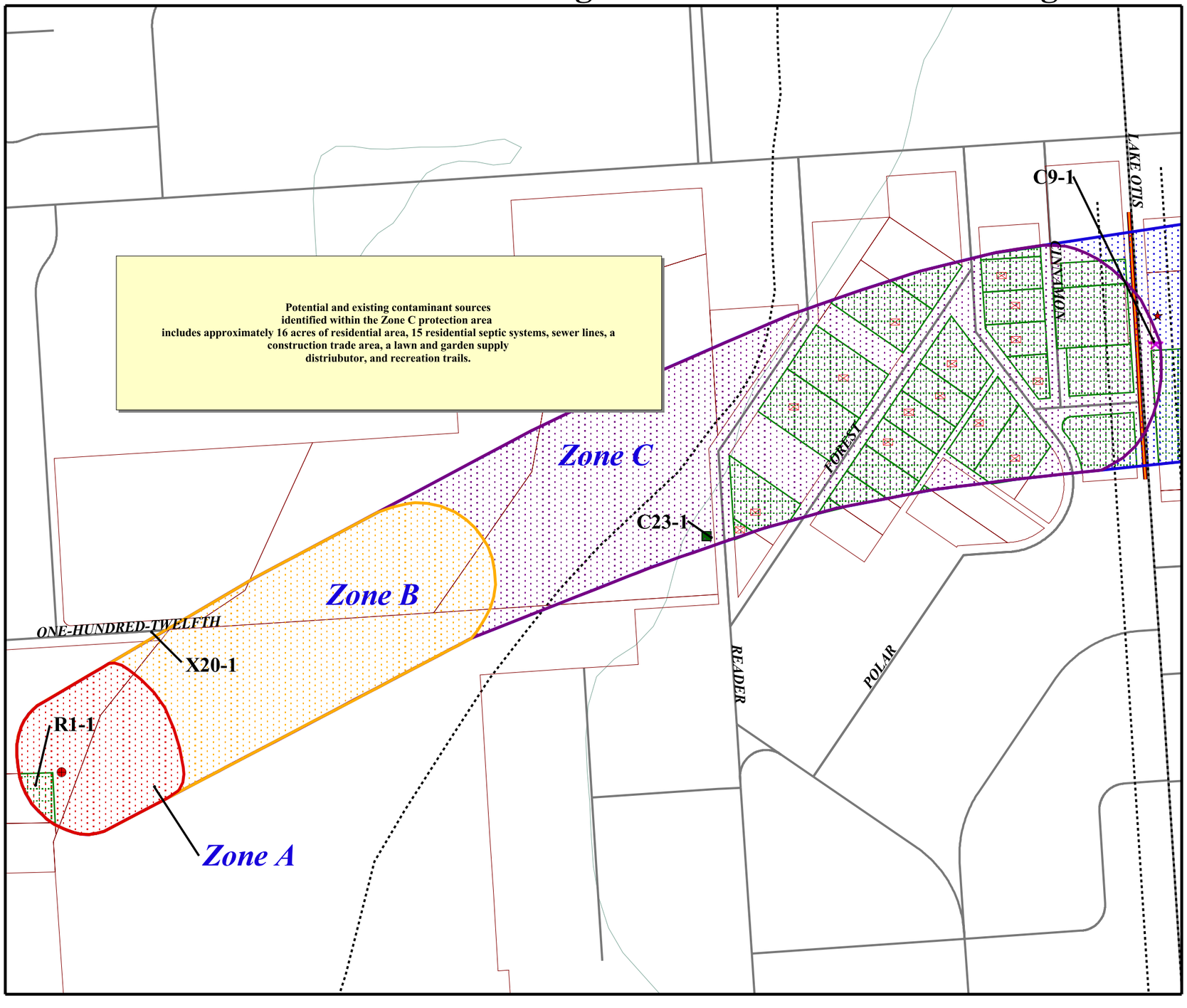
Sources of Other Organic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Overall Rank after Analysis*	*Location*	*Map Number*	*Comments*
Septic systems (serves one single-family home)	R02	R2-6	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-7	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-8	C	Low		Off of Forest Drive	2	
Septic systems (serves one single-family home)	R02	R2-9	C	Low		Off of Forest Drive	2	

APPENDIX C

Drinking Water Protection Area and Potential & Existing Contaminant Sources for Eagle Crest Condominiums

Drinking Water Protection Area and
Potential & Existing Contaminant Sources for Eagle Crest Condominiums



- Eagle Crest Condominium's DW Well

Zone A Protection Area
- Several Months Travel Time

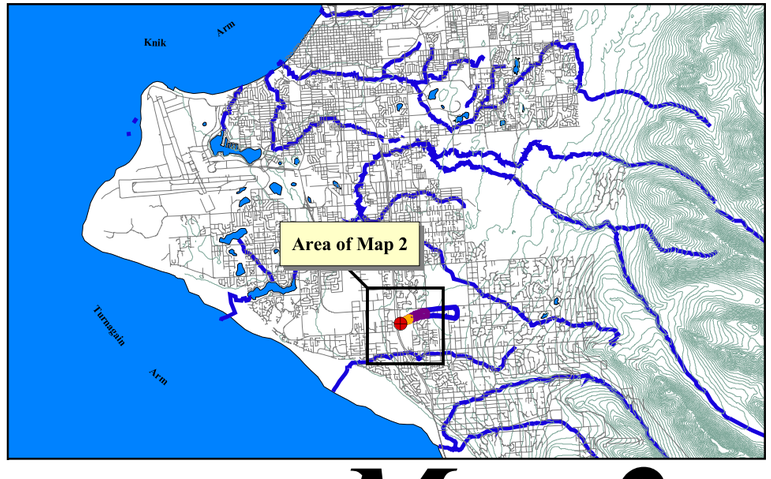
Zone B Protection Area
- Less Than 2 Years Travel Time

Zone C Protection Area
- Less Than 5 Years Travel Time

Zone D Protection Area
- Less Than 10 Years Travel Time
- Residential Area (R1)
- Septic Systems (R2)
- Land Parcels

Potential Contaminant Sources
- Lawn and Garden Supplies/Services (C23)
- Construction Trade Areas and Materials (C9)
- Contaminated Sites, DEC Recognized (U4)
- Trails (X46)
- Sewer Lines (D1)
- Anchorage Roads (X20)
- Elevation Contours

N W E S

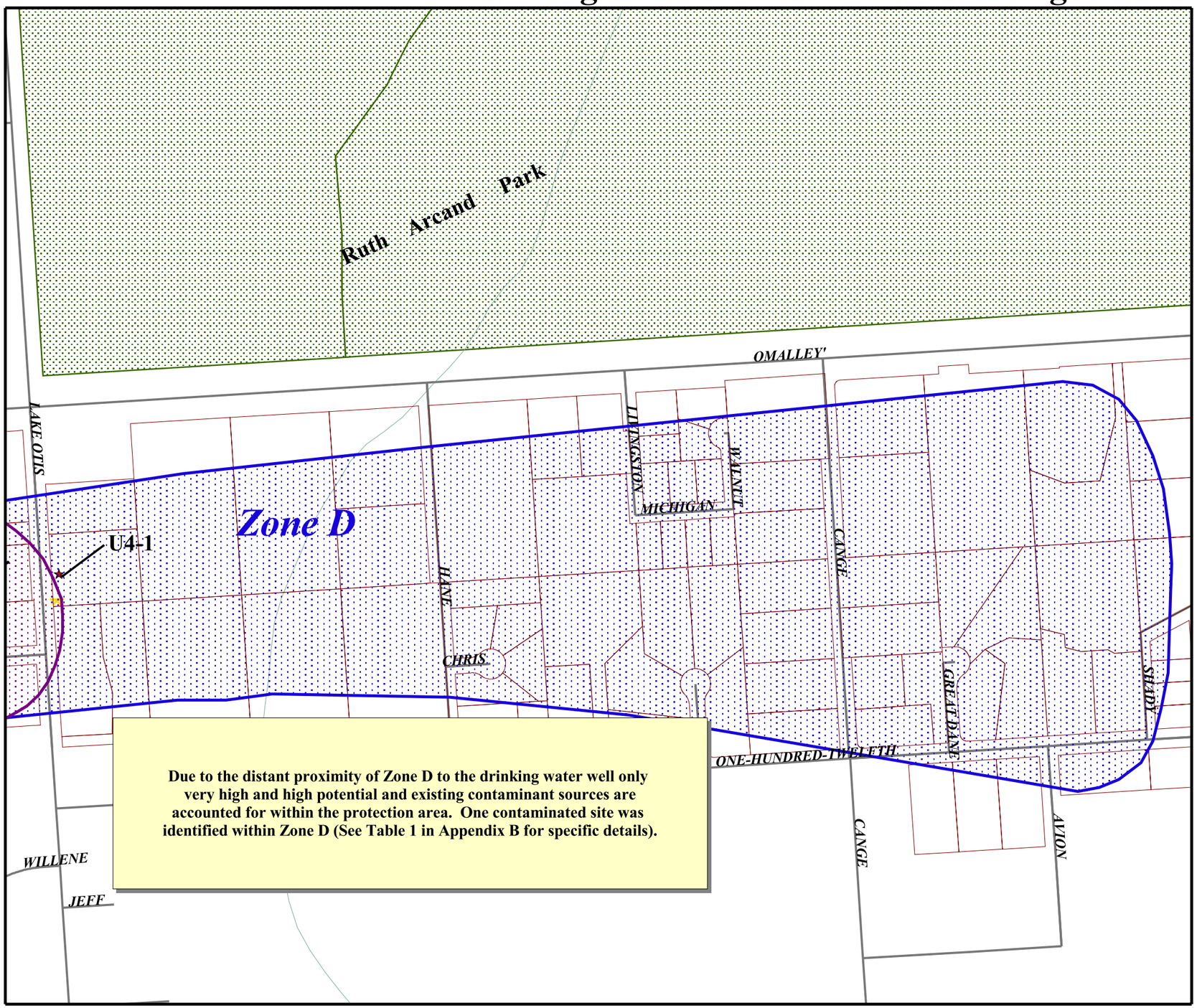


500 0 500 1000 Feet

PWSID 213792.001

Map 2

Drinking Water Protection Area and
Potential & Existing Contaminant Sources for Eagle Crest Condominiums



- Eagle Crest Condominium's DW Well

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
- Anchorage Land Parcels

Potential Contaminant Sources
- Lawn and Garden Supplies/Services (C23)
- Construction Trade Areas and Materials (C9)
- Contaminated Sites, DEC Recognized (U4)
- Roads (X20)
- Elevation Contours
- Ruth Arcand Park

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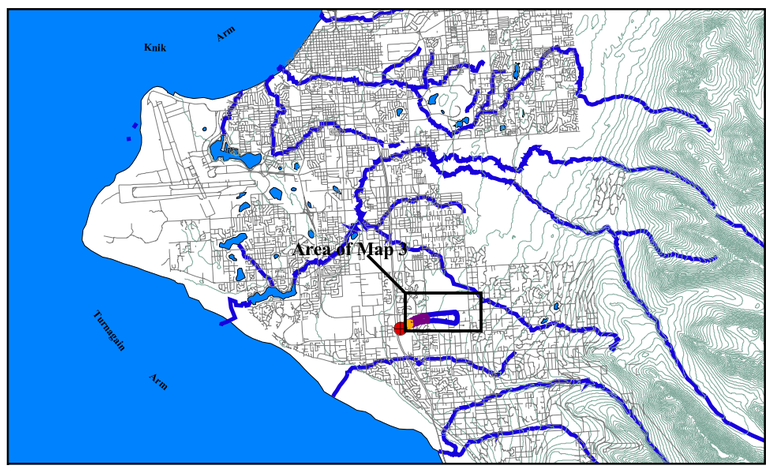


500 0 500 1000 Feet

PWSID 213792.001

Map 3

APPENDIX D

Vulnerability Analysis for Eagle Crest Condominiums

Chart 1. Susceptibility of the wellhead - Eagle Crest Condominiums

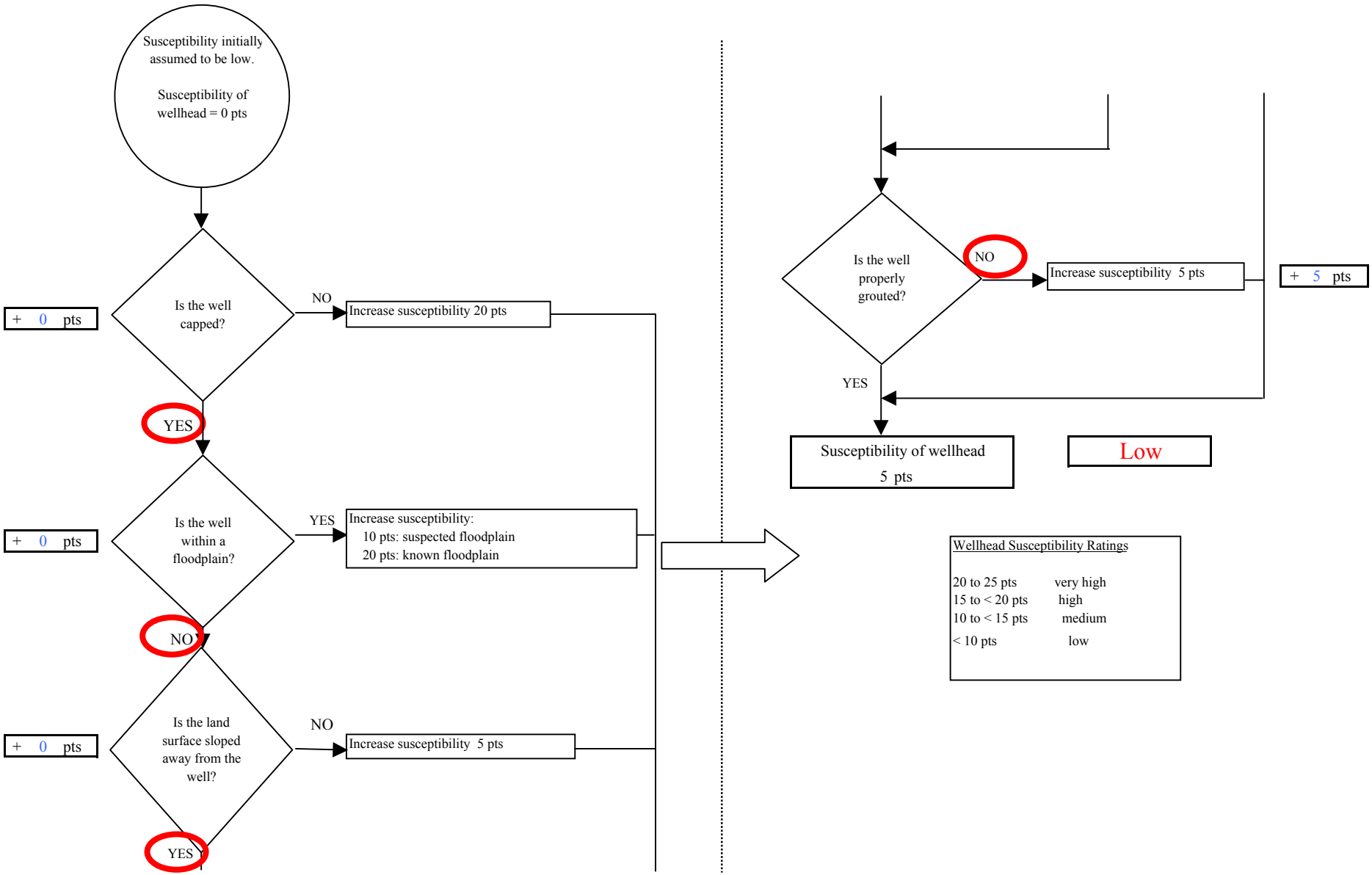


Chart 2. Susceptibility of the aquifer - Eagle Crest Condominiums

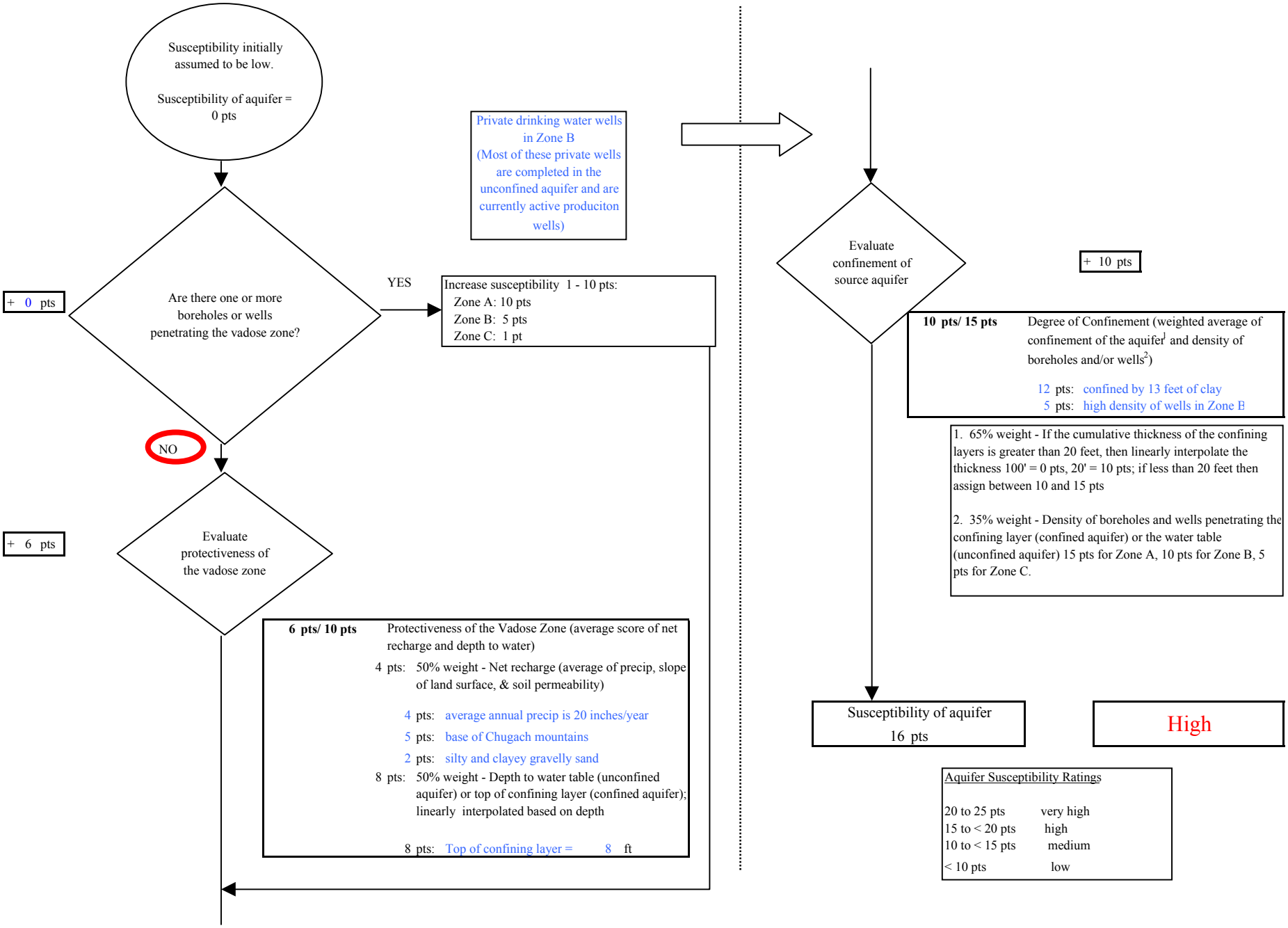
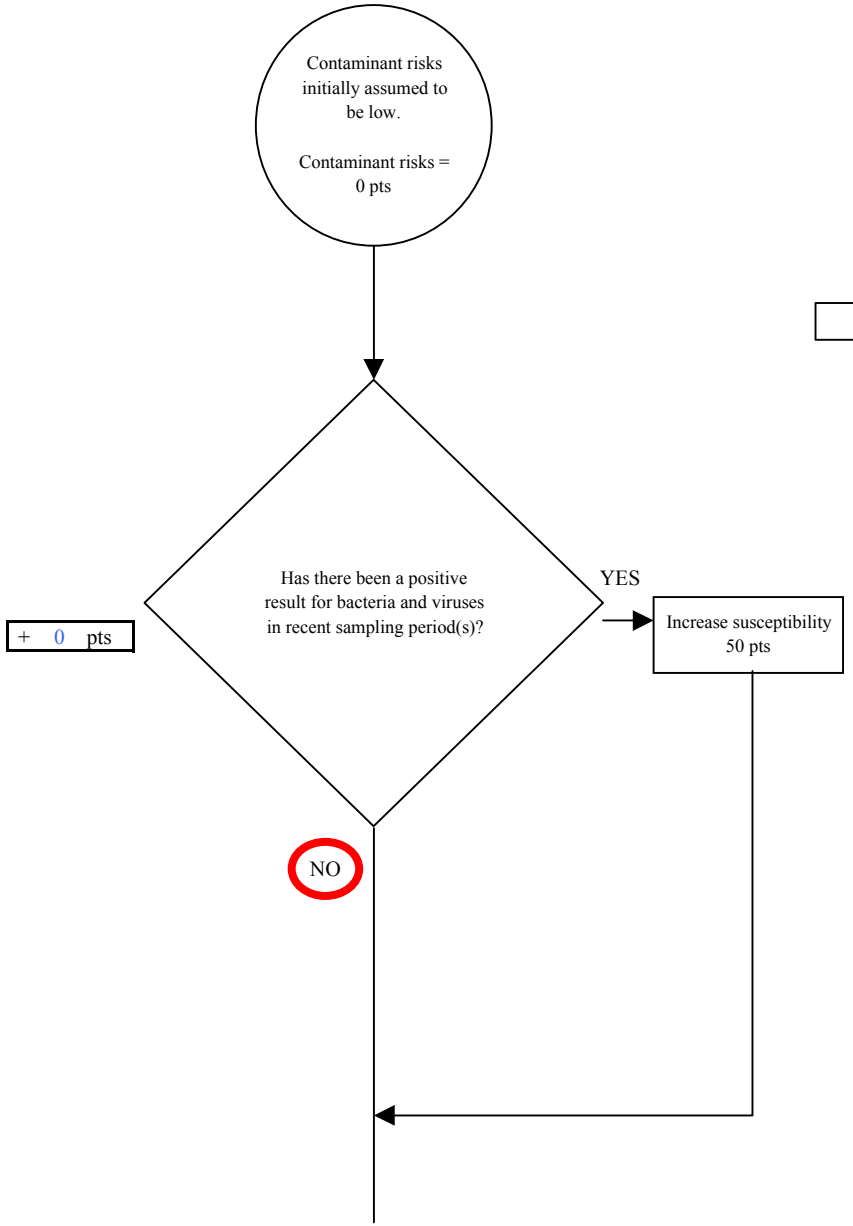
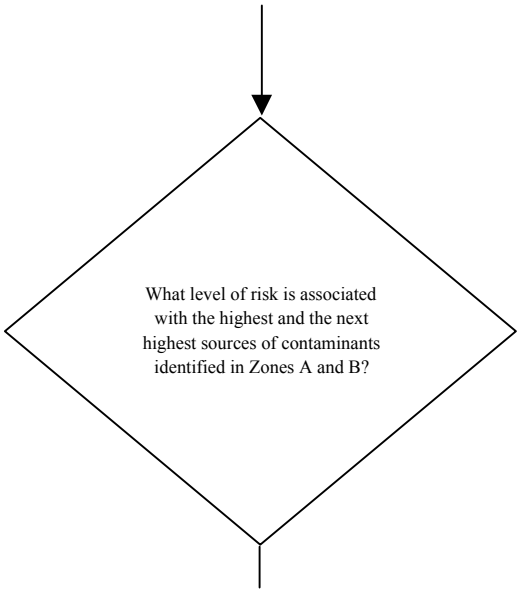


Chart 3. Contaminant risks for Eagle Crest Condominiums - Bacteria & Viruses





+ 10 pts

Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	2	0	2

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

Matrix Score 10

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

Chart 3. Contaminant risks for Eagle Crest Condominiums - Bacteria & Viruses

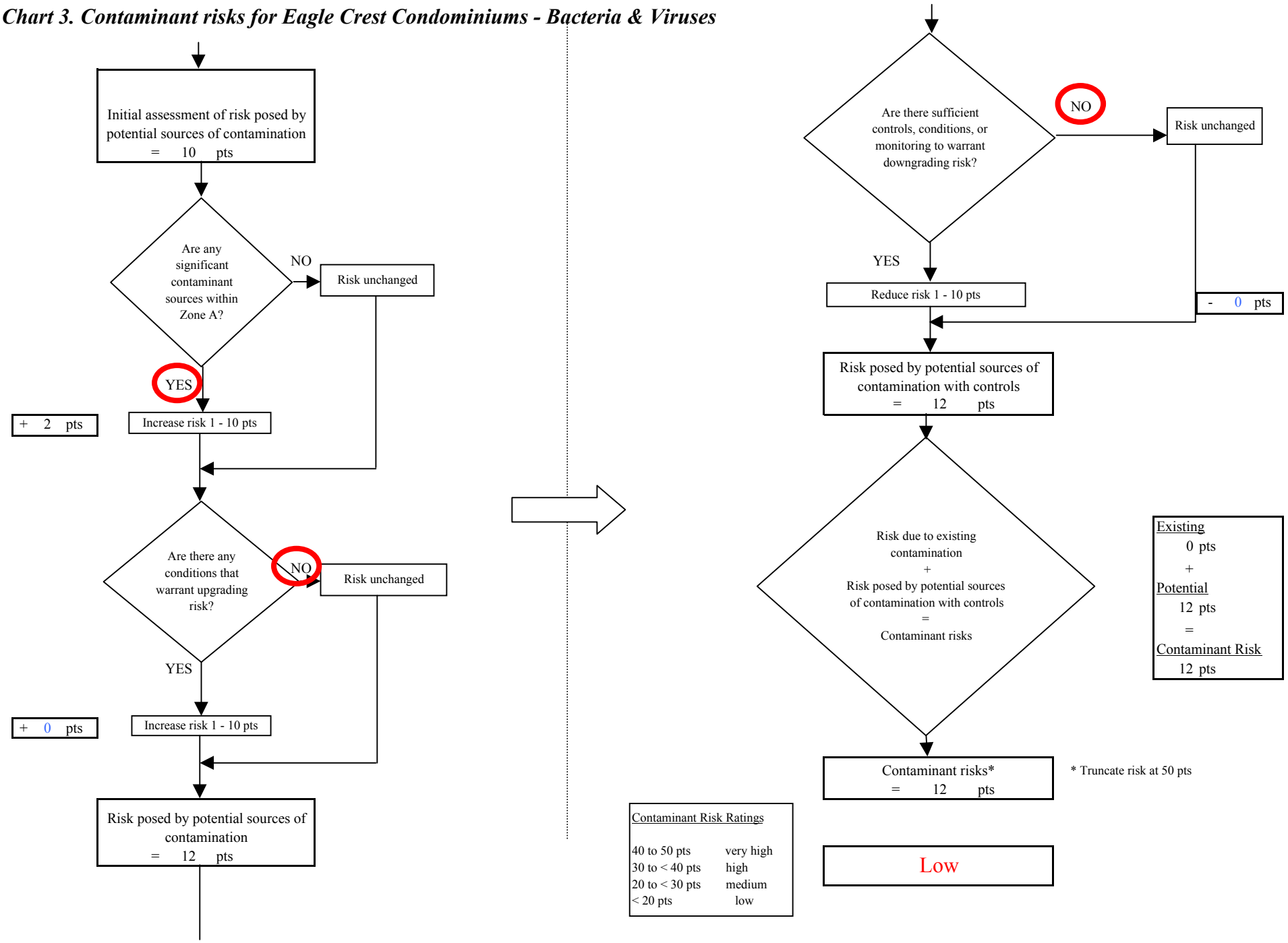


Chart 4. Vulnerability analysis for Eagle Crest Condominiums - Bacteria & Viruses

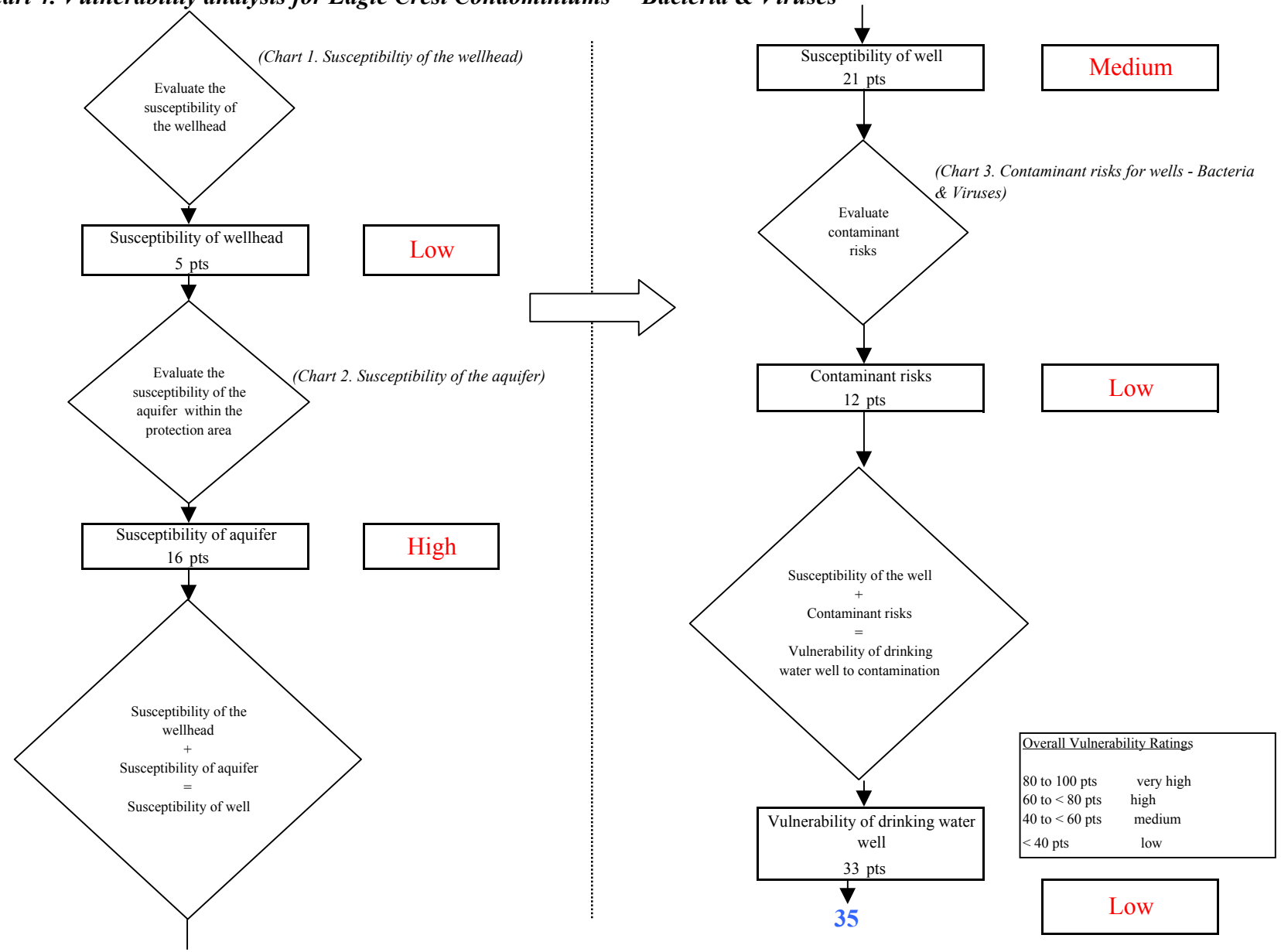


Chart 5. Contaminant risks for Eagle Crest Condominiums - Nitrates and Nitrites

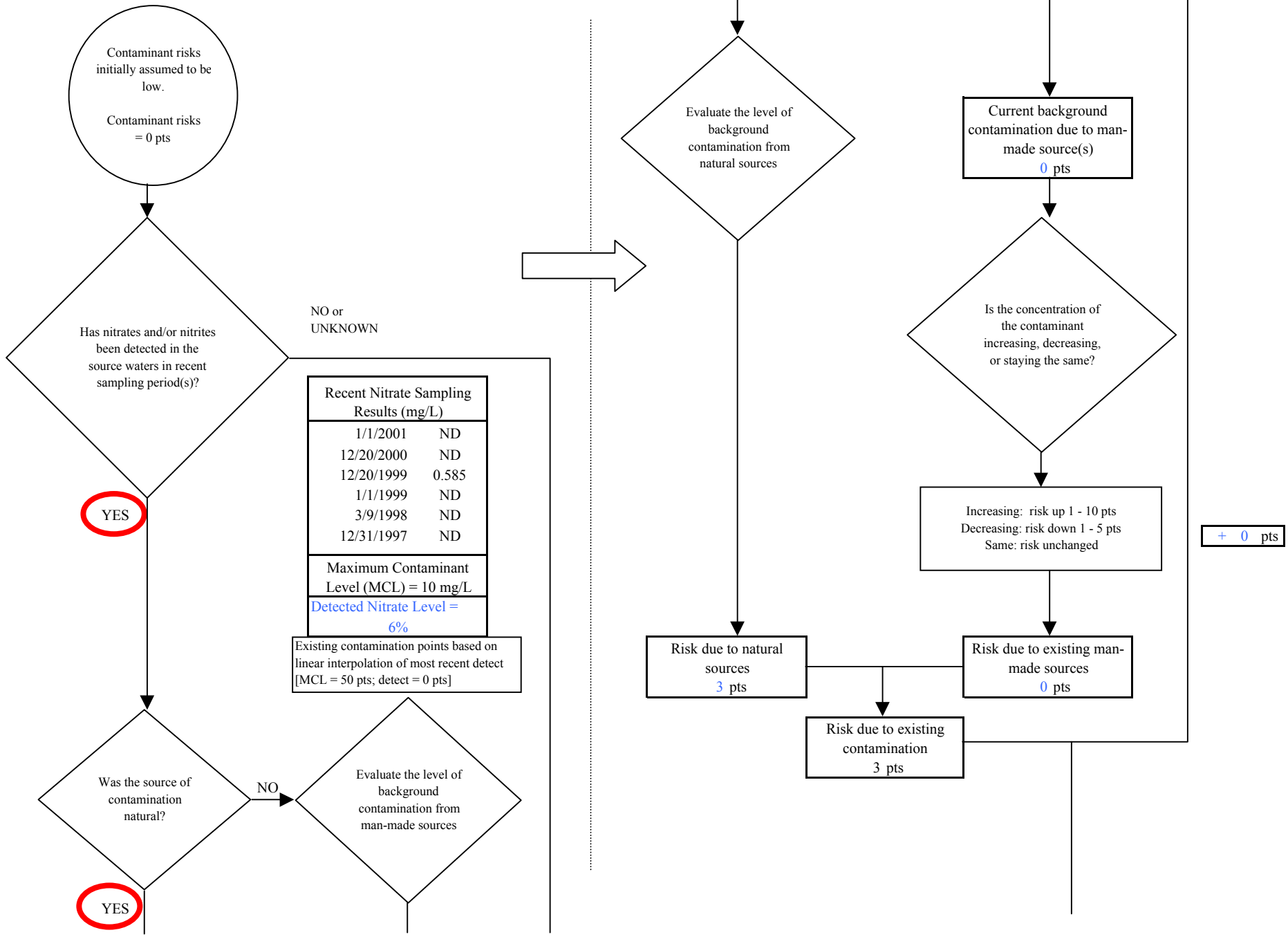


Chart 5. Contaminant risks for Eagle Crest Condominiums - Nitrates and Nitrites

+ 20 pts

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

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

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	2	9	11

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

Matrix Score 20

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

Initial assessment of risk posed by potential sources of contamination = 20 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

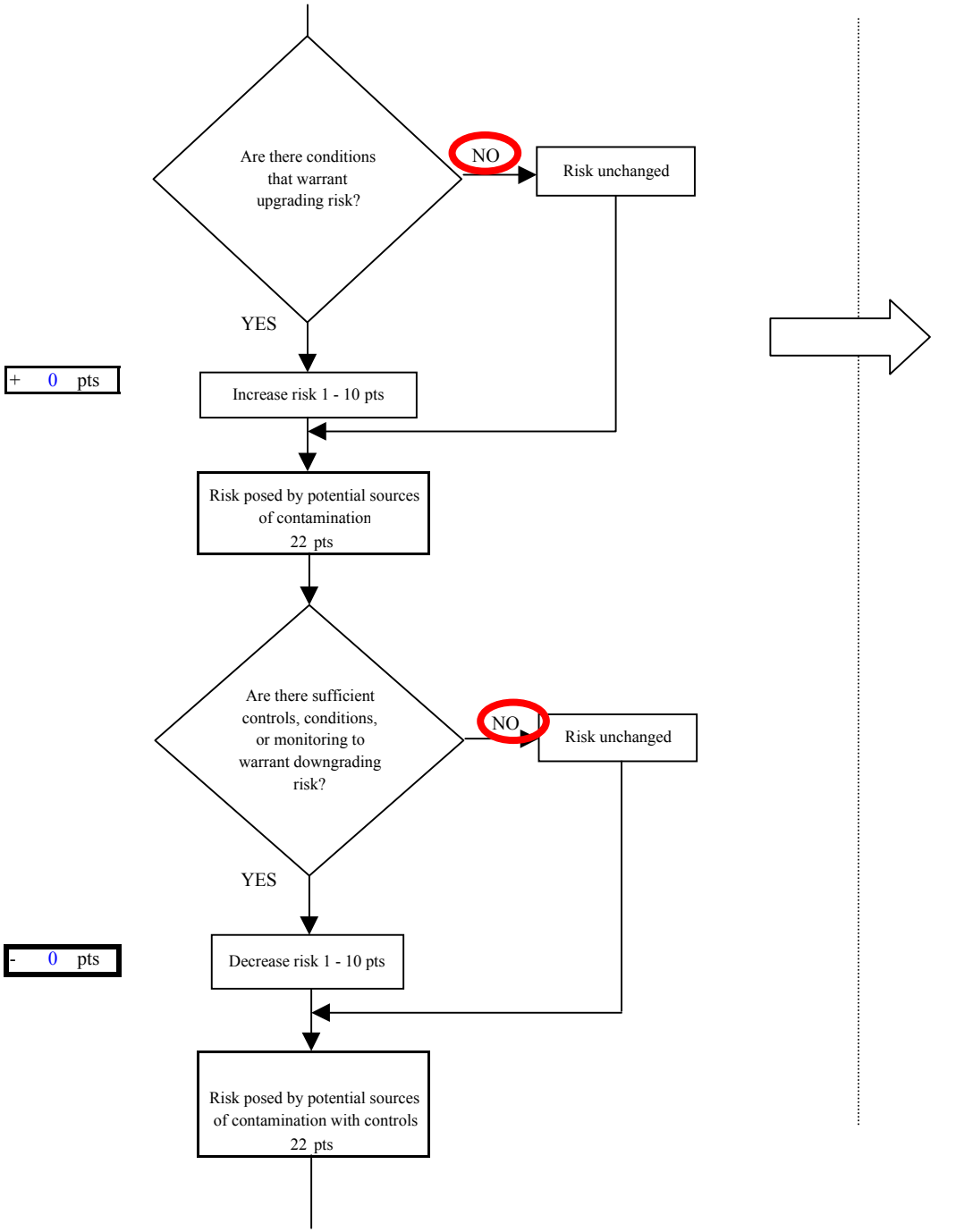
Risk unchanged

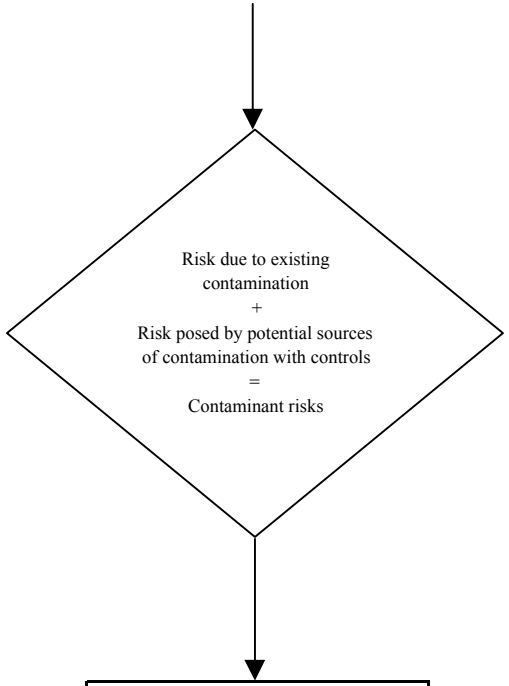
YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 5. Contaminant risks for Eagle Crest Condominiums - Nitrates and Nitrites





Existing
3 pts
+
Potential
22 pts
=
Contaminant Risk
25 pts

Contaminant risks*
= 25 pts

*Truncate risk at 50 pts

Medium

Contaminant Risk Ratings

40 to 50 pts	very high
30 to < 40 pts	high
20 to < 30 pts	medium
< 20 pts	low

Chart 6. Vulnerability analysis for Eagle Crest Condominiums - Nitrates and Nitrites

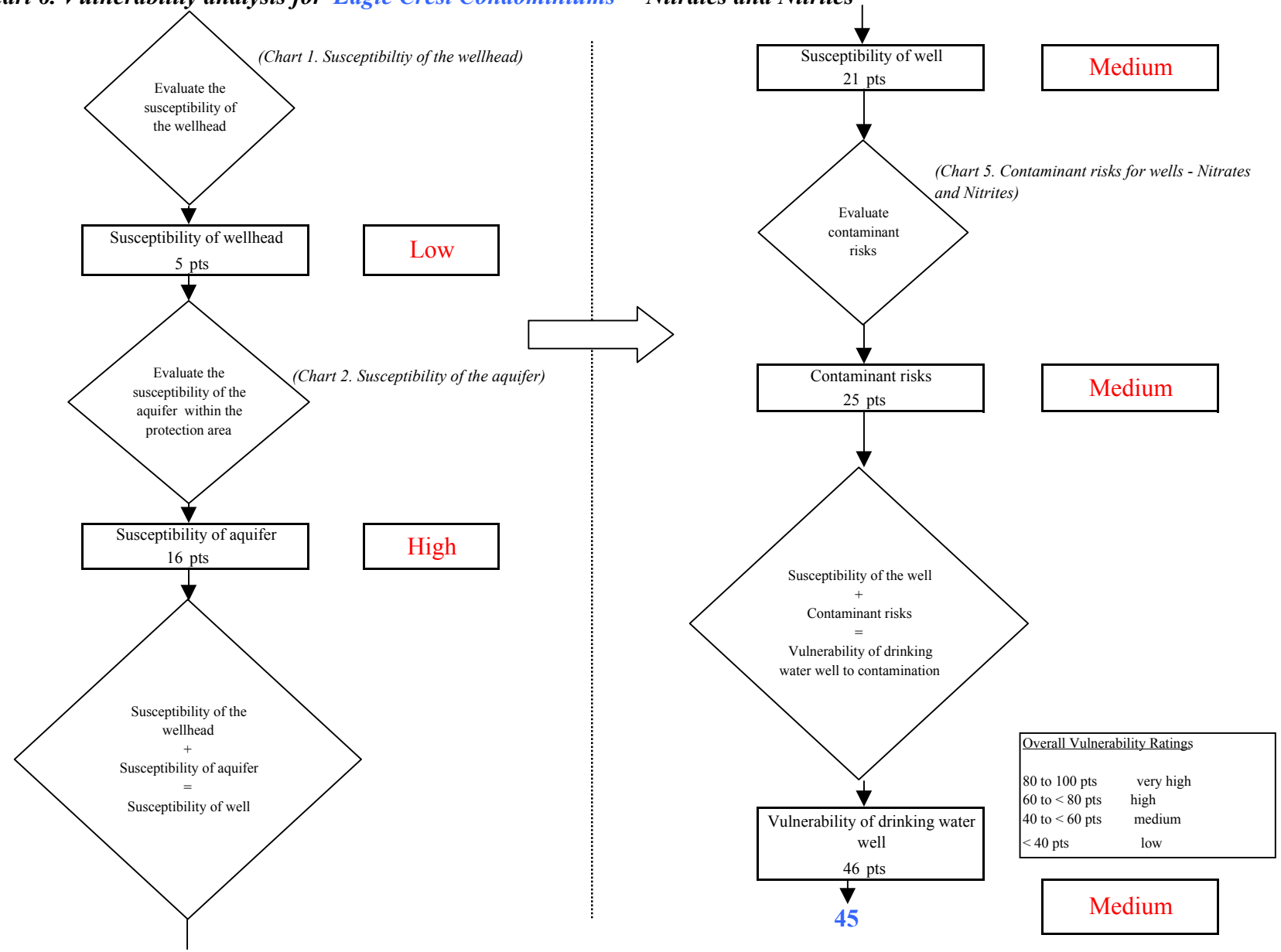


Chart 7. Contaminant risks for Eagle Crest Condominiums - Volatile Organic Chemicals

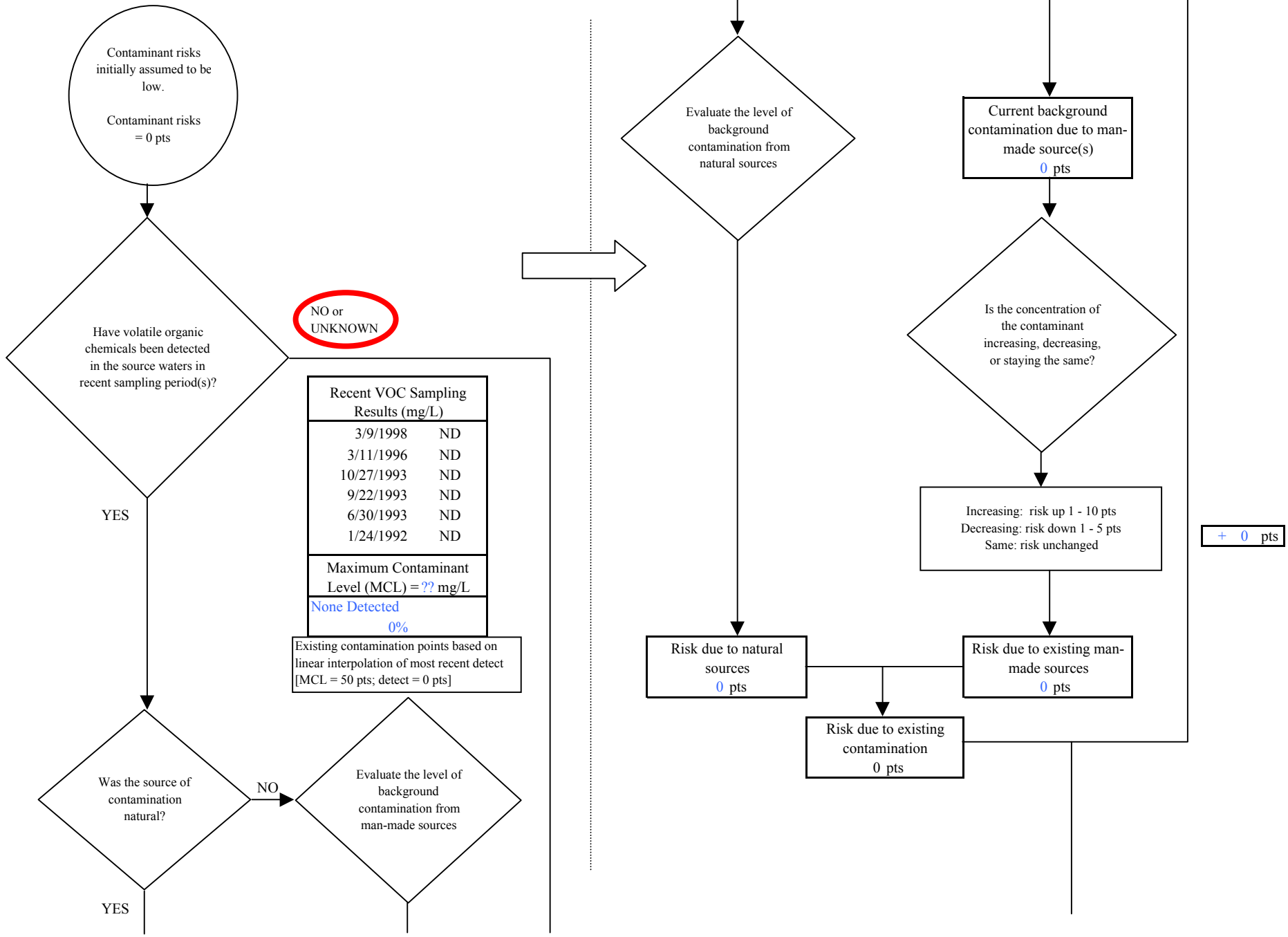


Chart 7. Contaminant risks for Eagle Crest Condominiums - Volatile Organic Chemicals

+ 10 pts

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

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

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	2	5	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 individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

Initial assessment of risk posed by potential sources of contamination = 10 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 7. Contaminant risks for Eagle Crest Condominiums - Volatile Organic Chemicals

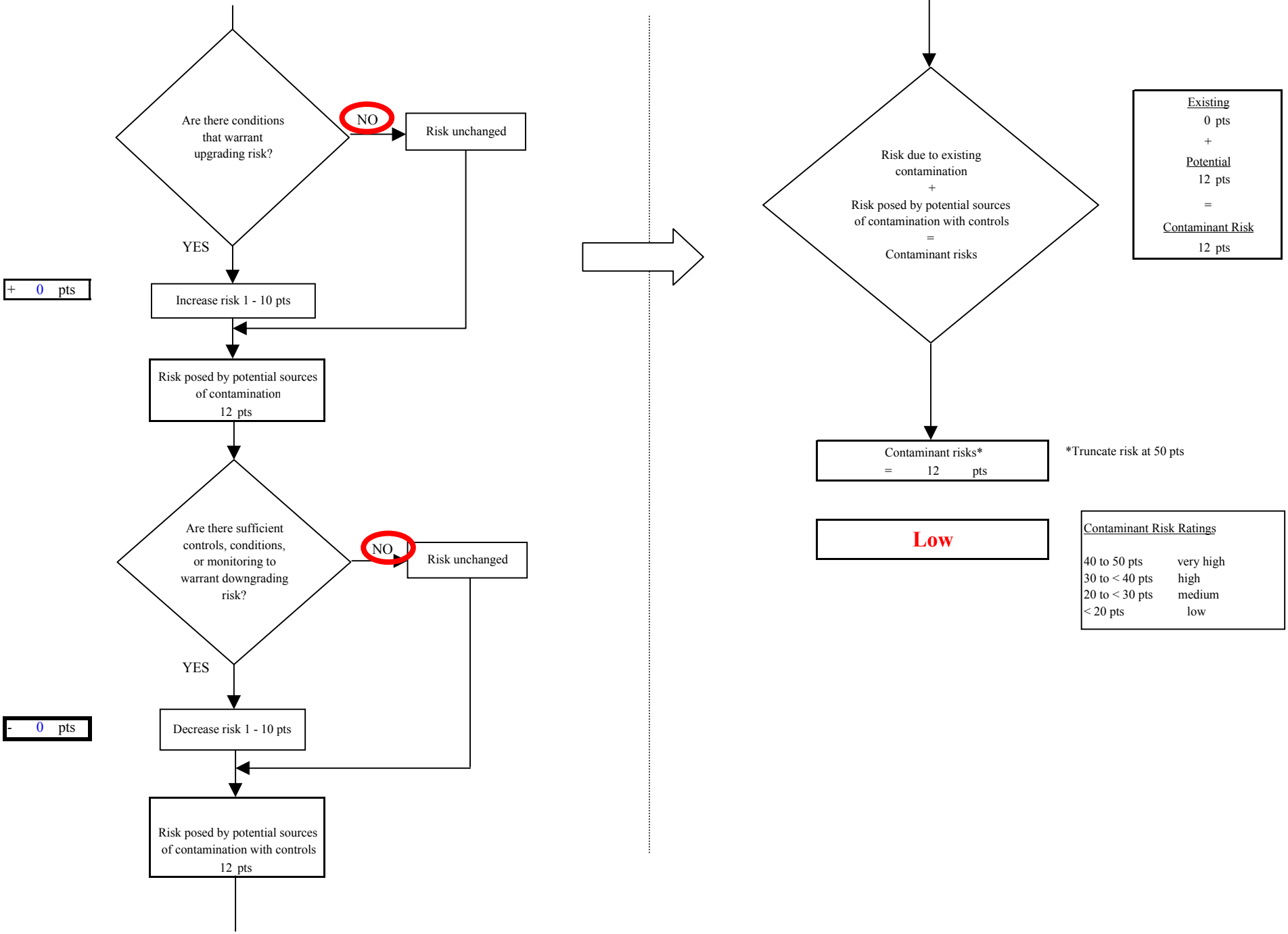


Chart 8. Vulnerability analysis for Eagle Crest Condominiums - Volatile Organic Chemicals

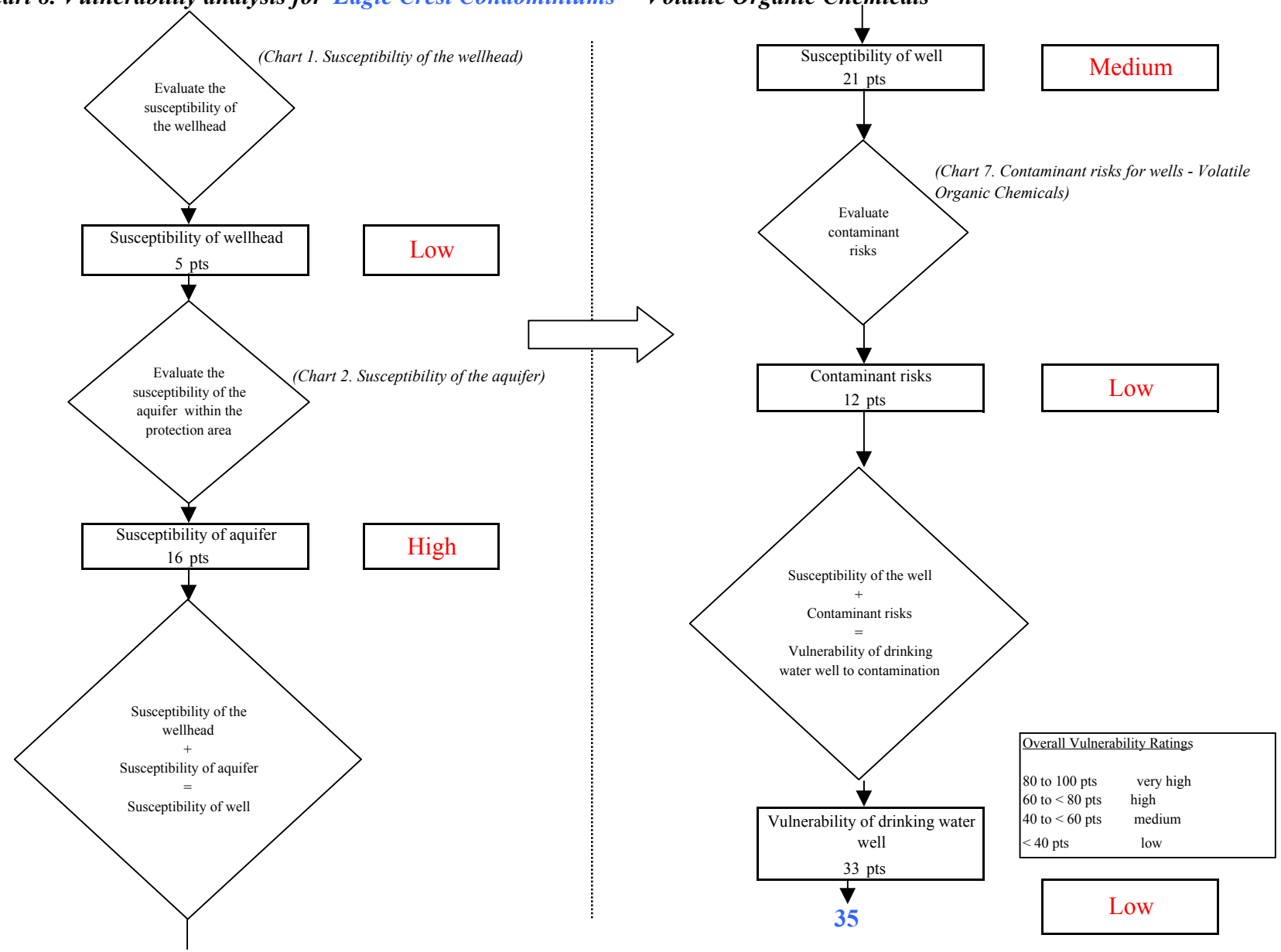


Chart 9. Contaminant risks for Eagle Crest Condominiums - Heavy Metals, Cyanide and Other Inorganic Chemicals

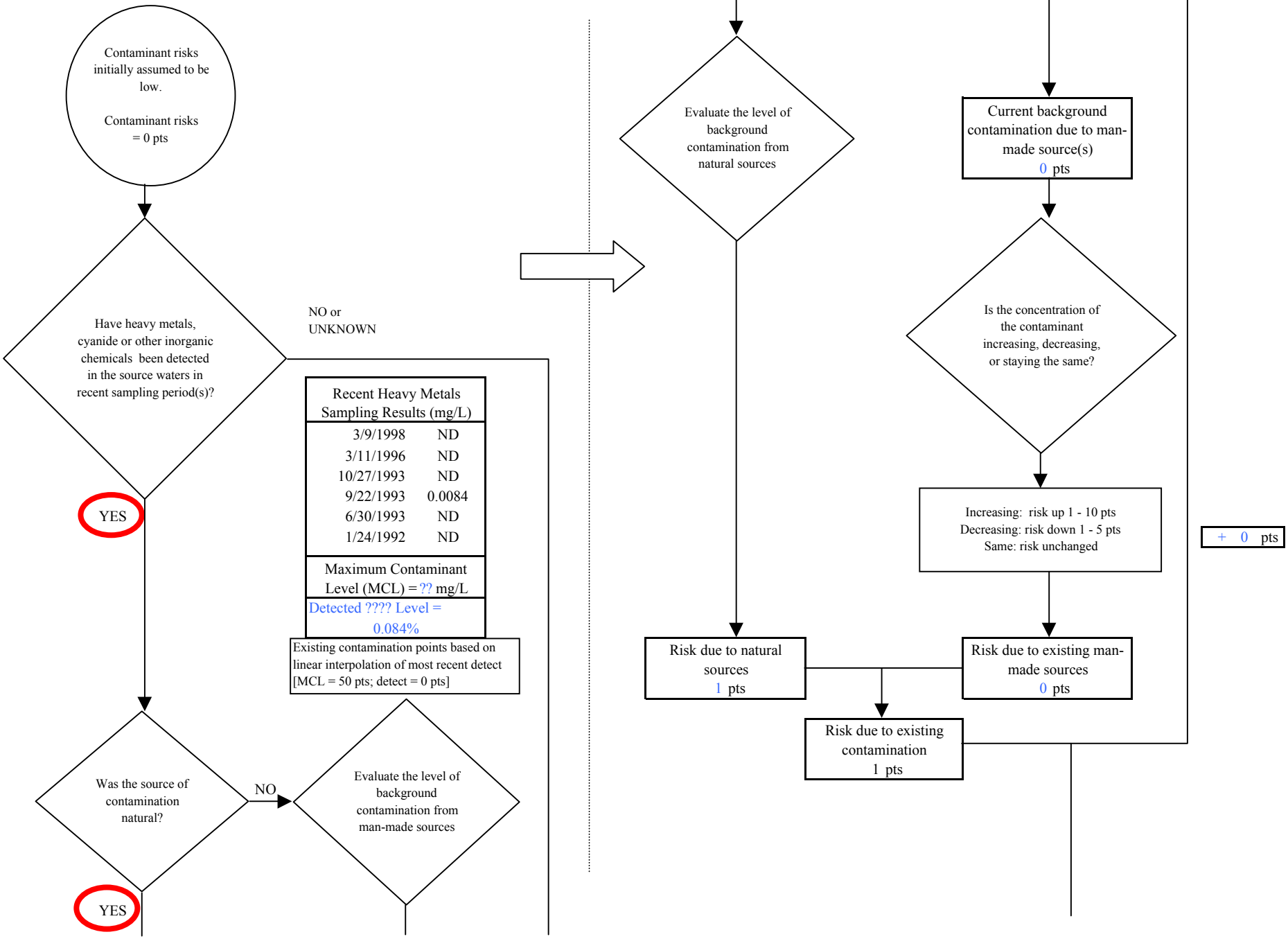


Chart 9. Contaminant risks for Eagle Crest Condominiums - Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 10 pts

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

Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	2	6	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 10

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

Initial assessment of risk posed by potential sources of contamination = 10 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

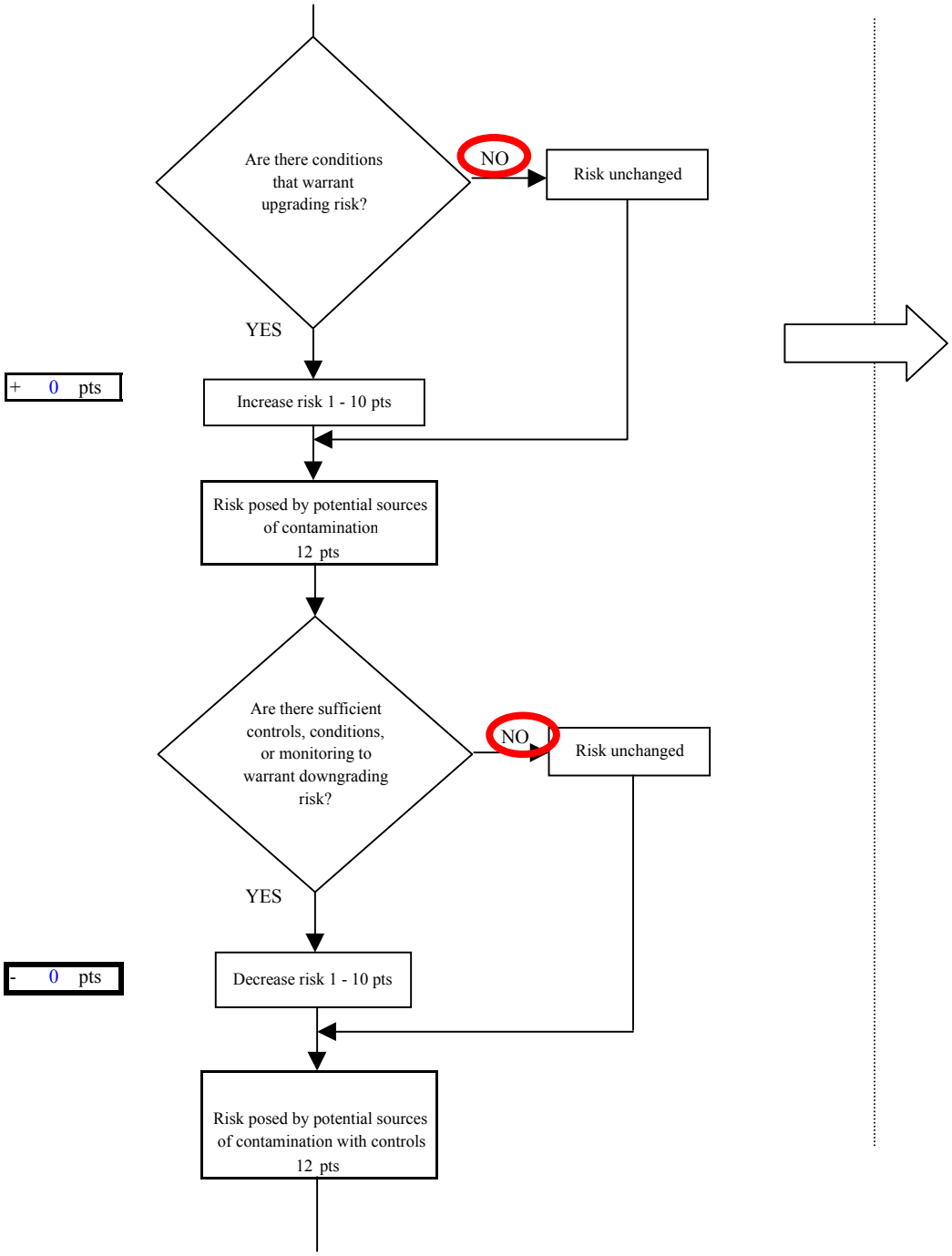
Risk unchanged

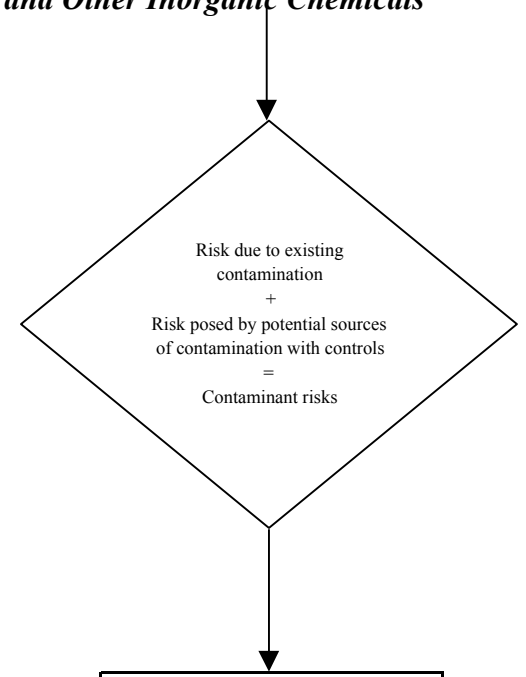
YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 9. Contaminant risks for Eagle Crest Condominiums - Heavy Metals, Cyanide and Other Inorganic Chemicals





Existing
1 pts
+
Potential
12 pts
=
Contaminant Risk
13 pts

Contaminant risks*
= 13 pts

*Truncate risk at 50 pts

Low

Contaminant Risk Ratings

40 to 50 pts	very high
30 to < 40 pts	high
20 to < 30 pts	medium
< 20 pts	low

Chart 10. Vulnerability analysis for Eagle Crest Condominiums - Heavy Metals, Cyanide and Other Inorganic Chemicals

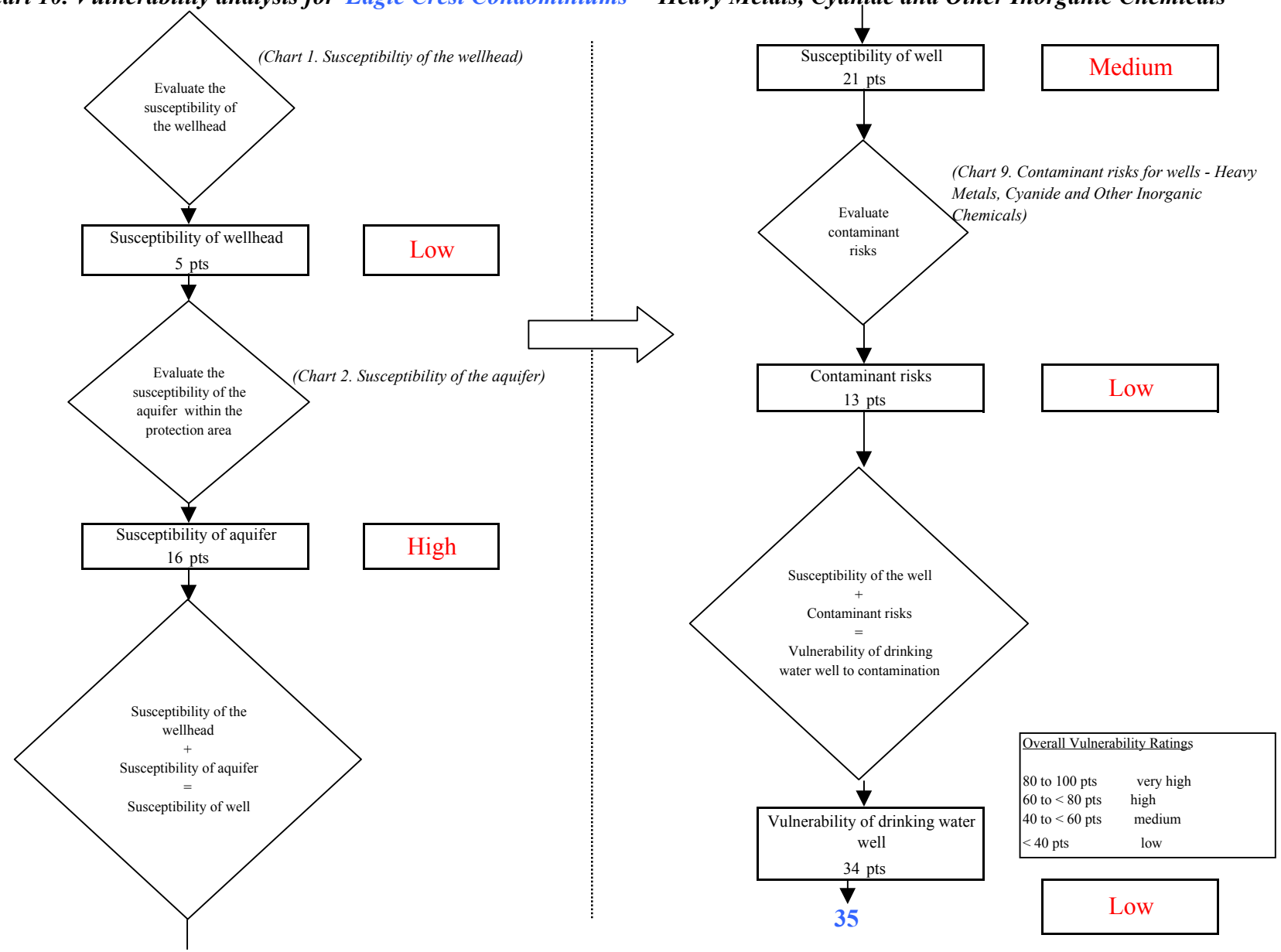


Chart 11. Contaminant risks for Eagle Crest Condominiums - Synthetic Organic Chemicals

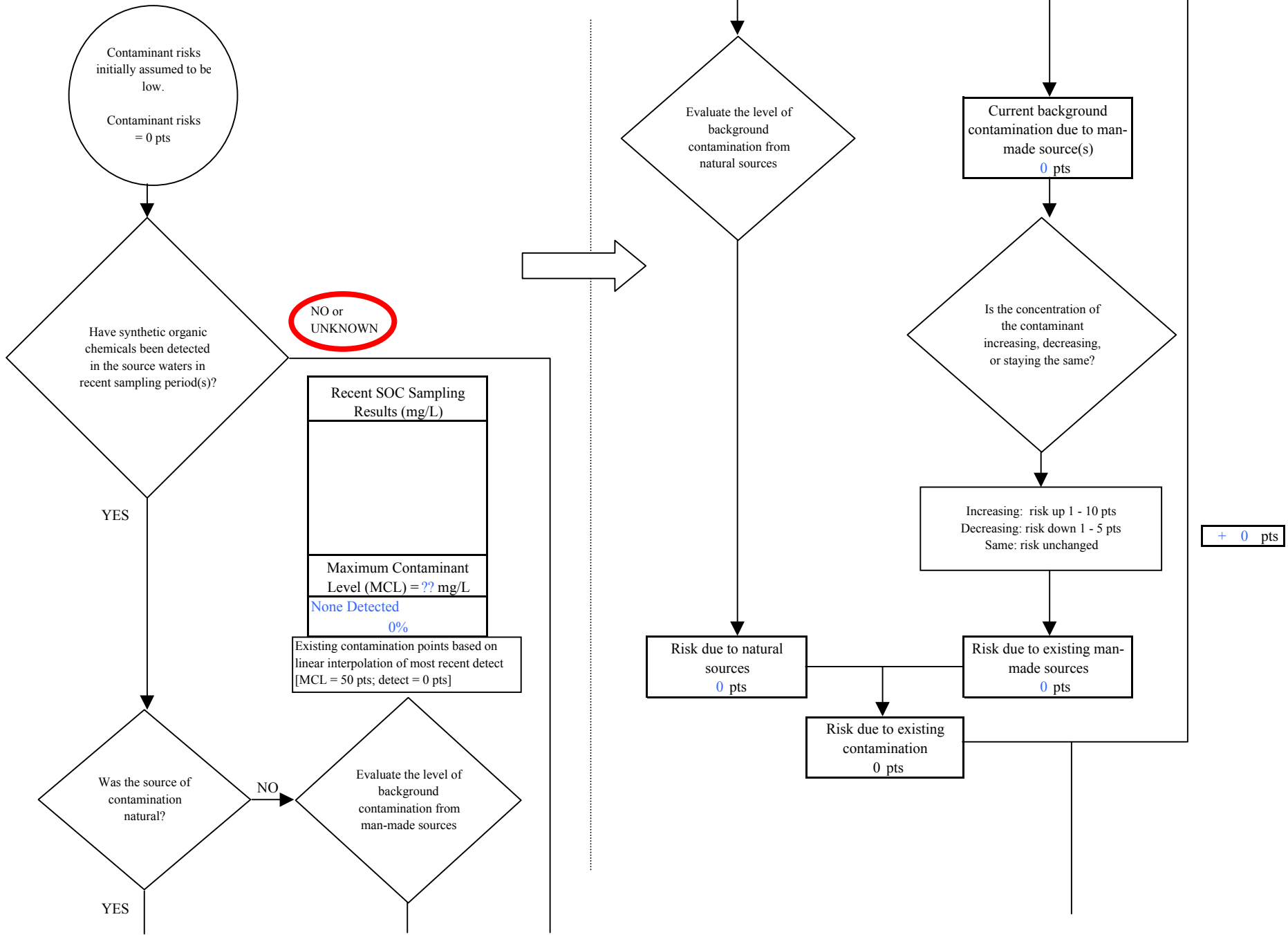


Chart 11. Contaminant risks for Eagle Crest Condominiums - Synthetic Organic Chemicals

+ 20 pts

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

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

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	1	1
Low(s)	1	3	4

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

Matrix Score 20

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

Initial assessment of risk posed by potential sources of contamination = 20 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 11. Contaminant risks for Eagle Crest Condominiums - Synthetic Organic Chemicals

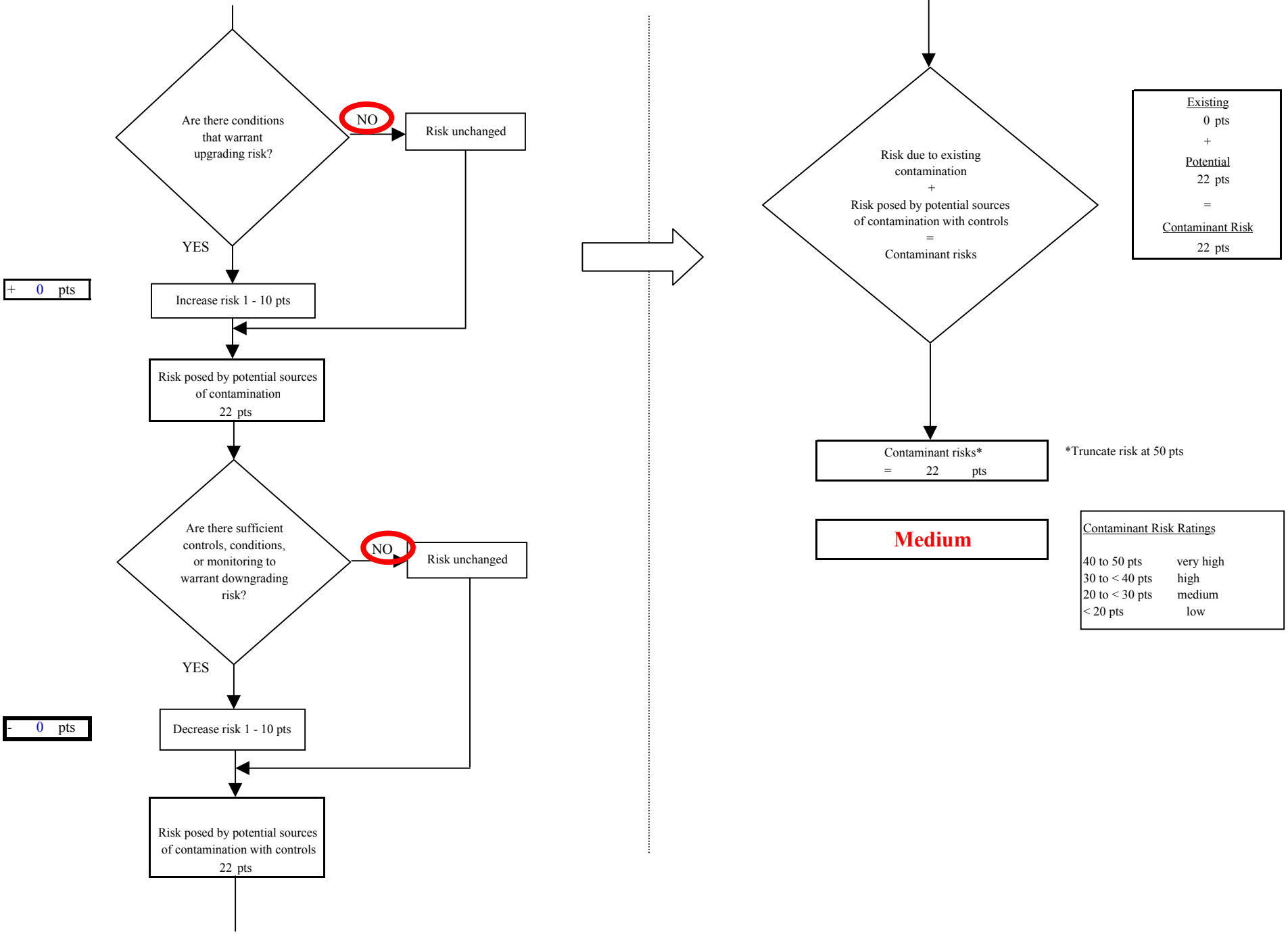


Chart 12. Vulnerability analysis for Eagle Crest Condominiums - Synthetic Organic Chemicals

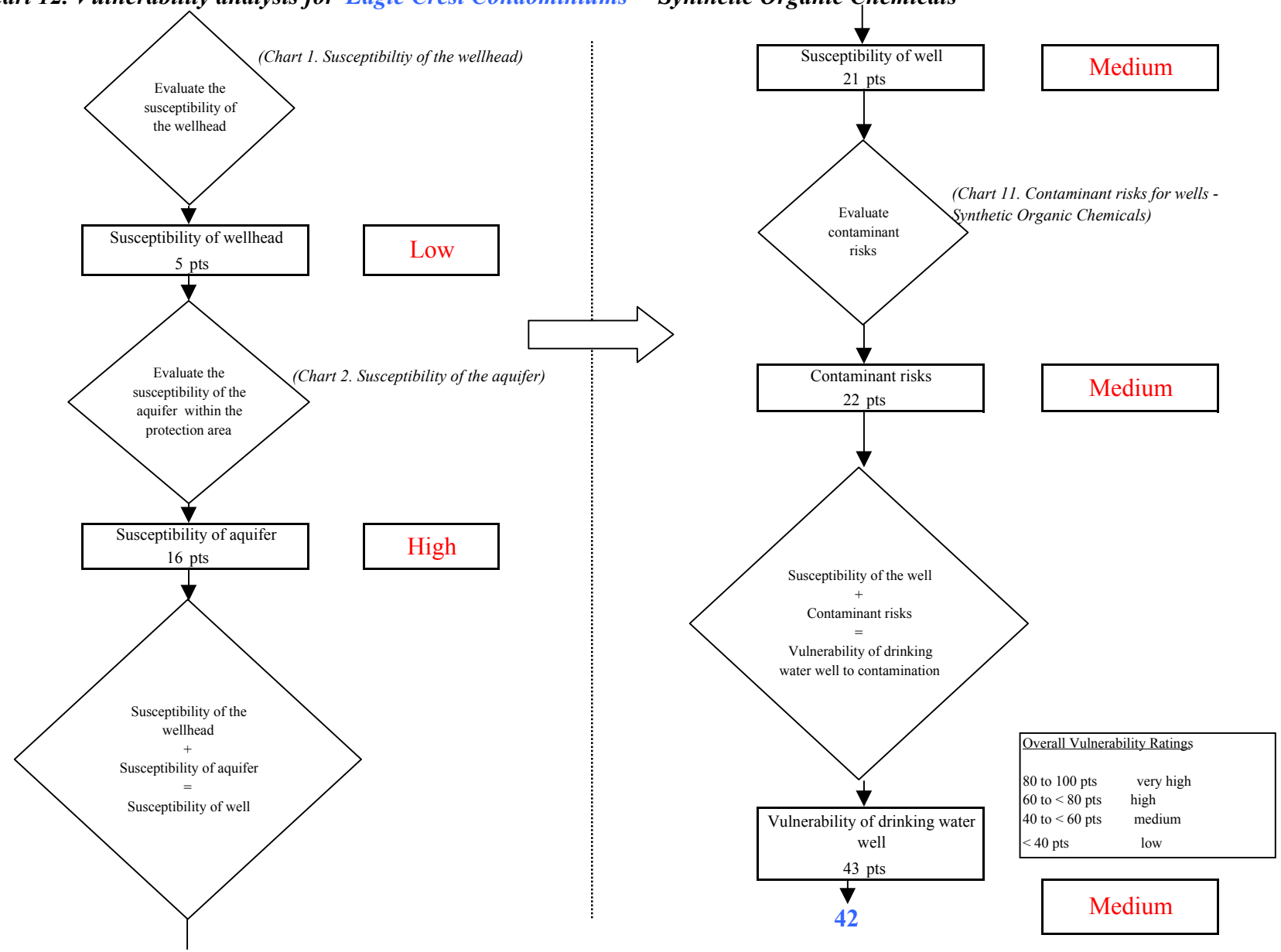


Chart 13. Contaminant risks for Eagle Crest Condominiums - Other Organic Chemicals

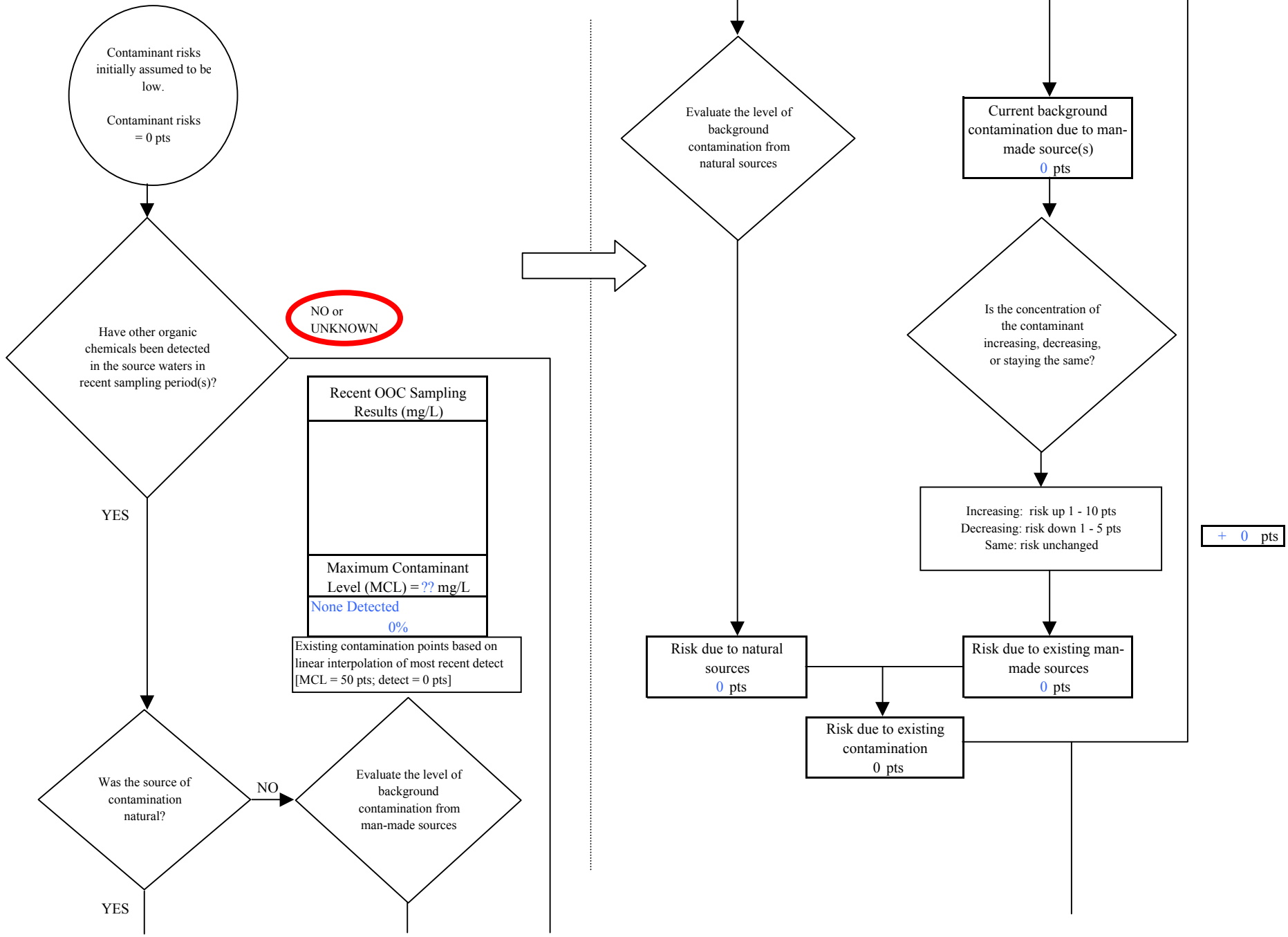
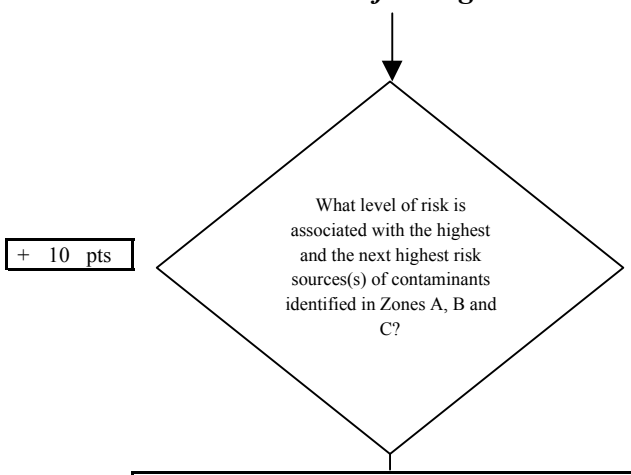


Chart 13. Contaminant risks for Eagle Crest Condominiums - Other Organic Chemicals



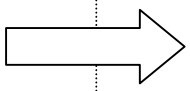
+ 10 pts

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)	2	4	6

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

Matrix Score 10

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



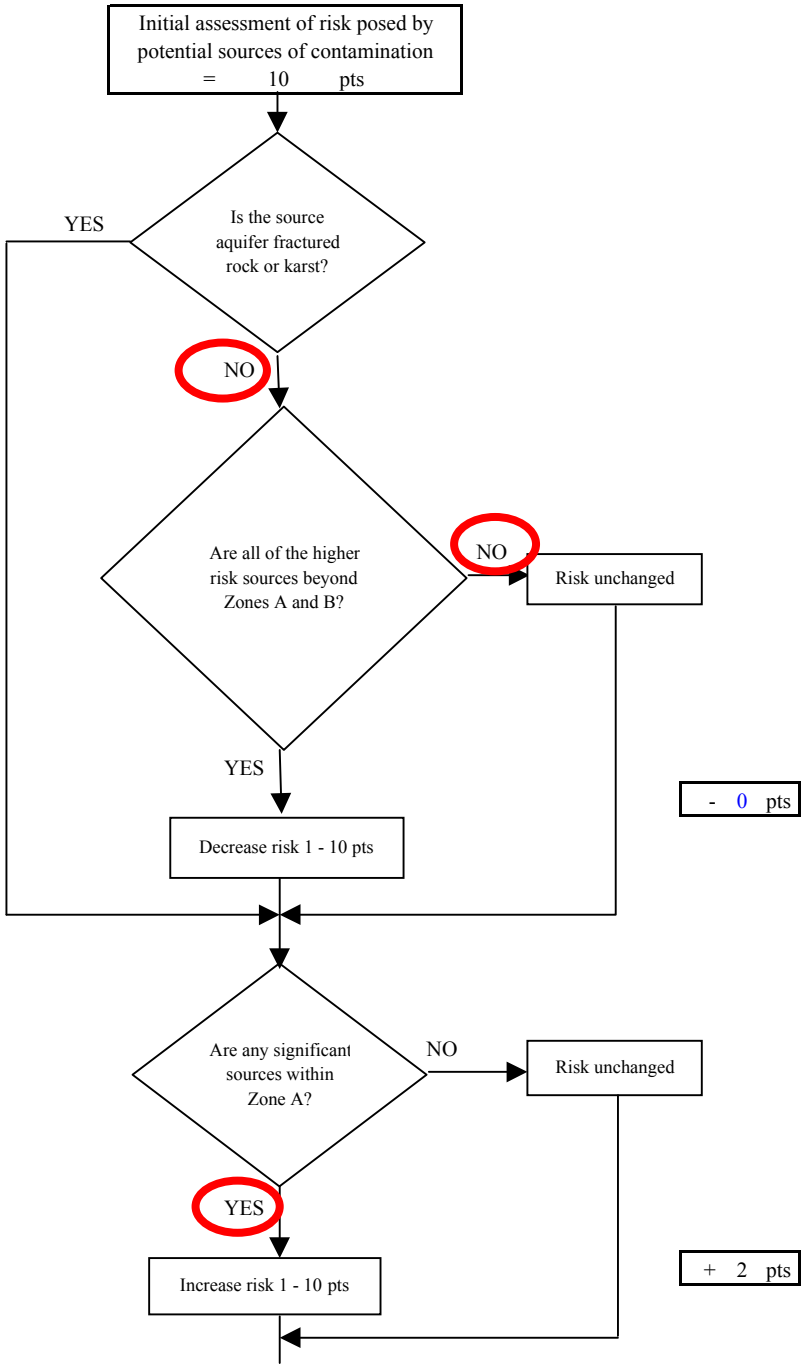
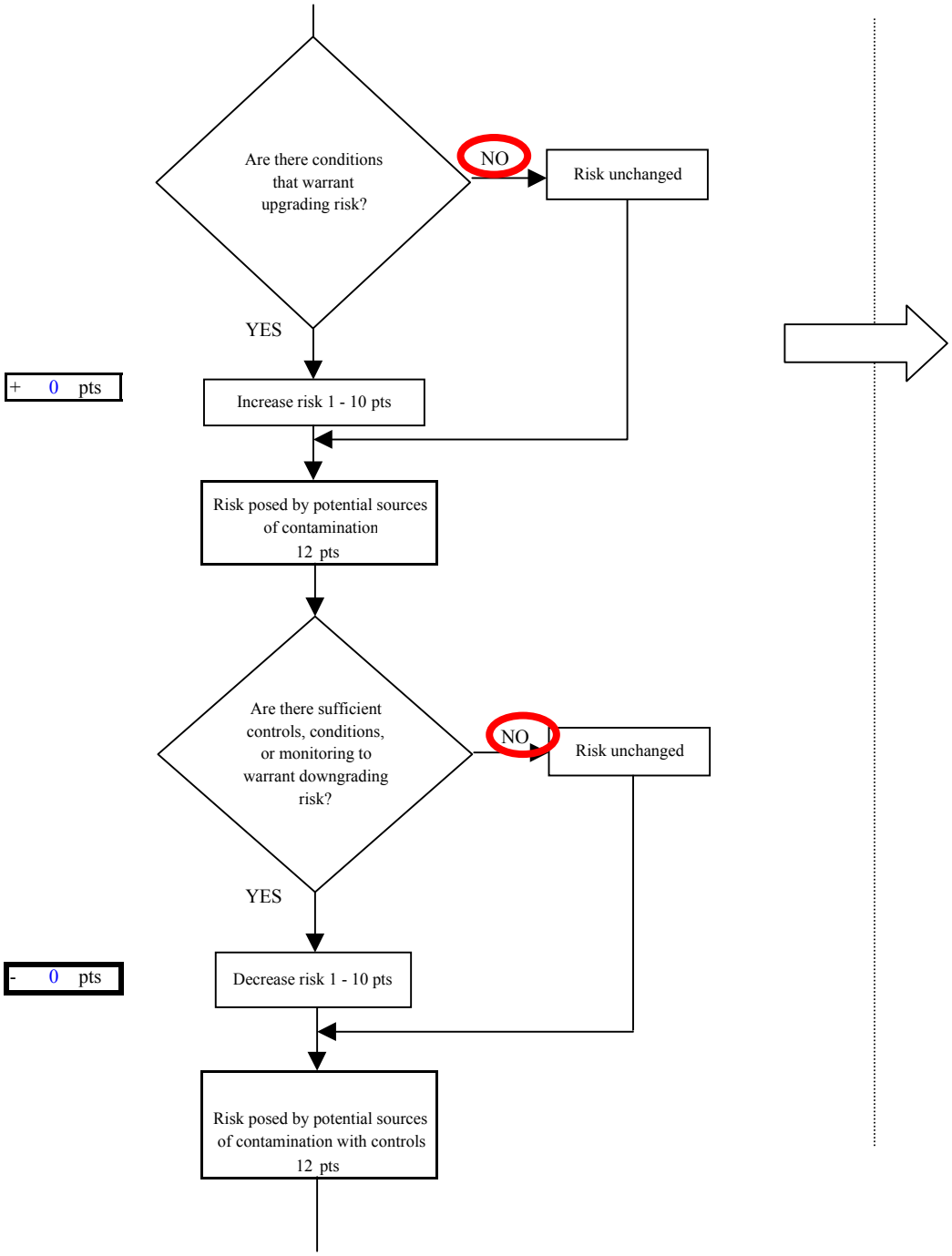
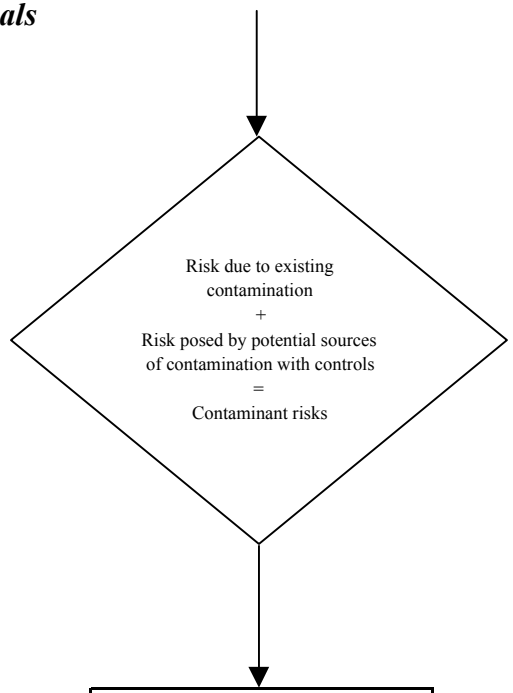


Chart 13. Contaminant risks for Eagle Crest Condominiums - Other Organic Chemicals





Existing
0 pts
+
Potential
12 pts
=
Contaminant Risk
12 pts

Contaminant risks*
= 12 pts

*Truncate risk at 50 pts

Low

Contaminant Risk Ratings

40 to 50 pts	very high
30 to < 40 pts	high
20 to < 30 pts	medium
< 20 pts	low

Chart 14. Vulnerability analysis for Eagle Crest Condominiums - Other Organic Chemicals