

Source Water Assessment for
Greenbrook Subdivision
Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

DRINKING WATER PROTECTION PROGRAM REPORT 174
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Source Water Assessment for Greenbrook Subdivision’s Sources of Public Drinking Water, Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

By Heather A. Hammond

Drinking Water Protection Program Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Public Water System for Greenbrook Subdivision is a Class A (community) water system consisting of two wells in the Anchorage area. Identified potential and current sources of contaminants for Greenbrook Subdivision’s public water system includes: approximately 247 acres of residential area, residential septic systems, unpaved roads, and recreation trails. 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 water sources for Greenbrook Subdivision received a vulnerability rating of **Low** for volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals; **Medium** for bacteria and viruses; and **High** for nitrates and/or nitrites.

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 sources of public drinking water serving Greenbrook Subdivision. This water system consists of two wells 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.

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

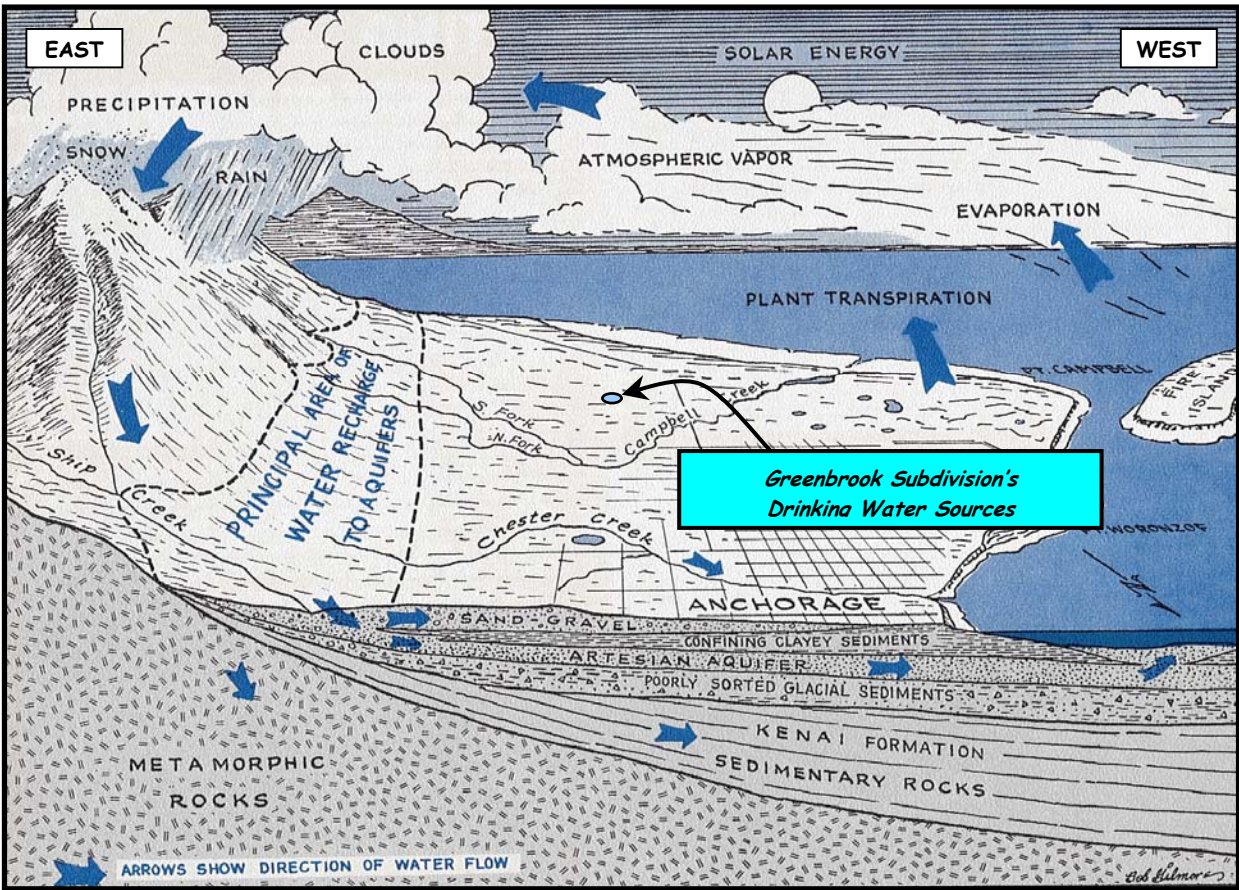


Figure 2. Generalized hydrologic cycle in the Anchorage area [Barnwell, George, Dearborn, Weeks, and Zenone, 1972].

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° F during July to 8° 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 enter 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 surficial topography as well as its close connection with surface water bodies.

GREENBROOK SUBDIVISION'S PUBLIC DRINKING WATER SYSTEM

Greenbrook Subdivision's Public Drinking Water System is a Class A (community) water system, which is owned

and operated by the Greenbrook Homeowners Association. The system consists of two wells, which are located off of Von Scheben Drive and Freitag Drive, in the Greenbrook Subdivision, at an elevation of approximately 900 feet above sea level (see Figure 3).

According to the most recent Monitoring Waiver (3/2/98) the wells are within 30 feet of each other and the surrounding area is properly drained and protected against flooding by the ground slope diverting surface runoff away from well casings. Both wells are protected against foreign matter from entering the source waters along the well casings by a sanitary seal. Installation of the primary well occurred November 16, 1983 to a total depth of 86 feet below ground surface. The well was completed in a 6" well casing and according to the Driller's Log the well is screened from 48 to 59 feet below ground surface. Static water level was recorded at the surface which indicates that the well is artesian. The most recent Sanitary Survey (09/12/96) indicates that the well was grouted in a 20 foot vertical interval.

Installation of the secondary well occurred July 9, 1976

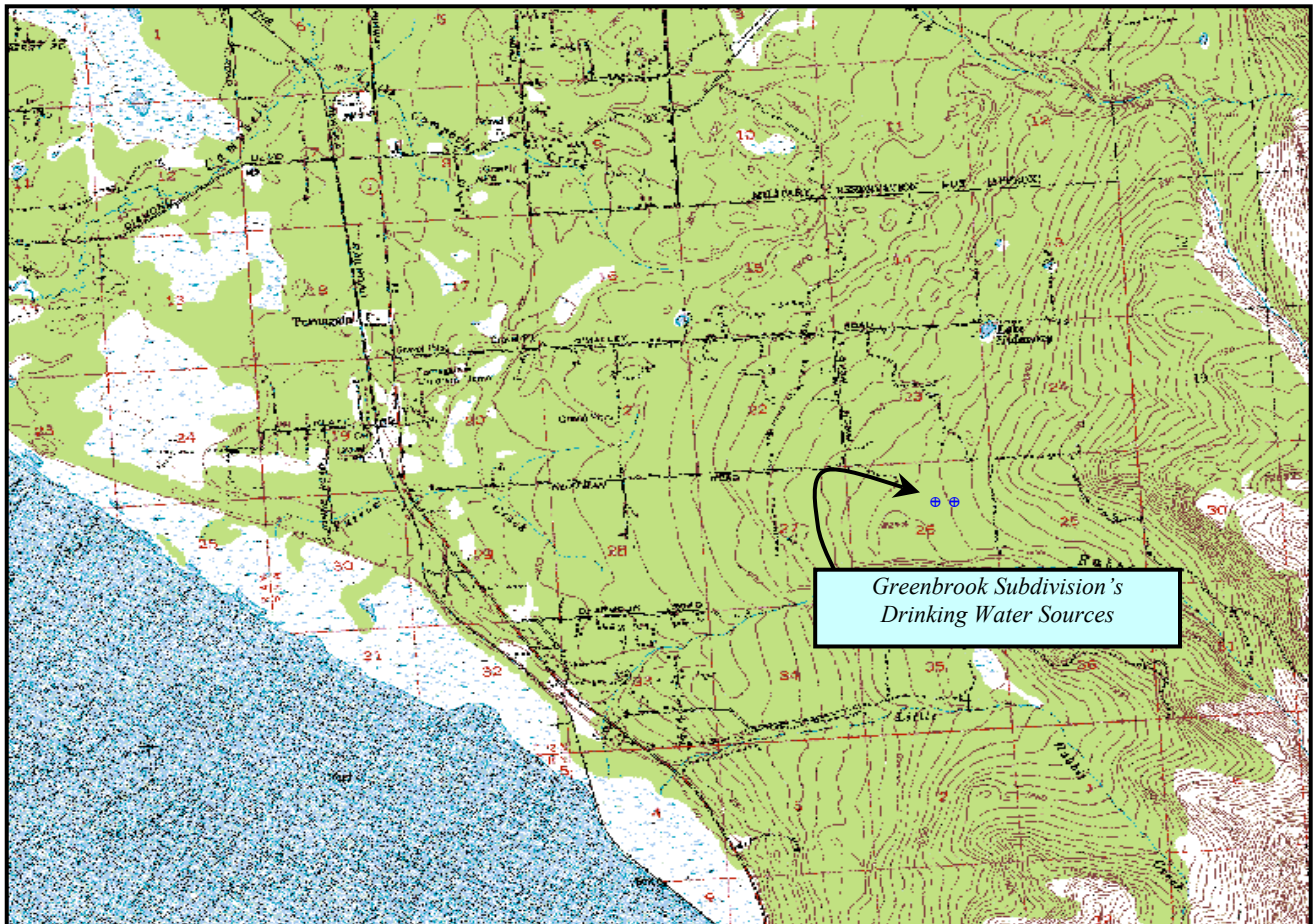


Figure 3. Map showing the location of the drinking water sources for Greenbrook Subdivision [Base: USGS Anchorage A8].

to a total depth of 58 feet below ground surface. The well was completed in a 6 inch casing and according to the Driller's Log the well is screened from 50 to 56 feet below ground surface. Static water level was recorded at 2 feet below ground surface which indicates that the well is artesian. The most recent Sanitary Survey (09/12/96) does not indicate that the well was grouted at the time of drilling. Grouting provides added protection against contaminants travelling along the well casing and into source waters.

This system operates year round and serves 140 residents through 35 service connections.

ASSESSMENT AND PROTECTION AREA FOR GREENBROOK SUBDIVISION'S PUBLIC DRINKING WATER SOURCES

The Drinking Water Protection and Assessment Area that has been established for Greenbrook Subdivision's sources of drinking water is the area that 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 Greenbrook Subdivision 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 $\frac{1}{4}$ 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 Greenbrook Subdivision. 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 through 5 in Appendix C depict the Contaminant Source Inventory for Greenbrook Subdivision. 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 within the Drinking Water Protection Area for Greenbrook Subdivision:

- Approximately 247 acres of residential area;
- residential septic systems;
- unpaved roads;
- recreation trails.

These potential and existing contaminant sources present risk for all six categories of drinking water contaminants for Greenbrook Subdivision's sources of public drinking

water.

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 GREENBROOK SUBDIVISION’S PUBLIC DRINKING WATER SOURCES

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:

$$\begin{array}{r}
 \text{Natural Susceptibility (0 – 50 points)} \\
 + \\
 \text{Contaminant Risks (0 – 50 points)} \\
 = \\
 \text{Vulnerability of the} \\
 \text{Drinking Water Source to Contamination (0 – 100).}
 \end{array}$$

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

$$\begin{array}{r}
 \text{Susceptibility of the Wellhead (0 – 25 Points)} \\
 + \\
 \text{Susceptibility of the Aquifer (0 – 25 Points)} \\
 = \text{Natural Susceptibility (Susceptibility of the Well)} \\
 \text{(0 – 50 Points)}
 \end{array}$$

According to the Driller’s Log it appears that the wells were completed in a confined aquifer. There is a strata of clay from 11 to 48 feet below ground surface. The wells are artesian with static water level recorded at ground surface. 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 sources of public drinking water serving Greenbrook Subdivision.

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

	Score	Rating
Susceptibility of the Wellhead	0	Low
Susceptibility of the Aquifer	18	High
Natural Susceptibility	18	Low

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 either well. Table 2 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 2. Contaminant Risks to Greenbrook Subdivision’s Public Drinking Water Sources

Contaminant Risks	Score	Rating
Bacteria and Viruses	22	Medium
Nitrates and/or Nitrites	42	Very High
Volatile Organic Chemicals	12	Low
Heavy Metals, Cyanide, And Other Inorganic Chemicals	12	Low
Synthetic Organic Chemicals	12	Low
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 Greenbrook Subdivision’s Public Drinking Water Sources to Contamination by Category

Category	Score	Rating
Bacteria and Viruses	40	Medium
Nitrates and Nitrites	60	High
Volatile Organic Chemicals	30	Low
Heavy Metals, Cyanide, and Other Inorganic Chemicals	30	Low
Synthetic Organic Chemicals	30	Low
Other Organic Chemicals	30	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.

Nitrates and/or nitrites are found in background concentration at the well sites, as elsewhere throughout Alaska. Nitrate concentrations in uncontaminated 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 Greenbrook Subdivision indicates that concentrations of nitrates have been detected (See Chart 5 – Contaminant Risks for Nitrates and/or Nitrites in Appendix D). Existing nitrate concentration is approximately 41% 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.

Since the late 1980’s, nitrate levels in Greenbrook Subdivision’s sources of public drinking water nearly doubled, showing an increase from 2.6 mg/L in 1984 to 4.1 mg/L in 2001. Because naturally occurring nitrate levels are typically less than 2mg/L it is suspected that the increase in nitrates may be from human-made sources. This increase may be due to growing urban development and the installation of residential septic systems within the Zone B and Zone C Protection Areas. Installation of septic systems began in the early 1970’s and peaked during the late 1990’s. Residential septic systems,

because of their effluent discharge, pose the greatest potential contaminant risk to the Greenbrook Subdivision's sources of public drinking water for bacteria and viruses and nitrates and or nitrites. Review of the historical sampling data indicate that bacteria and viruses have not been detected at the source waters serving Greenbrook Subdivision. However, sampling data does suggest that the surrounding septic systems may have impacted the groundwater sources.

Unpaved roads within the protection area are the most significant source of potential volatile organic chemical and heavy metal contamination to Greenbrook Subdivision's drinking water sources. Because unpaved roads do pose a potential for fuel spills to occur, major routes were ranked as low for volatile organic chemicals.

Residential areas within the protection area present the most significant source of potential contamination, from heavy metals, synthetic organic chemicals and other organic chemicals, to the well. Activities associated with maintaining residential areas are driving the potential risk to the groundwater source.

SUMMARY

A *Source Water Assessment* has been completed for the source of public drinking water serving Greenbrook Subdivision. The overall vulnerability of this source to contamination is **Low** for volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals; **Medium** for bacteria and viruses; and **High** for nitrates and/or nitrites. 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 Greenbrook Subdivision 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 Greenbrook Subdivision's public drinking water sources.

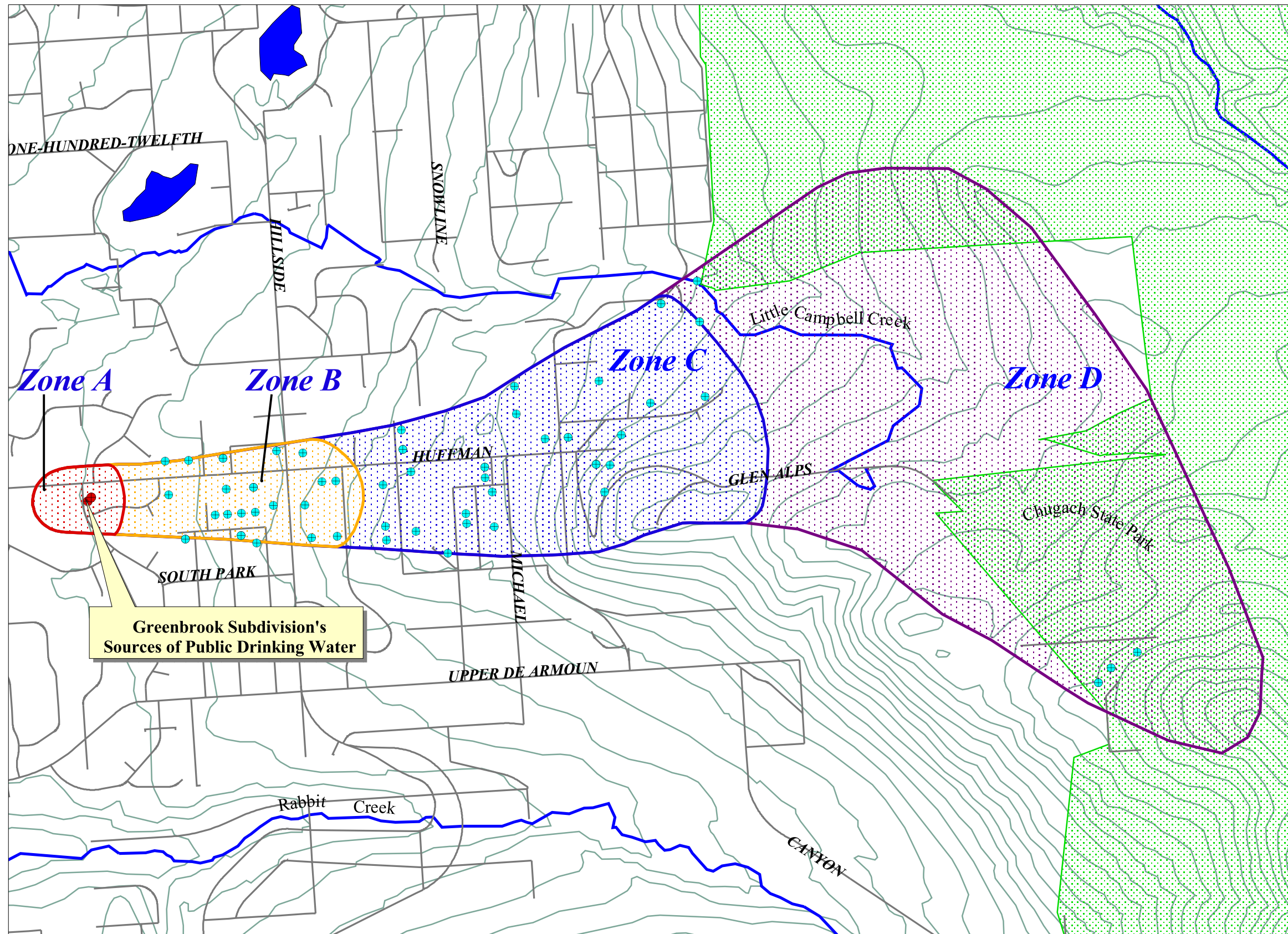
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APPENDIX A

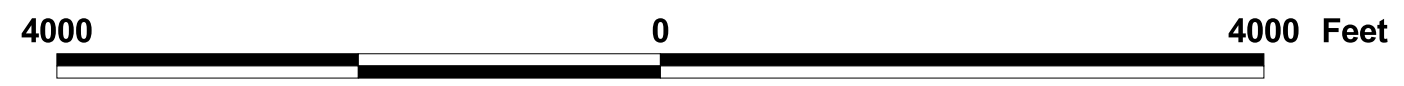
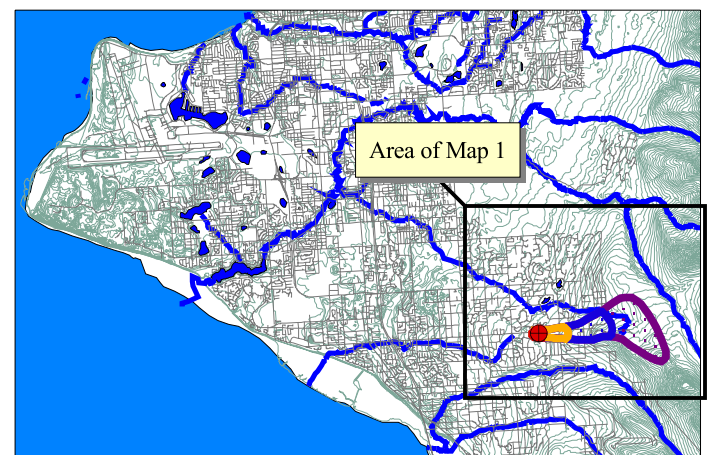
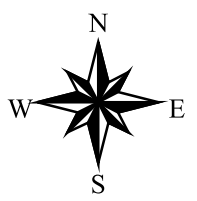
Greenbrook Subdivision's Drinking Water Protection Area

Drinking Water Protection Area for Greenbrook Subdivision



- Greenbrook Subdivision DW Sources
- Private & Public 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
- Anchorage Roads
- Chugach State Park
- Anchorage Streams
- Anchorage Lakes
- Elevation Contours

Greenbrook Subdivision's
Sources of Public Drinking Water



PWSID 210346.001

Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Greenbrook Subdivision

Table 1

**Contaminant Source Inventory for
Greenbrook Subdivision**

PWSID 210346.001

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.
Septic systems (serves one single-family home)	R02	R2-1	A	Along Huffman Road	3	
Highways and roads, dirt/gravel	X24	X24-1	A	Von Sheben Drive	2	
Highways and roads, dirt/gravel	X24	X24-2	A	Freitag Drive	2	
Highways and roads, dirt/gravel	X24	X24-3	A	Huffman Road	2	
Highways and roads, dirt/gravel	X24	X24-4	A	Audubon Drive	2	
Dog walking areas/foot trails	X46	X46-1	A	Trail located along Huffman Road	2	
Residential Areas	R01	R1-2	B	Residential areas located within Zone B	2	Approximately 67 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-10	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-11	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-12	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-13	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-14	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-15	B	Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-16	B	Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-17	B	Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-18	B	Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-19	B	Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-2	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-20	B	Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-21	B	Along Sanders Road	3	
Septic systems (serves one single-family home)	R02	R2-22	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-23	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-24	B	Along Holman Ave.	3	

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-25	B	Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-26	B	Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-27	B	Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-28	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-29	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-3	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-30	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-31	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-32	B	Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-33	B	Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-34	B	Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-35	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-36	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-37	B	Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-38	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-39	B	Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-4	B	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-40	B	Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-5	B	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-6	B	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-7	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-8	B	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-9	B	Along Huffman Road	3	
Highways and roads, dirt/gravel	X24	X24-10	B	Saunders Road	2	
Highways and roads, dirt/gravel	X24	X24-11	B	Bedford Street	2	
Highways and roads, dirt/gravel	X24	X24-12	B	Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-13	B	Rya Street	2	

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Highways and roads, dirt/gravel	X24	X24-5	B	Freitag Circle	2	
Highways and roads, dirt/gravel	X24	X24-6	B	Rockridge Drive	2	
Highways and roads, dirt/gravel	X24	X24-7	B	Northpark Drive	2	
Highways and roads, dirt/gravel	X24	X24-8	B	Lupine Road	2	
Highways and roads, dirt/gravel	X24	X24-9	B	Foster Street	2	
Dog walking areas/foot trails	X46	X46-2	B	Trail located along Hillside Drive	2	
Dog walking areas/foot trails	X46	X46-3	B	Trail located along Hillside Drive	2	
Residential Areas	R01	R1-3	C	Residential areas located within Zone C	3	Approximately 179 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-41-136	C	Septics located within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 - 3	C	All other roads located within Zone C	3	
Dog walking areas/foot trails	X46	X46-4	C	Trail located along Ginami Street	3	
Dog walking areas/foot trails	X46	X46-5	C	Trail located along Sultana Drive	3	

Table 2

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Bacteria and Viruses*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-1	A	Low	1	Along Huffman Road	3	
Residential Areas	R01	R1-1	A	Low	2	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Dog walking areas/foot trails	X46	X46-1	A	Low	3	Trail located along Huffman Road	2	
Septic systems (serves one single-family home)	R02	R2-2	B	Low	4	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-3	B	Low	5	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-4	B	Low	6	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-5	B	Low	7	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-6	B	Low	8	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-7	B	Low	9	Along Huffman Road	3	
Residential Areas	R01	R1-2	B	Low	10	Residential areas located within Zone B	2	Approximately 67 acres of residential area.
Highways and roads, dirt/gravel	X24	X24-1	A	Low		Von Sheben Drive	2	
Highways and roads, dirt/gravel	X24	X24-2	A	Low		Freitag Drive	2	
Highways and roads, dirt/gravel	X24	X24-3	A	Low		Huffman Road	2	
Highways and roads, dirt/gravel	X24	X24-4	A	Low		Audubon Drive	2	
Septic systems (serves one single-family home)	R02	R2-10	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-11	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-12	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-13	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-14	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-15	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-16	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-17	B	Low		Along Northpark Drive	3	

Table 2 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Bacteria and Viruses*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-18	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-19	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-20	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-21	B	Low		Along Sanders Road	3	
Septic systems (serves one single-family home)	R02	R2-22	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-23	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-24	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-25	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-26	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-27	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-28	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-29	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-30	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-31	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-32	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-33	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-34	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-35	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-36	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-37	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-38	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-39	B	Low		Along Hillside Drive	3	

Table 2 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Bacteria and Viruses*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-40	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-8	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-9	B	Low		Along Huffman Road	3	
Highways and roads, dirt/gravel	X24	X24-10	B	Low		Saunders Road	2	
Highways and roads, dirt/gravel	X24	X24-11	B	Low		Bedford Street	2	
Highways and roads, dirt/gravel	X24	X24-12	B	Low		Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-13	B	Low		Rya Street	2	
Highways and roads, dirt/gravel	X24	X24-5	B	Low		Freitag Circle	2	
Highways and roads, dirt/gravel	X24	X24-6	B	Low		Rockridge Drive	2	
Highways and roads, dirt/gravel	X24	X24-7	B	Low		Northpark Drive	2	
Highways and roads, dirt/gravel	X24	X24-8	B	Low		Lupine Road	2	
Highways and roads, dirt/gravel	X24	X24-9	B	Low		Foster Street	2	
Dog walking areas/foot trails	X46	X46-2	B	Low		Trail located along Hillside Drive	2	
Dog walking areas/foot trails	X46	X46-3	B	Low		Trail located along Hillside Drive	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	3	Approximately 179 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-41-136	C	Low		Septics located within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 - 3	C	Low		All other roads located within Zone C	3	
Dog walking areas/foot trails	X46	X46-4	C	Low		Trail located along Ginami Street	3	
Dog walking areas/foot trails	X46	X46-5	C	Low		Trail located along Sultana Drive	3	

Table 3

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Nitrates/Nitrites*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-1	A	Low	1	Along Huffman Road	3	
Residential Areas	R01	R1-1	A	Low	2	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Dog walking areas/foot trails	X46	X46-1	A	Low	3	Trail located along Huffman Road	2	
Septic systems (serves one single-family home)	R02	R2-2	B	Low	4	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-3	B	Low	5	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-4	B	Low	6	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-5	B	Low	7	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-6	B	Low	8	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-7	B	Low	9	Along Huffman Road	3	
Residential Areas	R01	R1-2	B	Low	10	Residential areas located within Zone B	2	Approximately 67 acres of residential area.
Highways and roads, dirt/gravel	X24	X24-1	A	Low		Von Sheben Drive	2	
Highways and roads, dirt/gravel	X24	X24-2	A	Low		Freitag Drive	2	
Highways and roads, dirt/gravel	X24	X24-3	A	Low		Huffman Road	2	
Highways and roads, dirt/gravel	X24	X24-4	A	Low		Audubon Drive	2	
Septic systems (serves one single-family home)	R02	R2-10	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-11	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-12	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-13	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-14	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-15	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-16	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-17	B	Low		Along Northpark Drive	3	

Table 3 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Nitrates/Nitrites*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-18	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-19	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-20	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-21	B	Low		Along Sanders Road	3	
Septic systems (serves one single-family home)	R02	R2-22	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-23	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-24	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-25	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-26	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-27	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-28	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-29	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-30	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-31	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-32	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-33	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-34	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-35	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-36	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-37	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-38	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-39	B	Low		Along Hillside Drive	3	

Table 3 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Nitrates/Nitrites*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-40	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-8	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-9	B	Low		Along Huffman Road	3	
Highways and roads, dirt/gravel	X24	X24-10	B	Low		Saunders Road	2	
Highways and roads, dirt/gravel	X24	X24-11	B	Low		Bedford Street	2	
Highways and roads, dirt/gravel	X24	X24-12	B	Low		Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-13	B	Low		Rya Street	2	
Highways and roads, dirt/gravel	X24	X24-5	B	Low		Freitag Circle	2	
Highways and roads, dirt/gravel	X24	X24-6	B	Low		Rockridge Drive	2	
Highways and roads, dirt/gravel	X24	X24-7	B	Low		Northpark Drive	2	
Highways and roads, dirt/gravel	X24	X24-8	B	Low		Lupine Road	2	
Highways and roads, dirt/gravel	X24	X24-9	B	Low		Foster Street	2	
Dog walking areas/foot trails	X46	X46-2	B	Low		Trail located along Hillside Drive	2	
Dog walking areas/foot trails	X46	X46-3	B	Low		Trail located along Hillside Drive	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	3	Approximately 179 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-41-136	C	Low		Septics located within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 - 3	C	Low		All other roads located within Zone C	3	
Dog walking areas/foot trails	X46	X46-4	C	Low		Trail located along Ginami Street	3	
Dog walking areas/foot trails	X46	X46-5	C	Low		Trail located along Sultana Drive	3	

Table 4

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Volatile Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Highways and roads, dirt/gravel	X24	X24-1	A	Low	1	Von Sheben Drive	2	
Highways and roads, dirt/gravel	X24	X24-2	A	Low	2	Freitag Drive	2	
Highways and roads, dirt/gravel	X24	X24-3	A	Low	3	Huffman Road	2	
Highways and roads, dirt/gravel	X24	X24-4	A	Low	4	Audubon Drive	2	
Highways and roads, dirt/gravel	X24	X24-5	B	Low	5	Freitag Circle	2	
Septic systems (serves one single-family home)	R02	R2-1	A	Low	6	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-2	B	Low	7	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-3	B	Low	8	Along Huffman Road	3	
Residential Areas	R01	R1-1	A	Low	9	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Residential Areas	R01	R1-2	B	Low	10	Residential areas located within Zone B	2	Approximately 67 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-10	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-11	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-12	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-13	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-14	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-15	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-16	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-17	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-18	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-19	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-20	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-21	B	Low		Along Sanders Road	3	
Septic systems (serves one single-family home)	R02	R2-22	B	Low		Along Hillside Drive	3	

Table 4 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Volatile Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-23	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-24	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-25	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-26	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-27	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-28	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-29	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-30	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-31	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-32	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-33	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-34	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-35	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-36	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-37	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-38	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-39	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-4	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-40	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-5	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-6	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-7	B	Low		Along Huffman Road	3	

Table 4 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Volatile Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-8	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-9	B	Low		Along Huffman Road	3	
Highways and roads, dirt/gravel	X24	X24-10	B	Low		Saunders Road	2	
Highways and roads, dirt/gravel	X24	X24-11	B	Low		Bedford Street	2	
Highways and roads, dirt/gravel	X24	X24-12	B	Low		Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-13	B	Low		Rya Street	2	
Highways and roads, dirt/gravel	X24	X24-6	B	Low		Rockridge Drive	2	
Highways and roads, dirt/gravel	X24	X24-7	B	Low		Northpark Drive	2	
Highways and roads, dirt/gravel	X24	X24-8	B	Low		Lupine Road	2	
Highways and roads, dirt/gravel	X24	X24-9	B	Low		Foster Street	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	3	Approximately 179 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-41-136	C	Low		Septics located within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 - 3	C	Low		All other roads located within Zone C	3	

Table 5

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision*

PWSID 210346.001

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	2	Approximately 1 acre of residential area.
Highways and roads, dirt/gravel	X24	X24-1	A	Low	2	Von Sheben Drive	2	
Highways and roads, dirt/gravel	X24	X24-2	A	Low	3	Freitag Drive	2	
Highways and roads, dirt/gravel	X24	X24-3	A	Low	4	Huffman Road	2	
Highways and roads, dirt/gravel	X24	X24-4	A	Low	5	Audubon Drive	2	
Highways and roads, dirt/gravel	X24	X24-5	B	Low	6	Freitag Circle	2	
Residential Areas	R01	R1-2	B	Low	7	Residential areas located within Zone B	2	Approximately 67 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-1	A	Low	8	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-2	B	Low	9	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-3	B	Low	10	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-10	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-11	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-12	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-13	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-14	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-15	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-16	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-17	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-18	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-19	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-20	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-21	B	Low		Along Sanders Road	3	
Septic systems (serves one single-family home)	R02	R2-22	B	Low		Along Hillside Drive	3	

Table 5 (continued)

Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision

PWSID 210346.001

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-23	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-24	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-25	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-26	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-27	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-28	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-29	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-30	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-31	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-32	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-33	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-34	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-35	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-36	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-37	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-38	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-39	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-4	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-40	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-5	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-6	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-7	B	Low		Along Huffman Road	3	

Table 5 (continued)

Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision

PWSID 210346.001

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-8	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-9	B	Low		Along Huffman Road	3	
Highways and roads, dirt/gravel	X24	X24-10	B	Low		Saunders Road	2	
Highways and roads, dirt/gravel	X24	X24-11	B	Low		Bedford Street	2	
Highways and roads, dirt/gravel	X24	X24-12	B	Low		Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-13	B	Low		Rya Street	2	
Highways and roads, dirt/gravel	X24	X24-6	B	Low		Rockridge Drive	2	
Highways and roads, dirt/gravel	X24	X24-7	B	Low		Northpark Drive	2	
Highways and roads, dirt/gravel	X24	X24-8	B	Low		Lupine Road	2	
Highways and roads, dirt/gravel	X24	X24-9	B	Low		Foster Street	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	3	Approximately 179 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-41-136	C	Low		Septics located within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 - 3	C	Low		All other roads located within Zone C	3	

Table 6

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Synthetic Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
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	B	Low	2	Residential areas located within Zone B	2	Approximately 67 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-1	A	Low	3	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-2	B	Low	4	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-3	B	Low	5	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-4	B	Low	6	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-5	B	Low	7	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-6	B	Low	8	Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-7	B	Low	9	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-8	B	Low	10	Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-10	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-11	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-12	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-13	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-14	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-15	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-16	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-17	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-18	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-19	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-20	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-21	B	Low		Along Sanders Road	3	
Septic systems (serves one single-family home)	R02	R2-22	B	Low		Along Hillside Drive	3	

Table 6 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Synthetic Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-23	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-24	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-25	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-26	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-27	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-28	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-29	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-30	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-31	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-32	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-33	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-34	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-35	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-36	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-37	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-38	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-39	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-40	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-9	B	Low		Along Huffman Road	3	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	3	Approximately 179 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-41-136	C	Low		Septics located within Zone C	4	

Table 6 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Synthetic Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
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Table 7

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Other Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
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	B	Low	2	Residential areas located within Zone B	2	Approximately 67 acres of residential area.
Highways and roads, dirt/gravel	X24	X24-1	A	Low	3	Von Sheben Drive	2	
Highways and roads, dirt/gravel	X24	X24-2	A	Low	4	Freitag Drive	2	
Highways and roads, dirt/gravel	X24	X24-3	A	Low	5	Huffman Road	2	
Highways and roads, dirt/gravel	X24	X24-4	A	Low	6	Audubon Drive	2	
Highways and roads, dirt/gravel	X24	X24-5	B	Low	7	Freitag Circle	2	
Highways and roads, dirt/gravel	X24	X24-6	B	Low	8	Rockridge Drive	2	
Highways and roads, dirt/gravel	X24	X24-7	B	Low	9	Northpark Drive	2	
Highways and roads, dirt/gravel	X24	X24-8	B	Low	10	Lupine Road	2	
Septic systems (serves one single-family home)	R02	R2-1	A	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-10	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-11	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-12	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-13	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-14	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-15	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-16	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-17	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-18	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-19	B	Low		Along Northpark Drive	3	
Septic systems (serves one single-family home)	R02	R2-2	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-20	B	Low		Along Northpark Drive	3	

Table 7 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Other Organic Chemicals*

PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-21	B	Low		Along Sanders Road	3	
Septic systems (serves one single-family home)	R02	R2-22	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-23	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-24	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-25	B	Low		Along Holman Ave.	3	
Septic systems (serves one single-family home)	R02	R2-26	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-27	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-28	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-29	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-3	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-30	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-31	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-32	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-33	B	Low		Along Upper Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-34	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-35	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-36	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-37	B	Low		Along Rya Street	3	
Septic systems (serves one single-family home)	R02	R2-38	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-39	B	Low		Along Hillside Drive	3	
Septic systems (serves one single-family home)	R02	R2-4	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-40	B	Low		Along Rya Street	3	

Table 7 (continued)

*Contaminant Source Inventory and Risk Ranking for
Greenbrook Subdivision
Sources of Other Organic Chemicals*

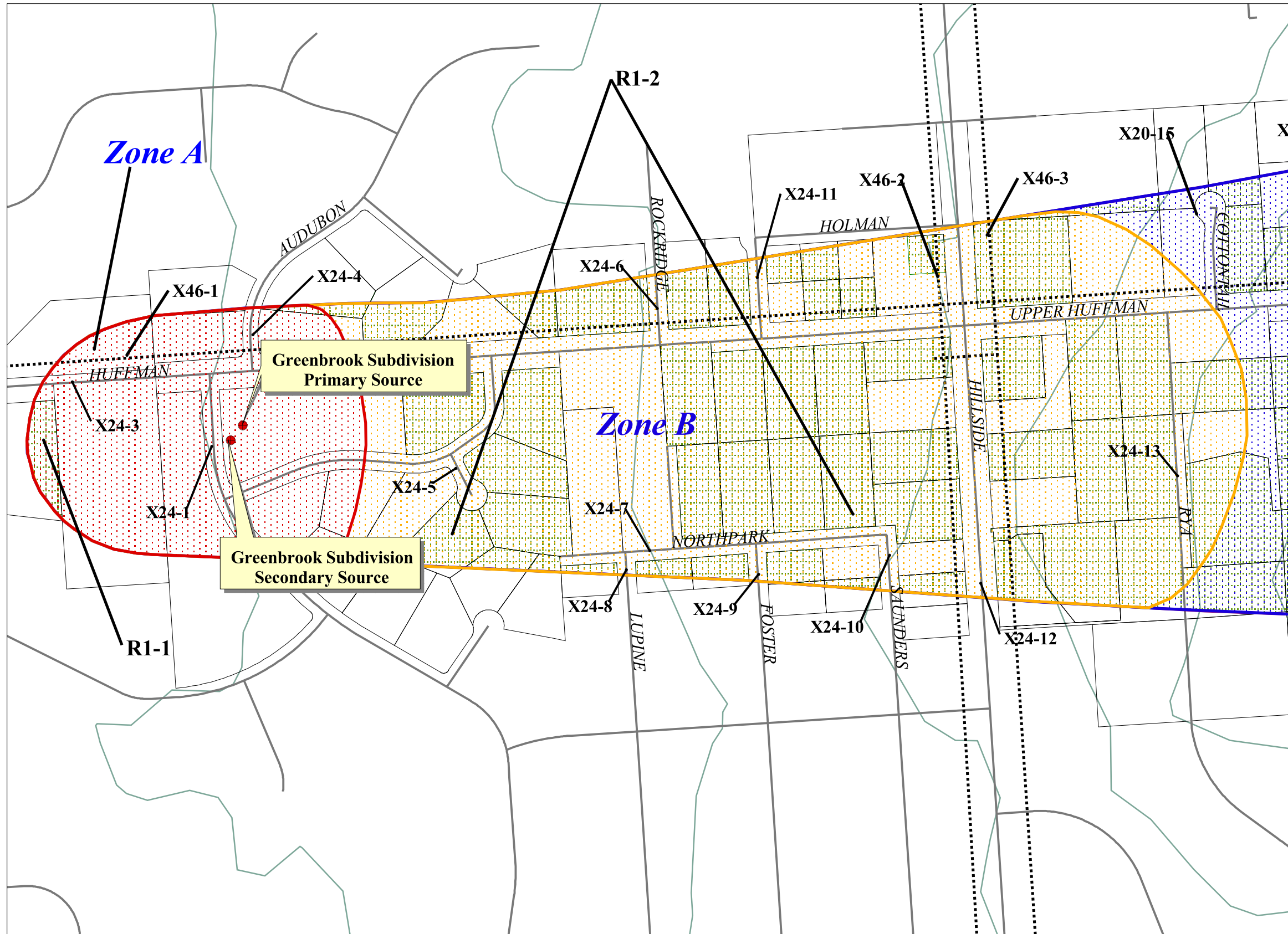
PWSID 210346.001

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Overall Rank after Analysis</i>	<i>Location</i>	<i>Map Number</i>	<i>Comments</i>
Septic systems (serves one single-family home)	R02	R2-5	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-6	B	Low		Along Freitag Circle	3	
Septic systems (serves one single-family home)	R02	R2-7	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-8	B	Low		Along Huffman Road	3	
Septic systems (serves one single-family home)	R02	R2-9	B	Low		Along Huffman Road	3	
Highways and roads, dirt/gravel	X24	X24-10	B	Low		Saunders Road	2	
Highways and roads, dirt/gravel	X24	X24-11	B	Low		Bedford Street	2	
Highways and roads, dirt/gravel	X24	X24-12	B	Low		Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-13	B	Low		Rya Street	2	
Highways and roads, dirt/gravel	X24	X24-9	B	Low		Foster Street	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	3	Approximately 179 acres of residential area.
Septic systems (serves one single-family home)	R02	R2-41-136	C	Low		Septics located within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 - 3	C	Low		All other roads located within Zone C	3	

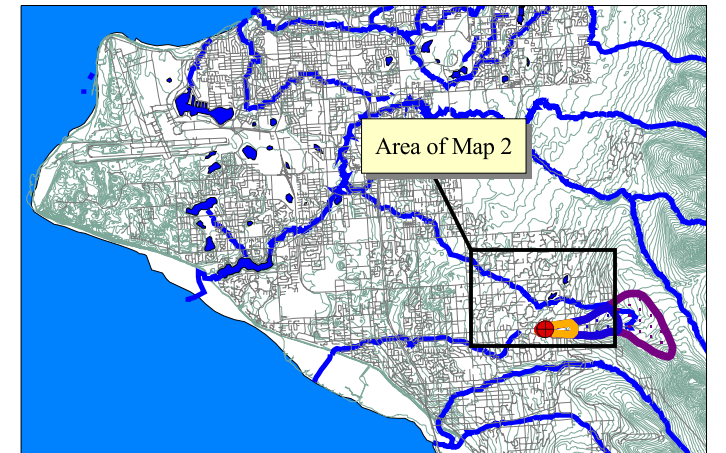
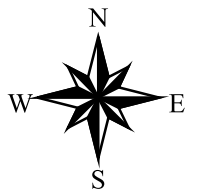
APPENDIX C

Greenbrook Subdivision's Drinking Water Protection Area and Potential & Existing Contaminant Sources

Drinking Water Protection Area for Greenbrook Subdivision and Potential & Existing Contaminant Sources



- Greenbrook Subdivision DW Sources
- 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
- Trails (X46)
- Anchorage Roads
- Anchorage Land Parcels
- Residential Areas (R1)
- Elevation Contours

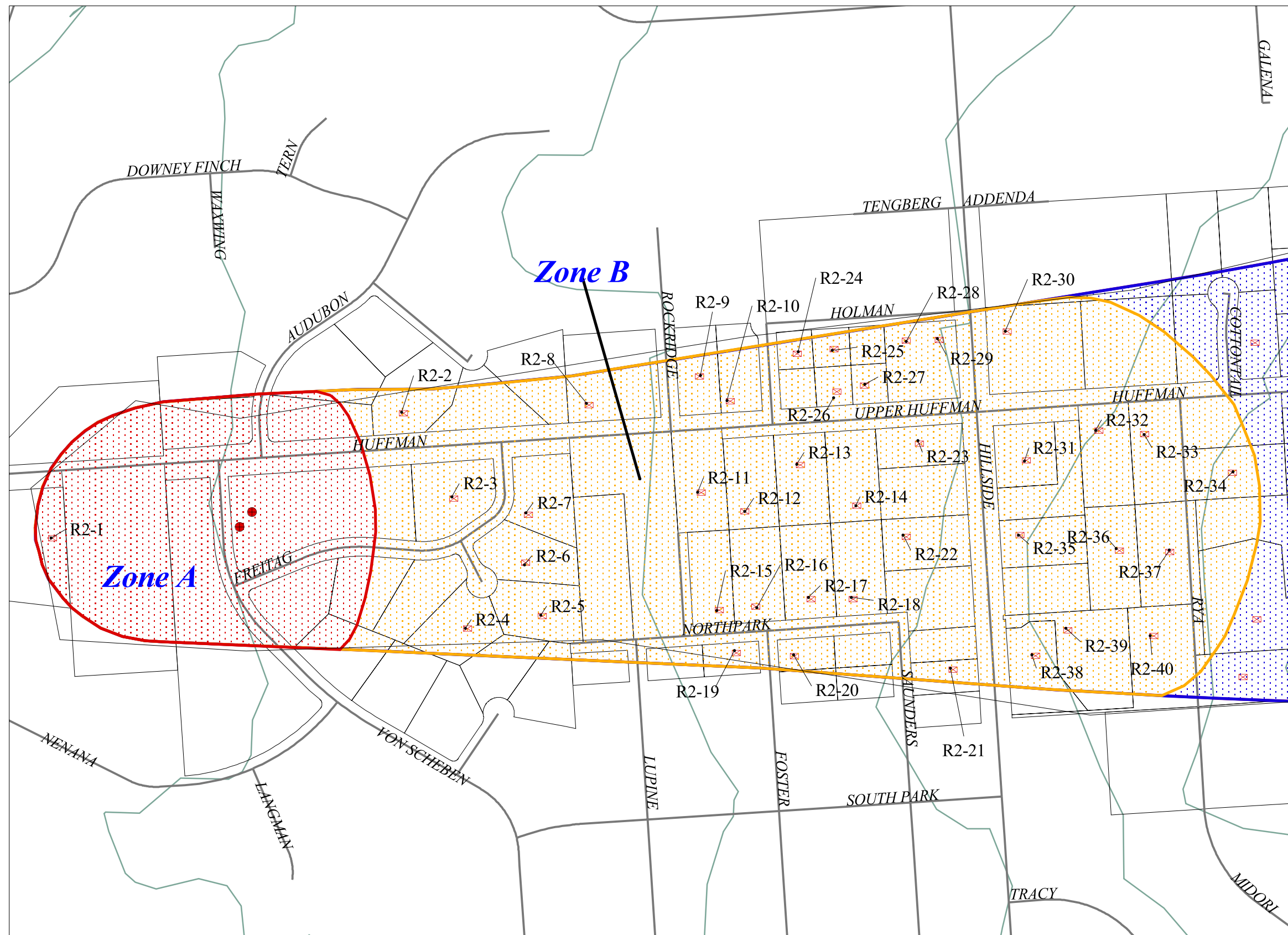


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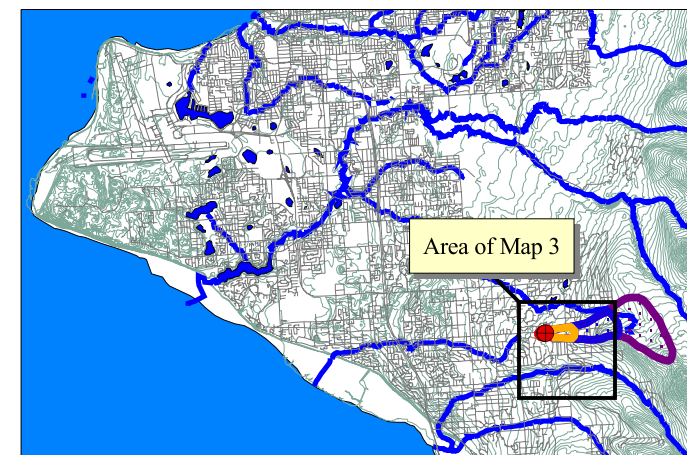
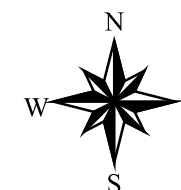
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Map 2

Drinking Water Protection Area for Greenbrook Subdivision and Potential & Existing Contaminant Sources



- Greenbrook Subdivision DW Sources
- 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
- ⊠ Septic Systems (R2)
- ⚡ Anchorage Roads (X20)
- ▭ Anchorage Land Parcels
- ⌄ Elevation Contours

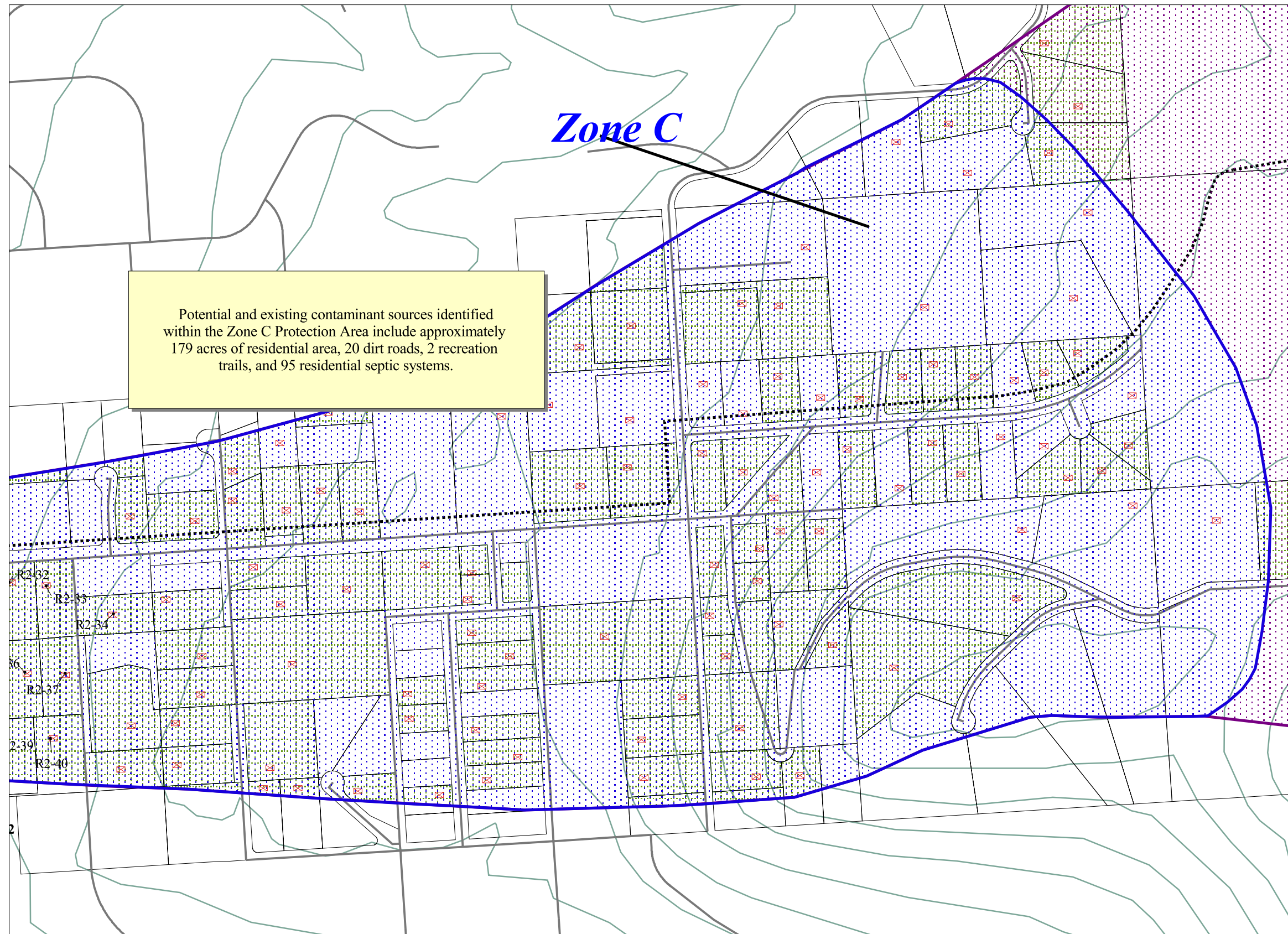


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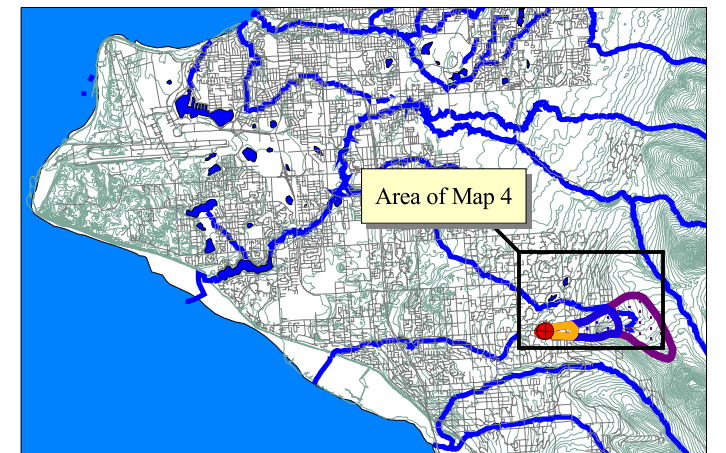
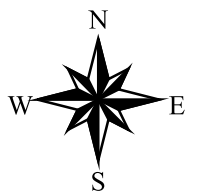
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Map 3

Drinking Water Protection Area for Greenbrook Subdivision and Potential & Existing Contaminant Sources



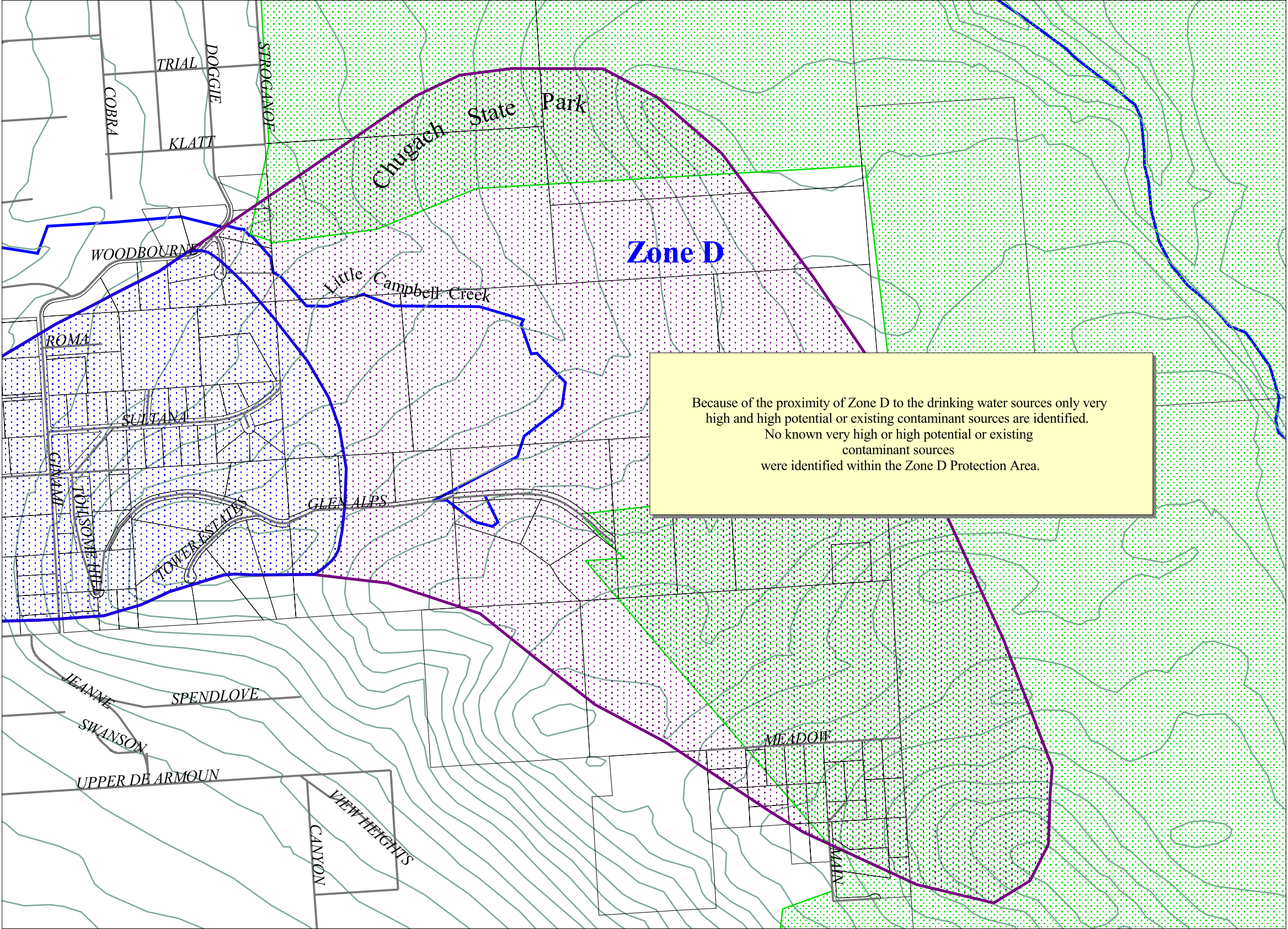
- Zone C Protection Area**
- Less Than 5 Years Travel Time
- Zone D Protection Area**
- Less Than 10 Years Travel Time
- Trails (X46)
- Anchorage Roads (X20)
- Septic Systems (R2)
- Anchorage Land Parcels
- Residential Areas (R1)
- Elevation Contours



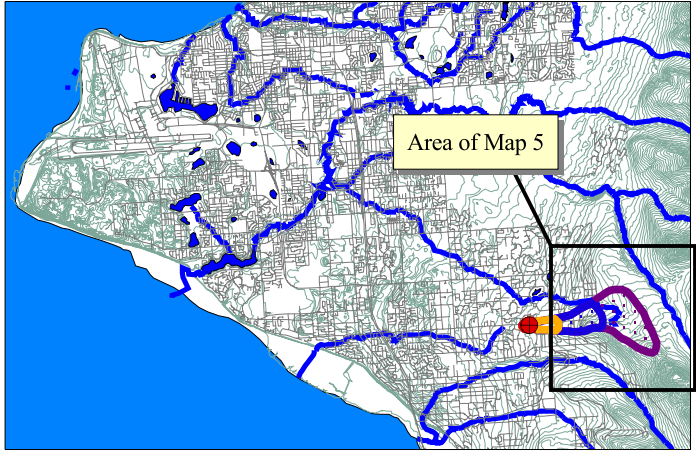
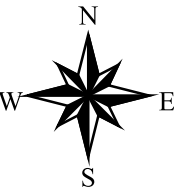
PWSID 210346.001

Map 4

Drinking Water Protection Area for Greenbrook Subdivision and Potential & Existing Contaminant Sources



- Zone C Protection Area**
- Less Than 5 Years Travel Time**
- Zone D Protection Area**
- Less Than 10 Years Travel Time**
- Anchorage Roads (X20)**
- Anchorage Land Parcels**
- Chugach State Park**
- Elevation Contours**
- Anchorage Streams**



PWSID 210346.001

Map 5

APPENDIX D

Vulnerability Analysis for Greenbrook Subdivision's Public Drinking Water Sources

Chart 1. Susceptibility of the wellheads - Greenbrook Subdivision

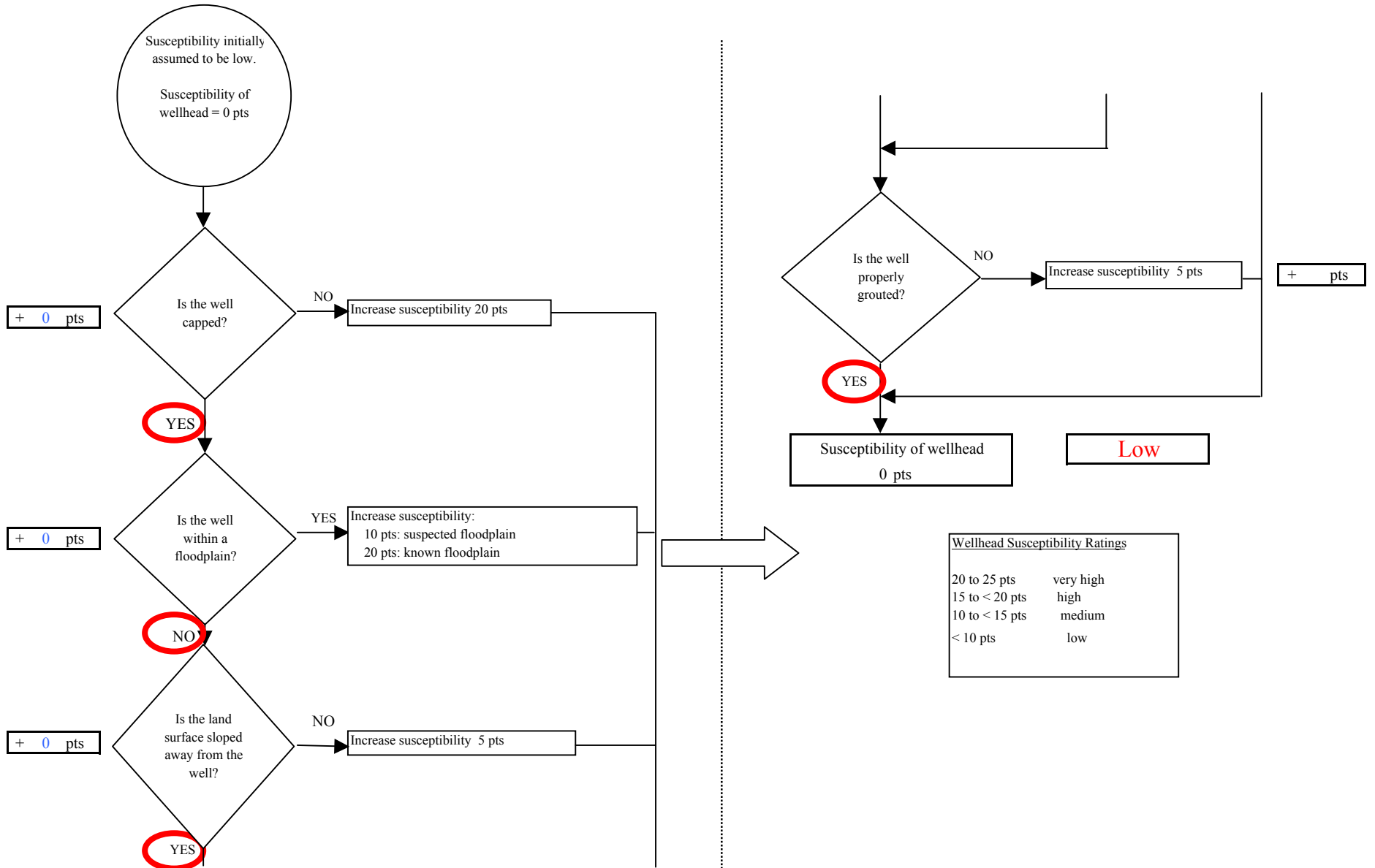


Chart 2. Susceptibility of the aquifer - Greenbrook Subdivision

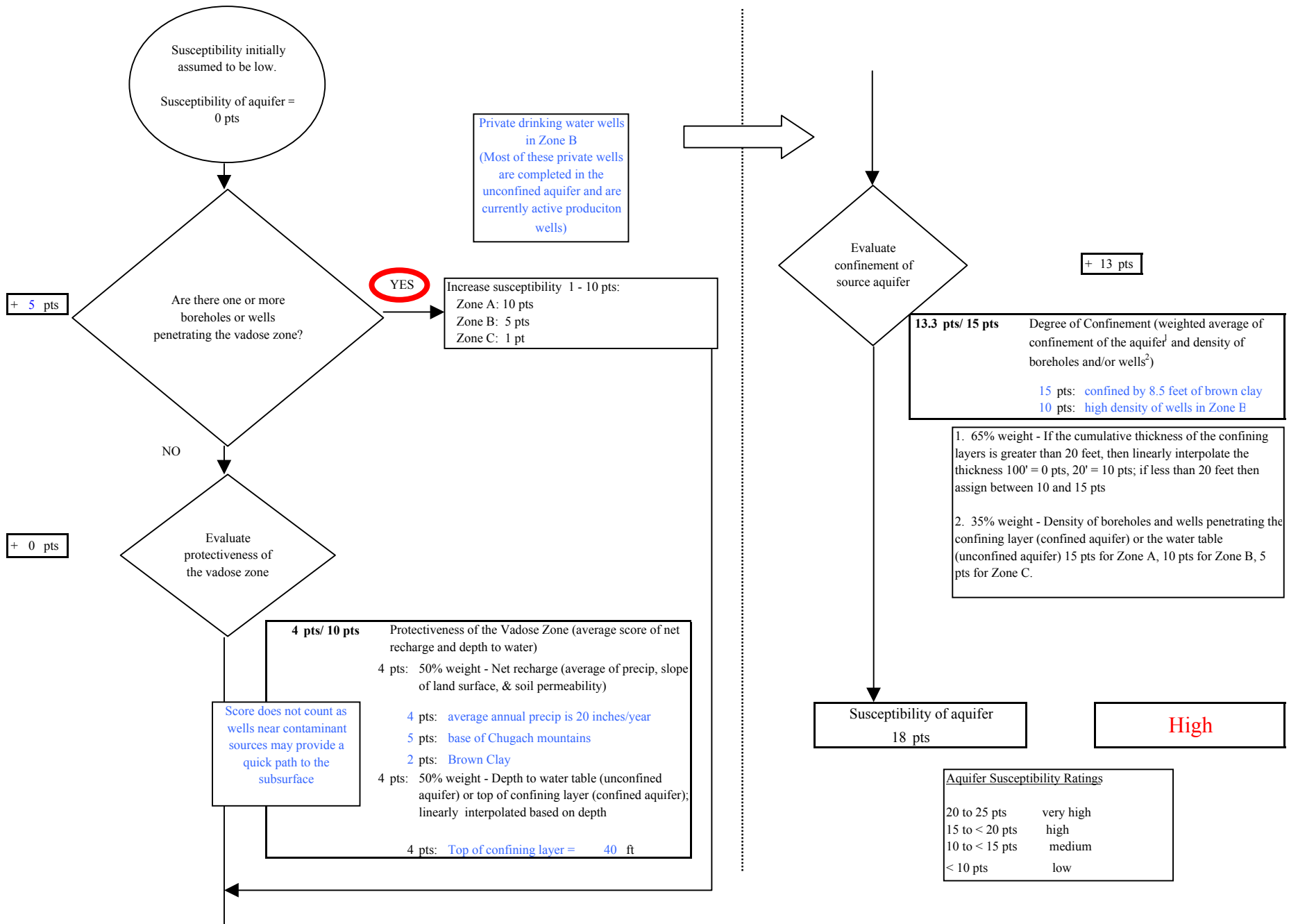
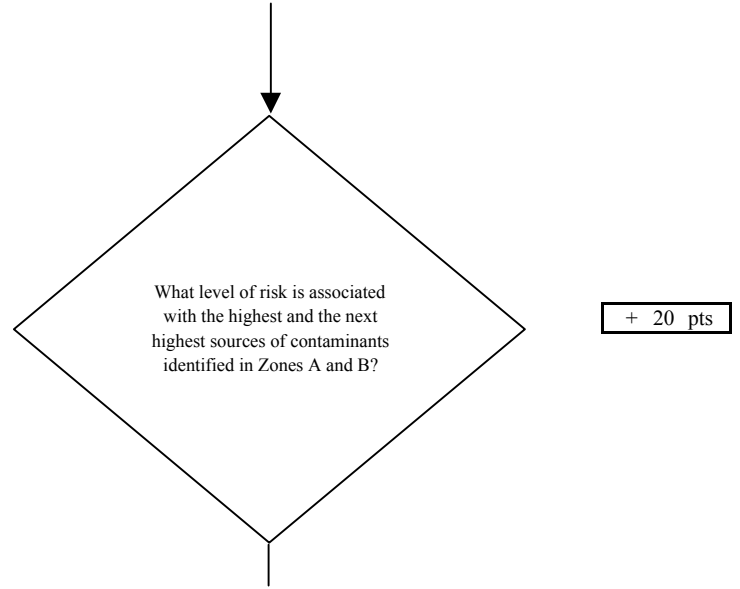
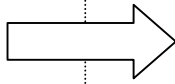
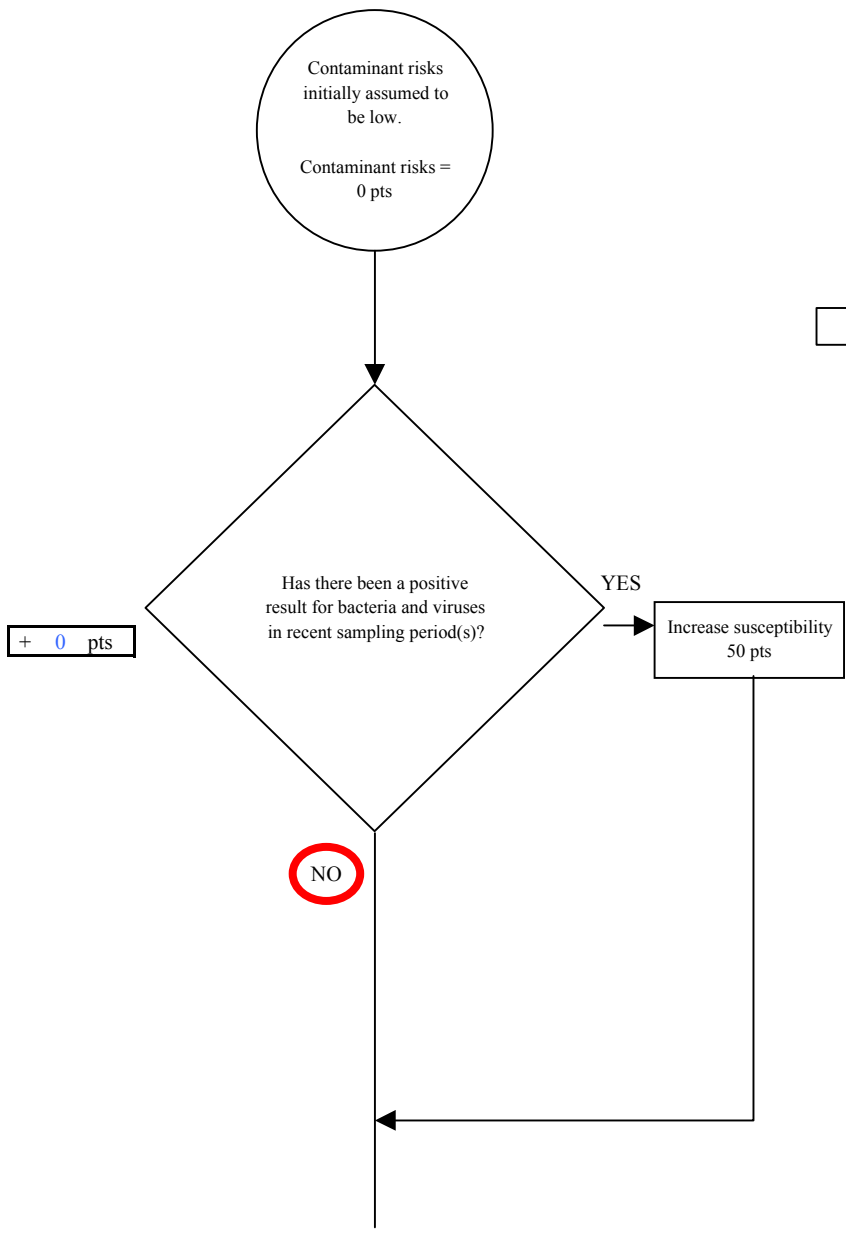


Chart 3. Contaminant risks for Greenbrook Subdivision - Bacteria & Viruses



Risk Rankings for Contaminant Sources Identified in Zones A and B			
	Zone A	Zone B	Total
Very High(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	4	8	12

	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 Greenbrook Subdivision - Bacteria & Viruses

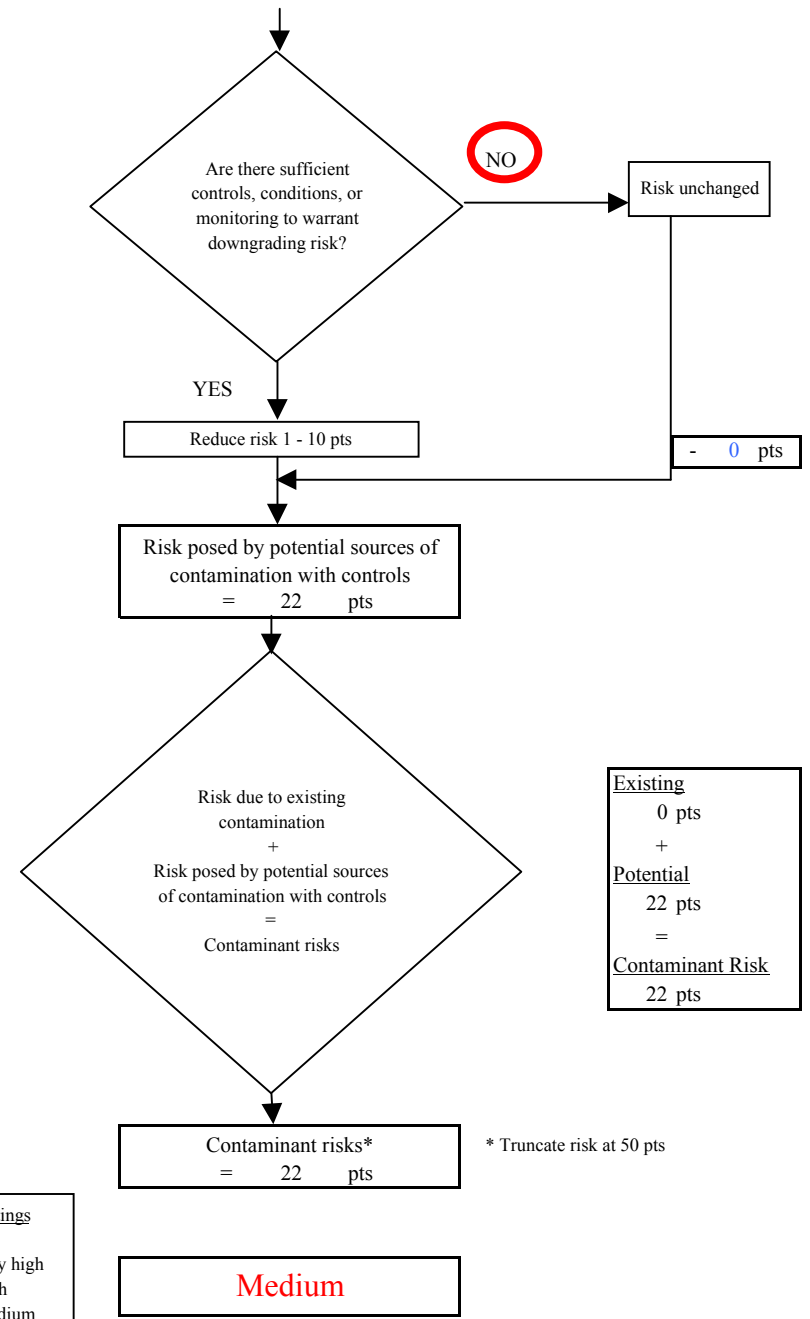
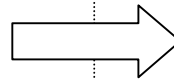
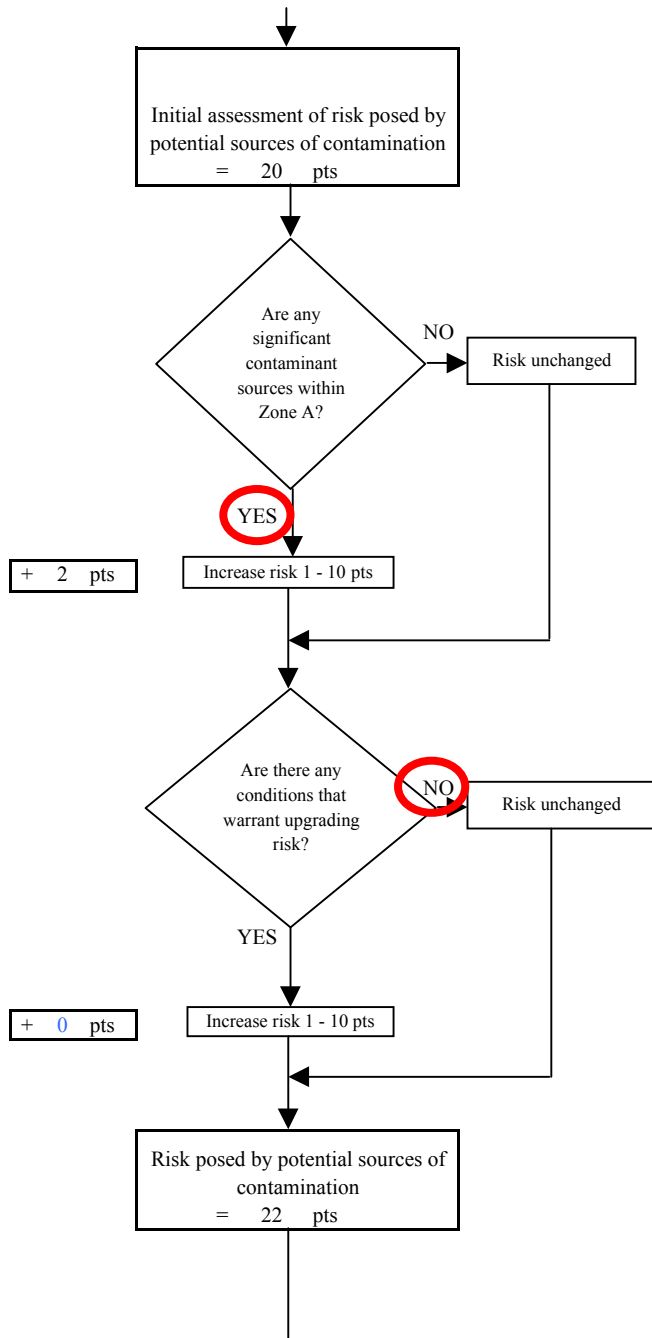


Chart 4. Vulnerability analysis for Greenbrook Subdivision - Bacteria & Viruses

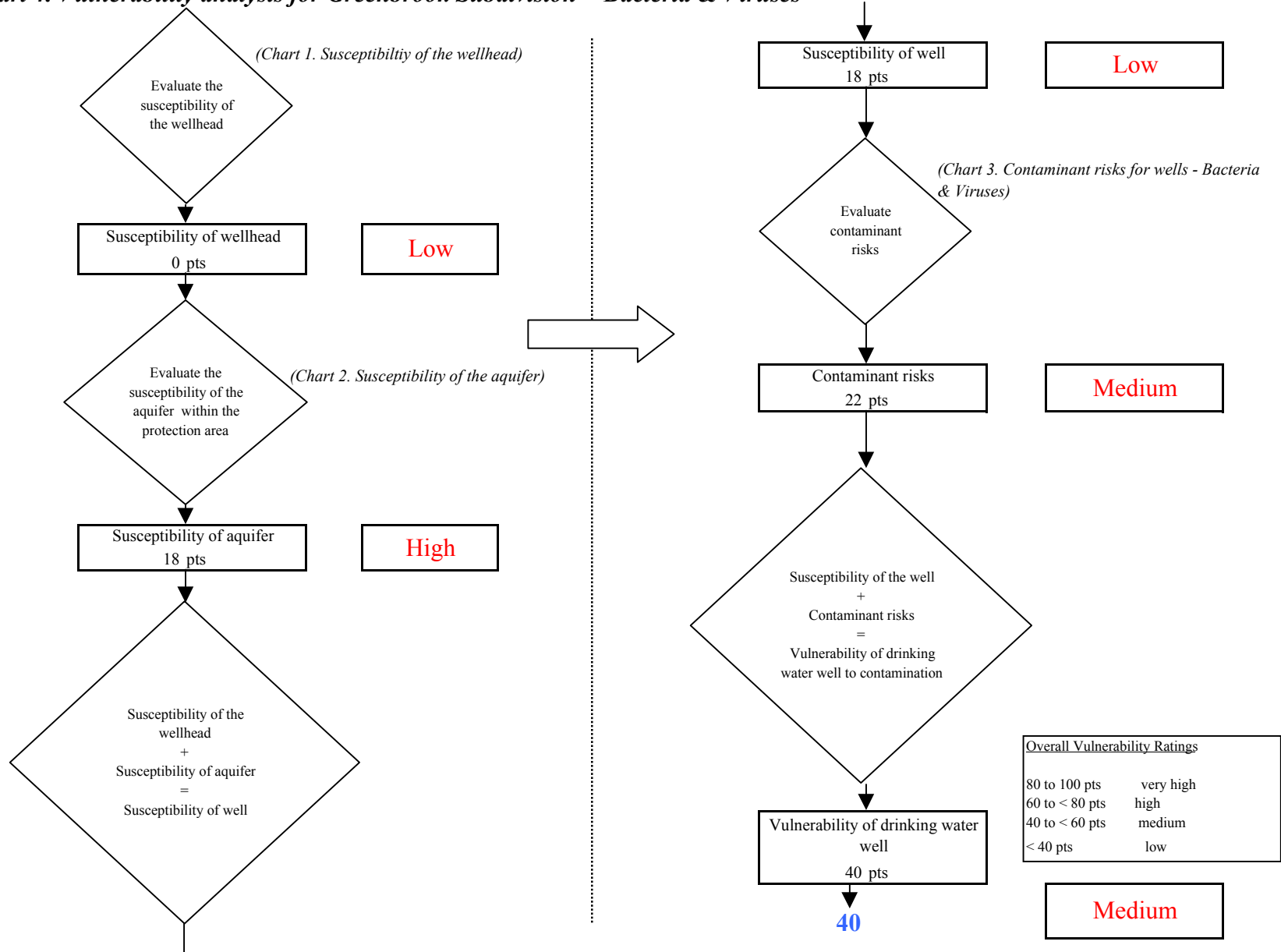


Chart 5. Contaminant risks for Greenbrook Subdivision - Nitrates and Nitrites

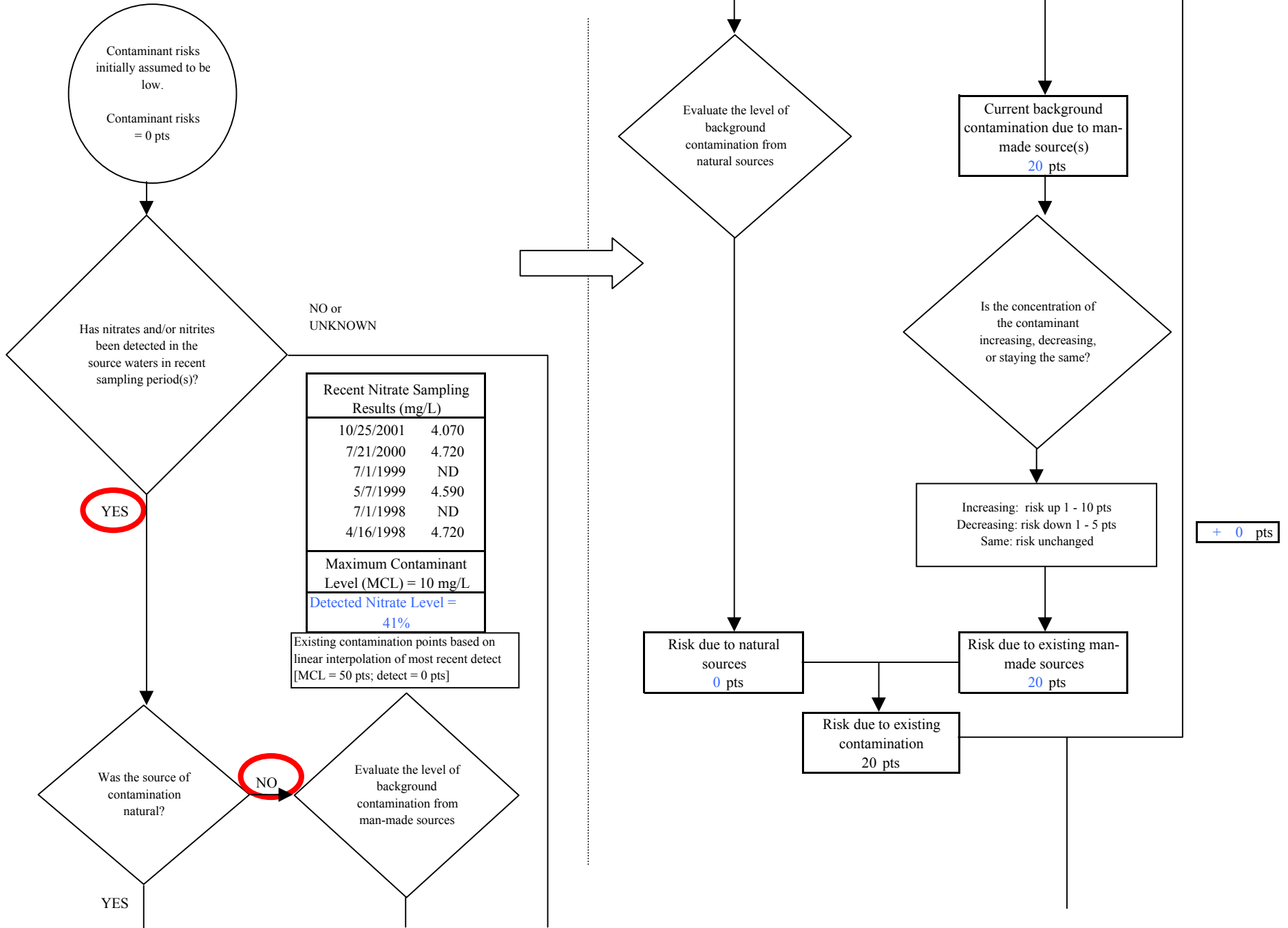
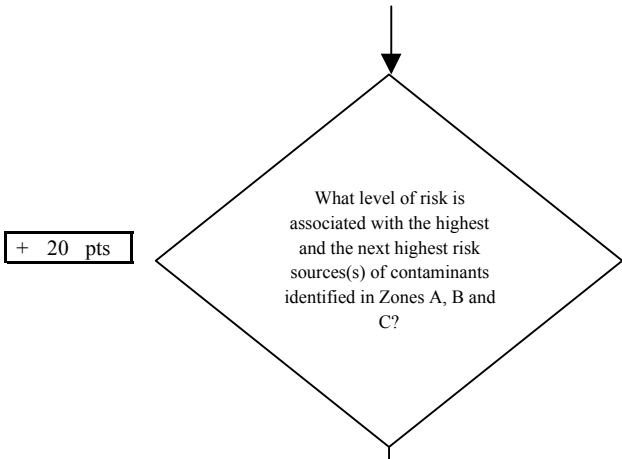


Chart 5. Contaminant risks for Greenbrook Subdivision - Nitrates and Nitrites



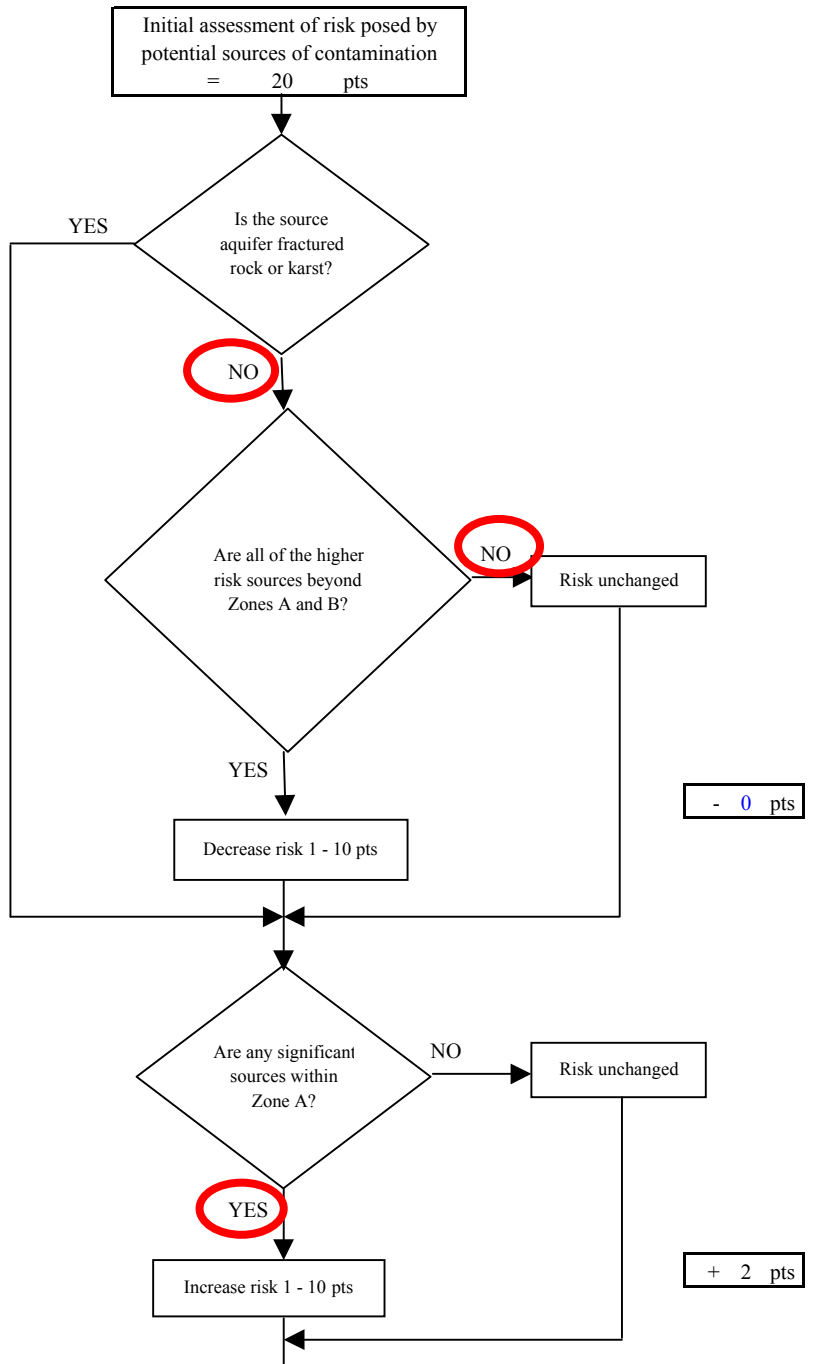
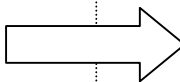
+ 20 pts

Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	3	23	26

	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.



- 0 pts

+ 2 pts

Chart 5. Contaminant risks for Greenbrook Subdivision - Nitrates and Nitrites

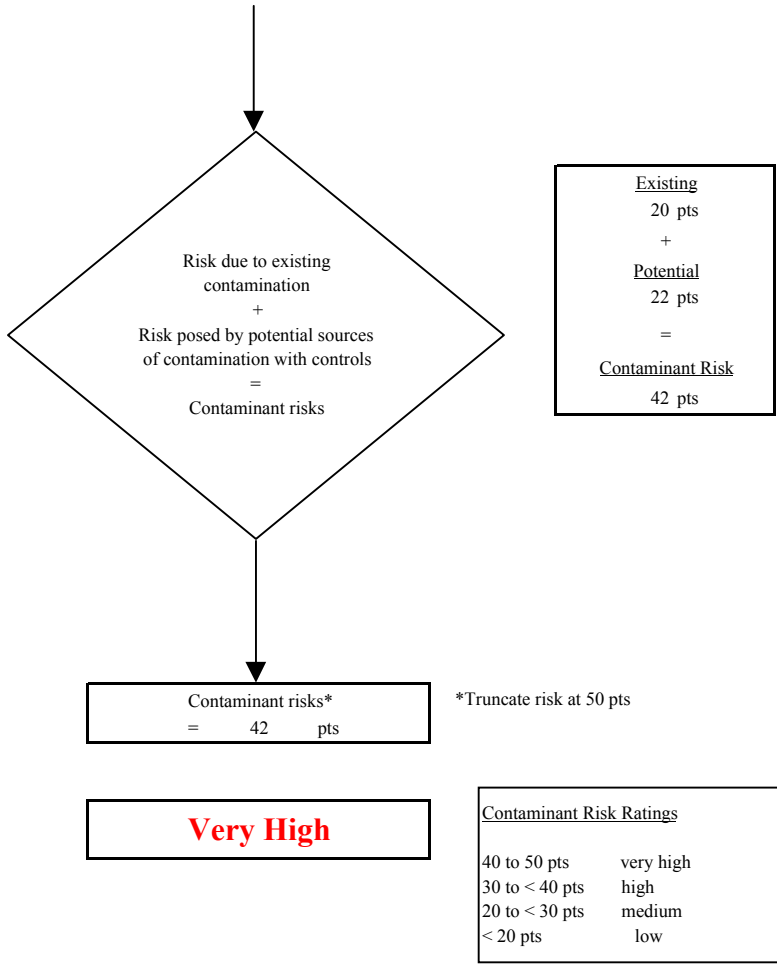
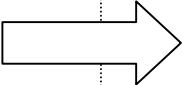
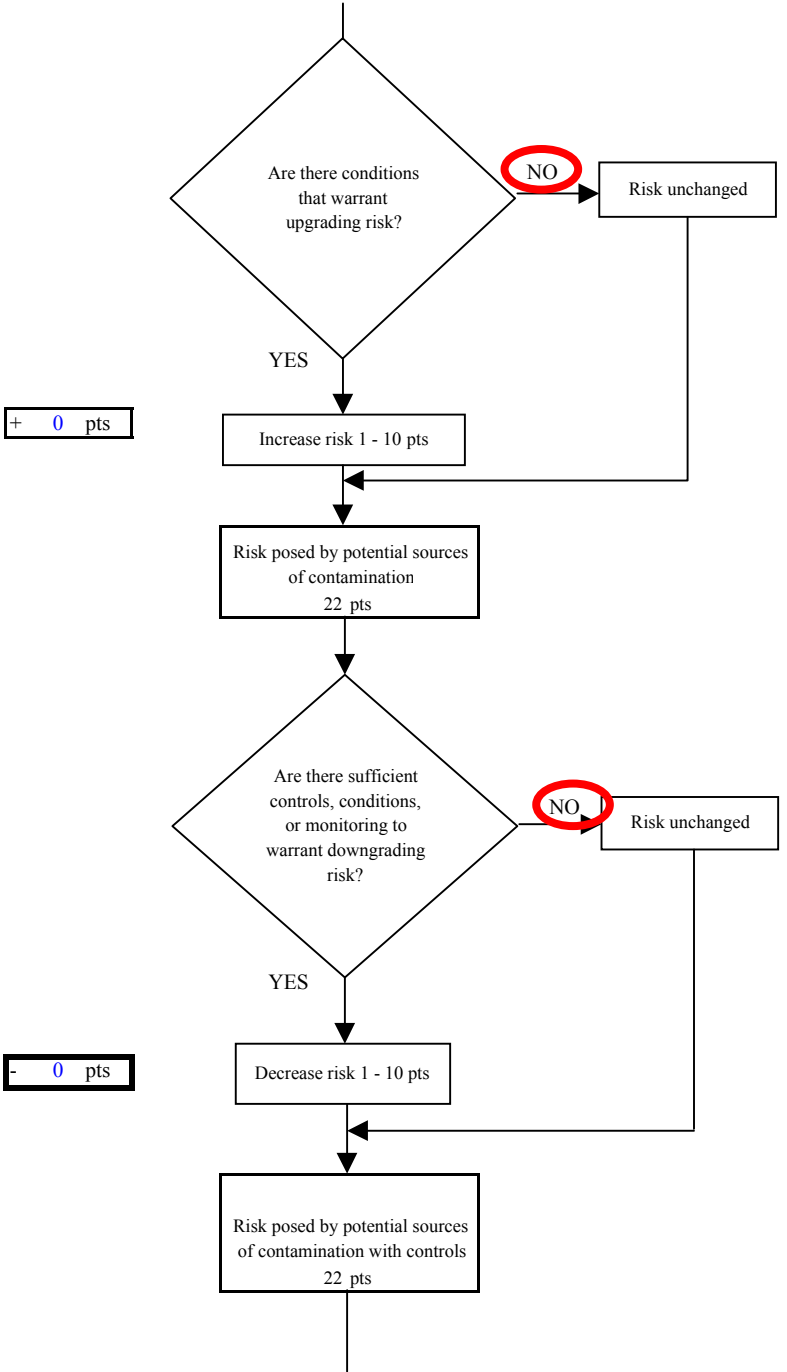


Chart 6. Vulnerability analysis for Greenbrook Subdivision - Nitrates and Nitrites

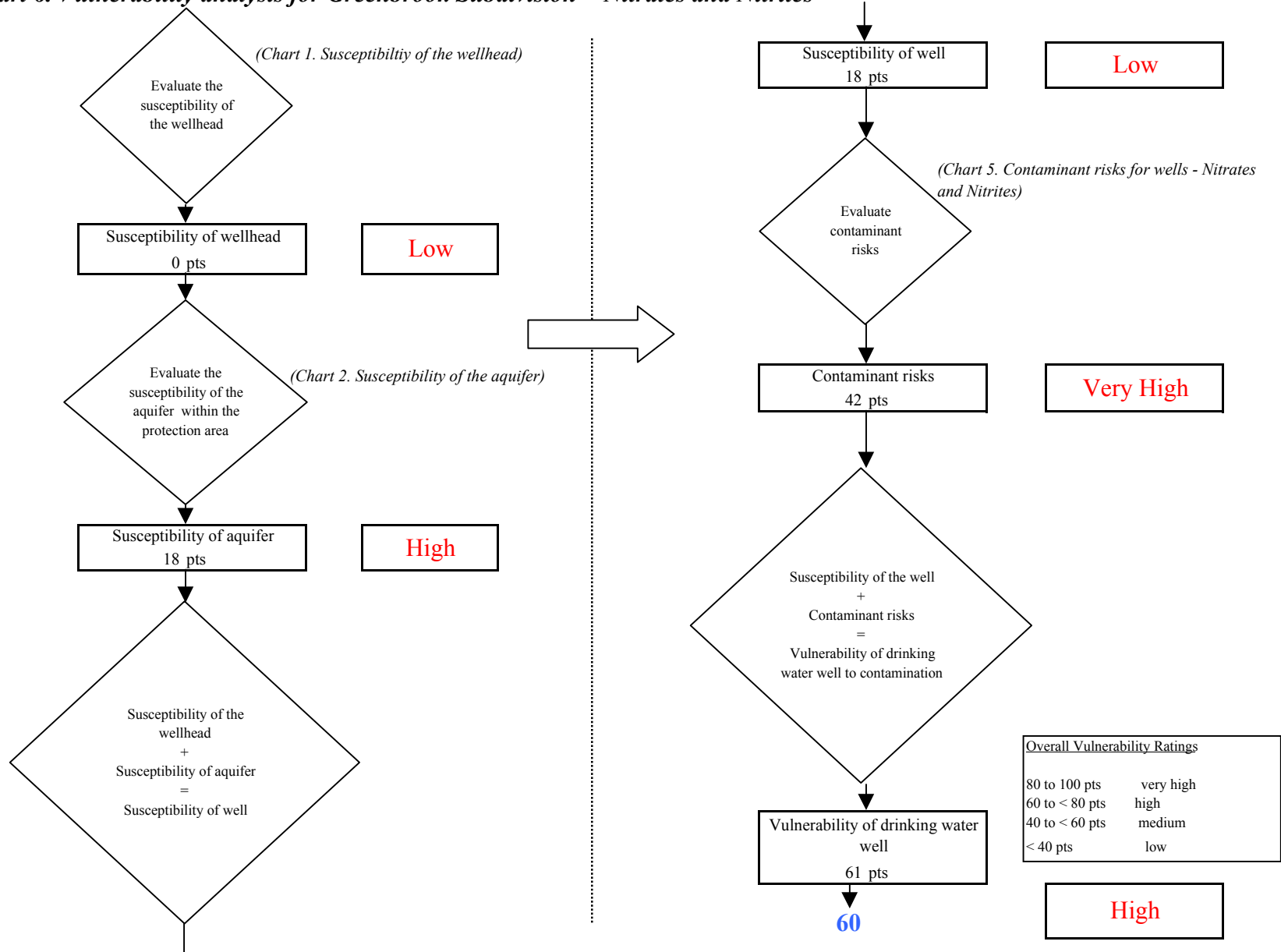


Chart 7. Contaminant risks for Greenbrook Subdivision - Volatile Organic Chemicals

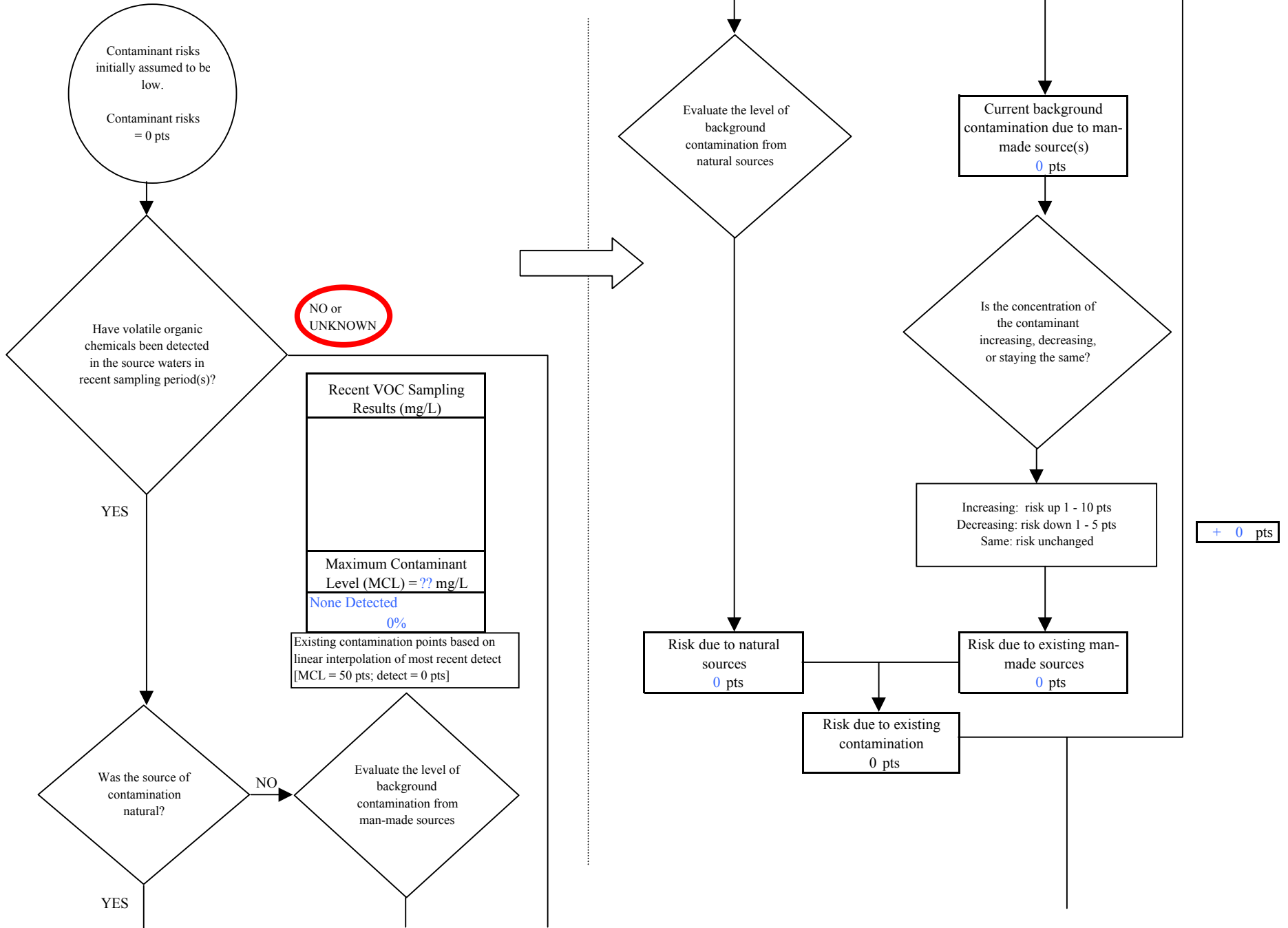
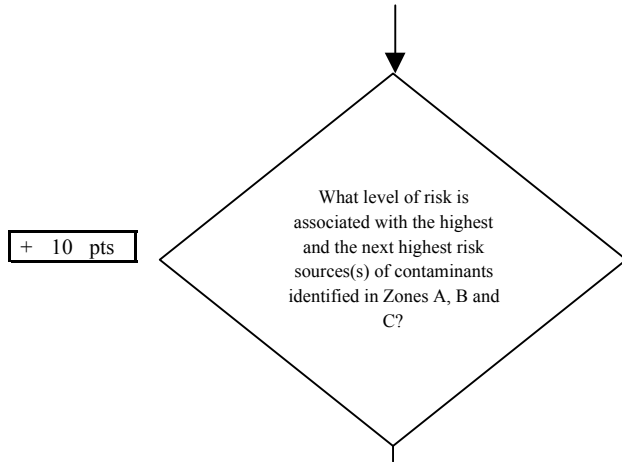


Chart 7. Contaminant risks for Greenbrook Subdivision - Volatile Organic Chemicals



Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	3	6	9

	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.

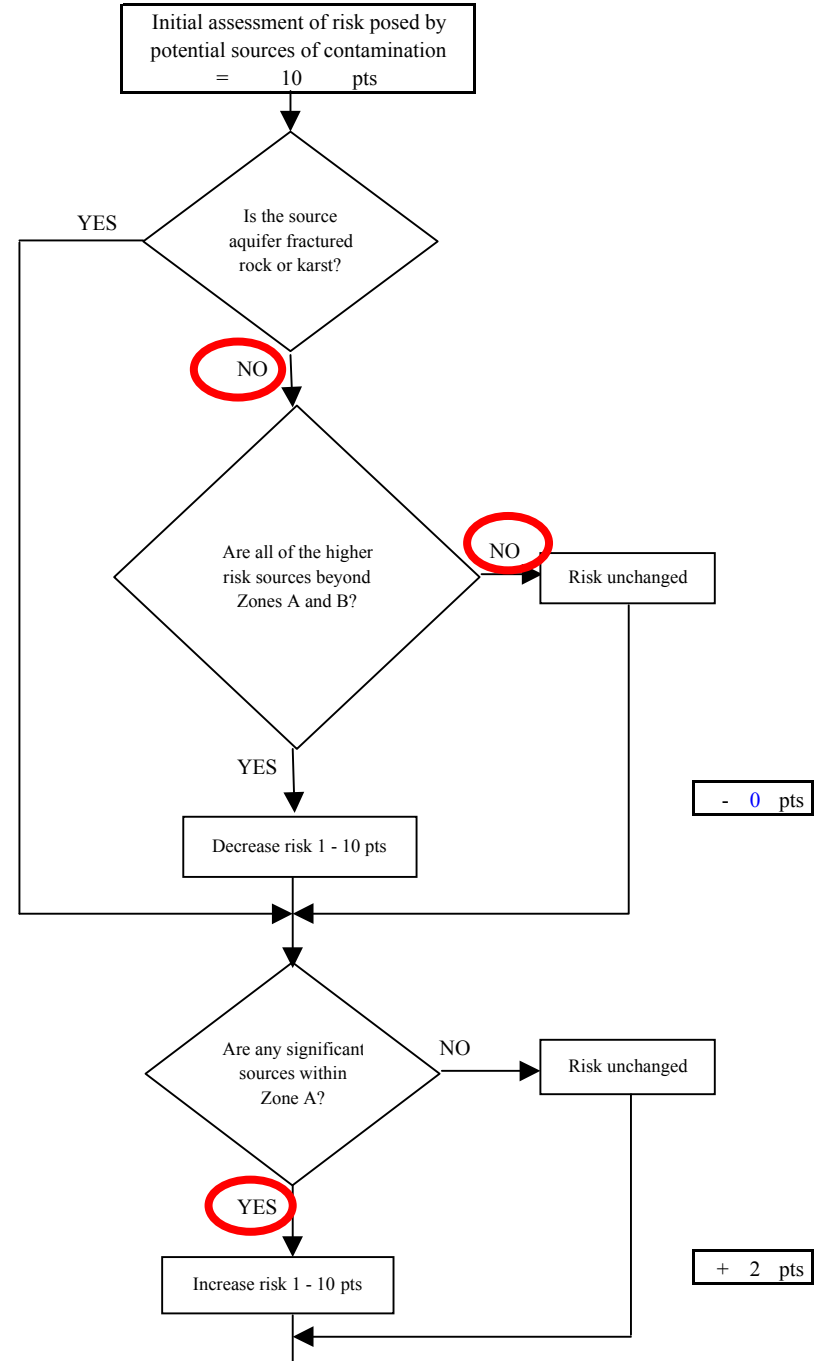
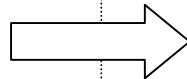


Chart 7. Contaminant risks for Greenbrook Subdivision - Volatile Organic Chemicals

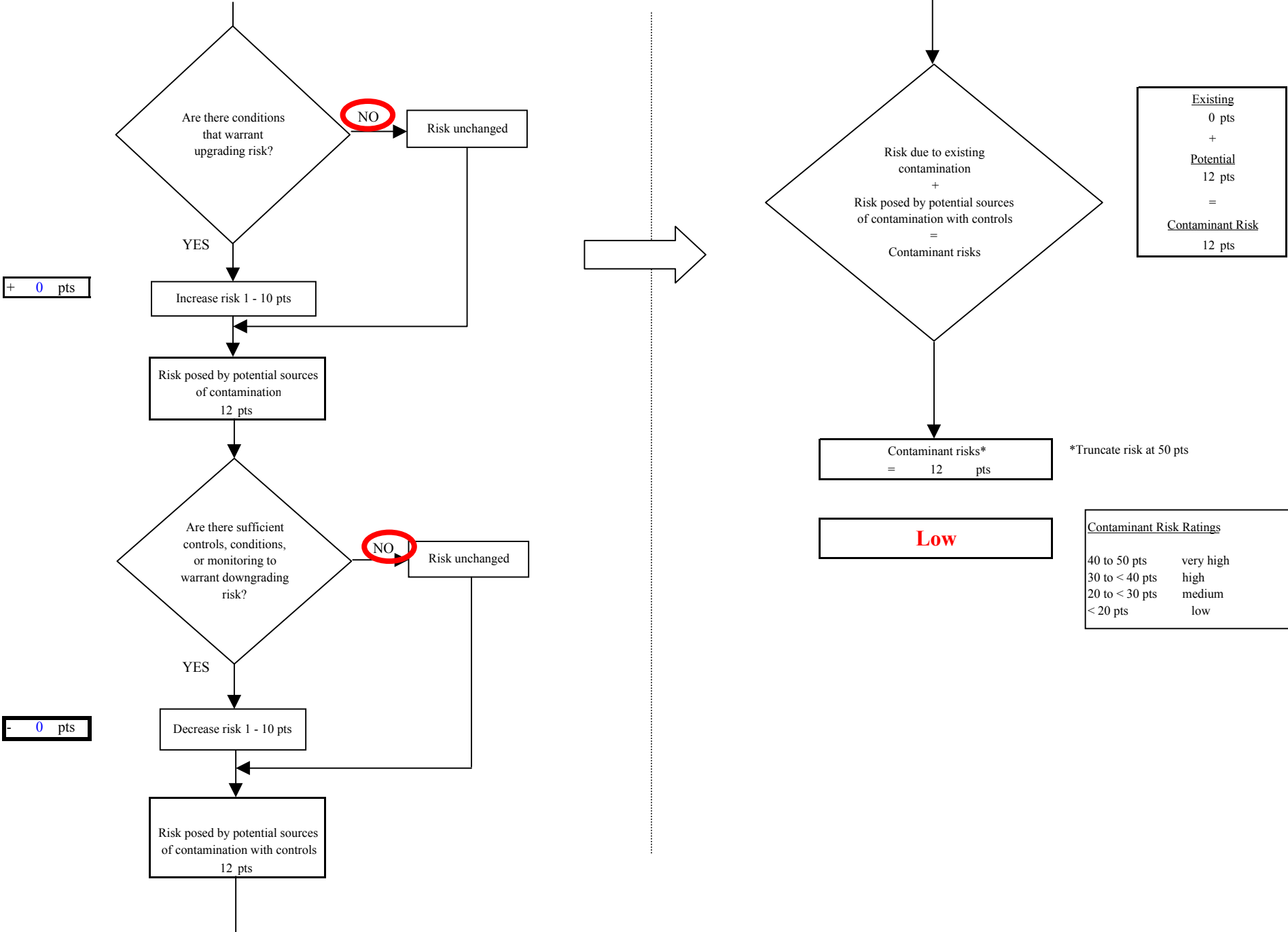


Chart 8. Vulnerability analysis for Greenbrook Subdivision - Volatile Organic Chemicals

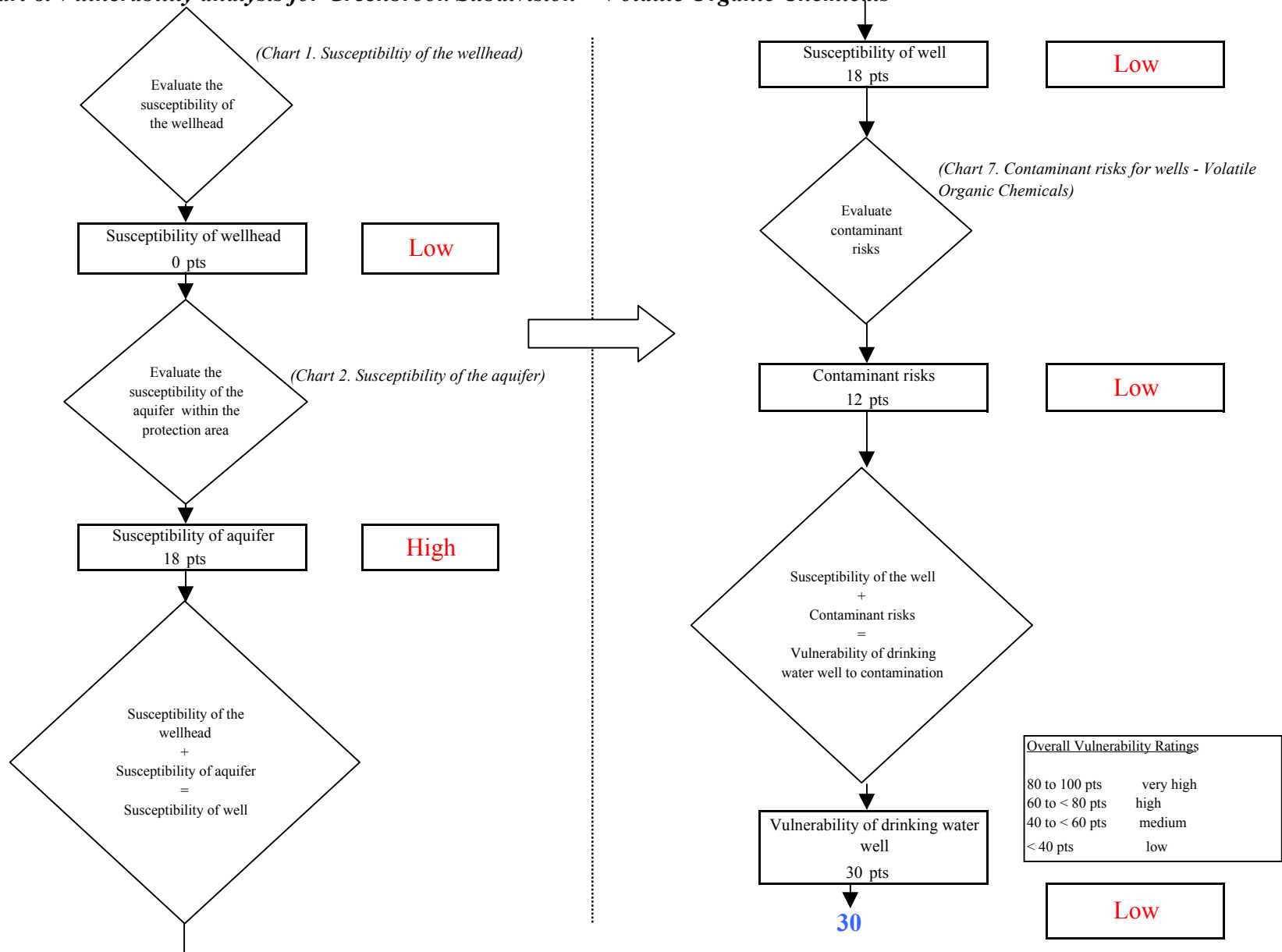


Chart 9. Contaminant risks for Greenbrook Subdivision - Heavy Metals, Cyanide and Other Inorganic Chemicals

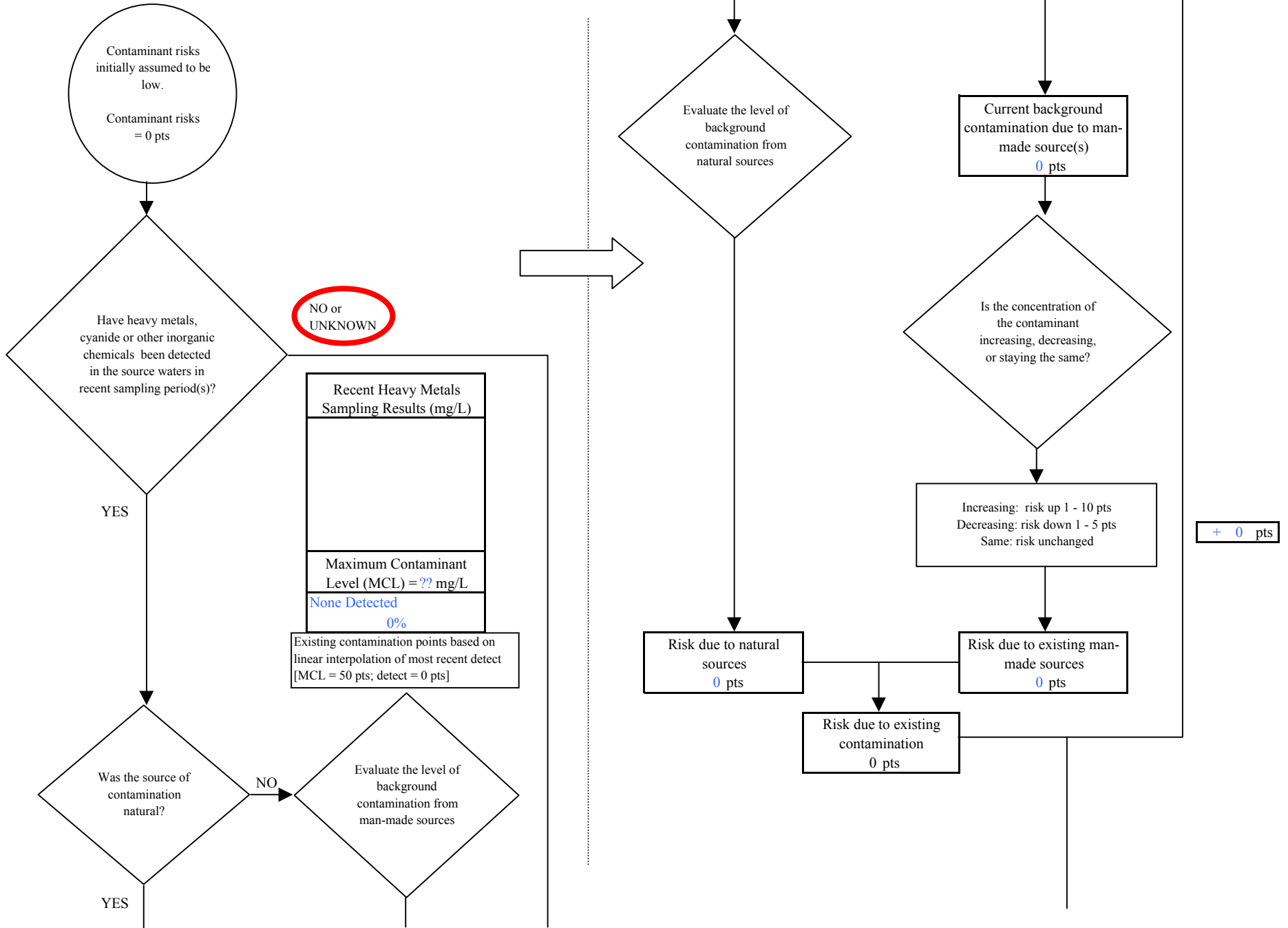
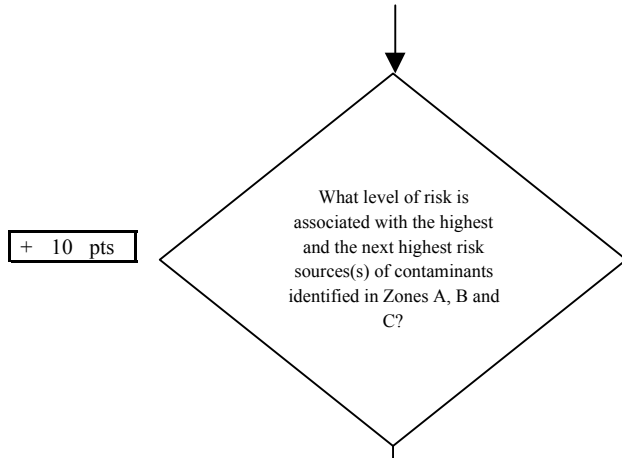


Chart 9. Contaminant risks for Greenbrook Subdivision - Heavy Metals, Cyanide and Other Inorganic Chemicals



+ 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)	3	4	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.

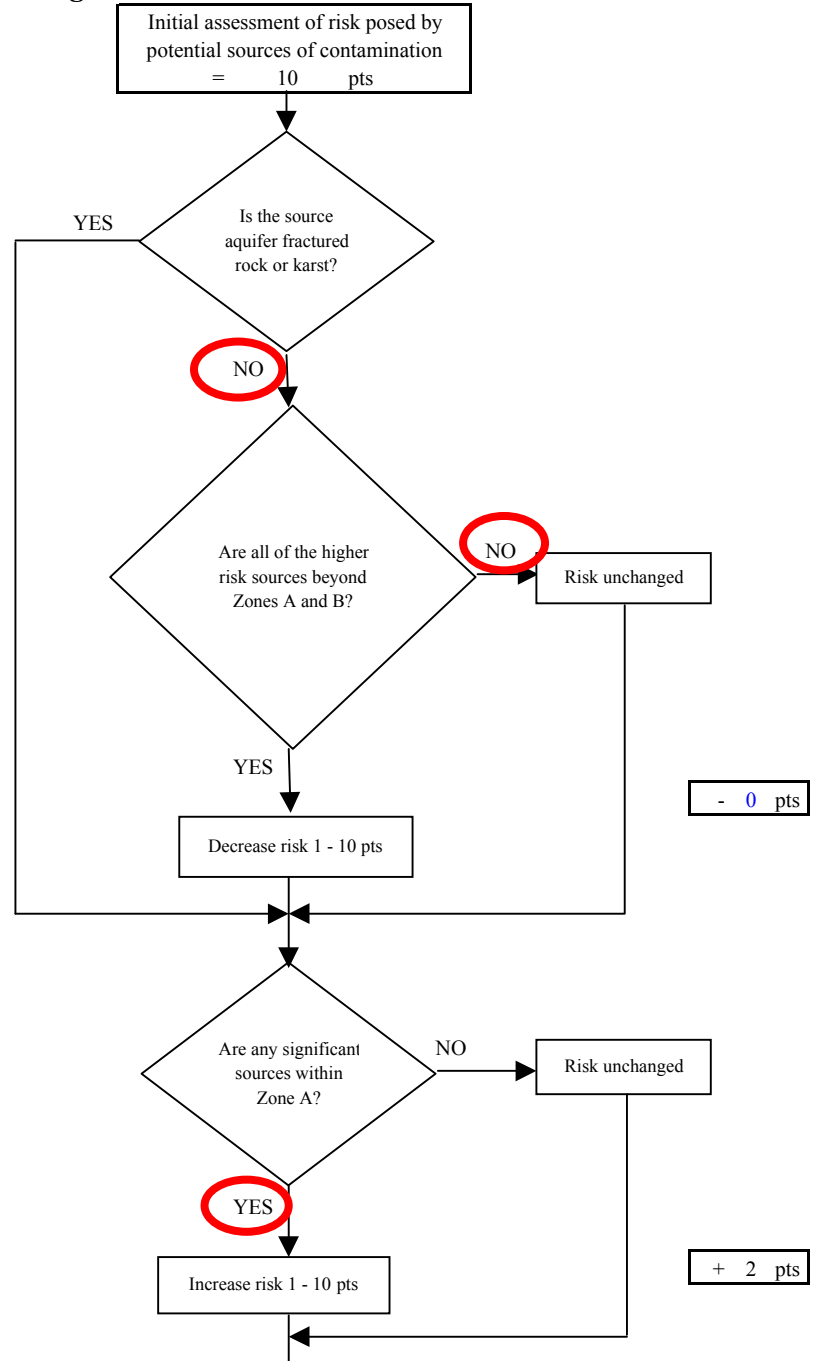
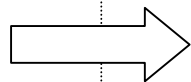


Chart 9. Contaminant risks for Greenbrook Subdivision - Heavy Metals, Cyanide and Other Inorganic Chemicals

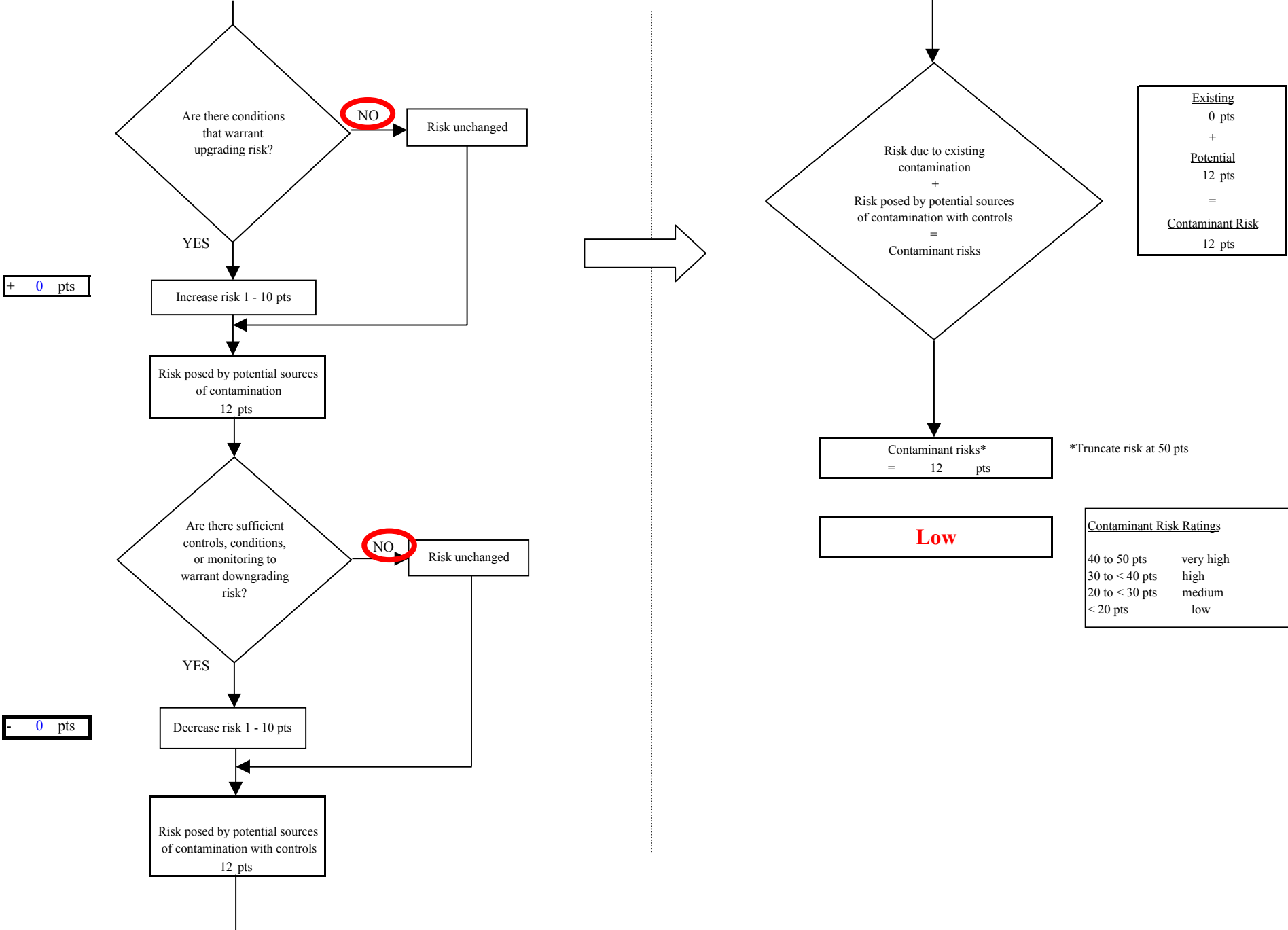


Chart 10. Vulnerability analysis for Greenbrook Subdivision - Heavy Metals, Cyanide and Other Inorganic Chemicals

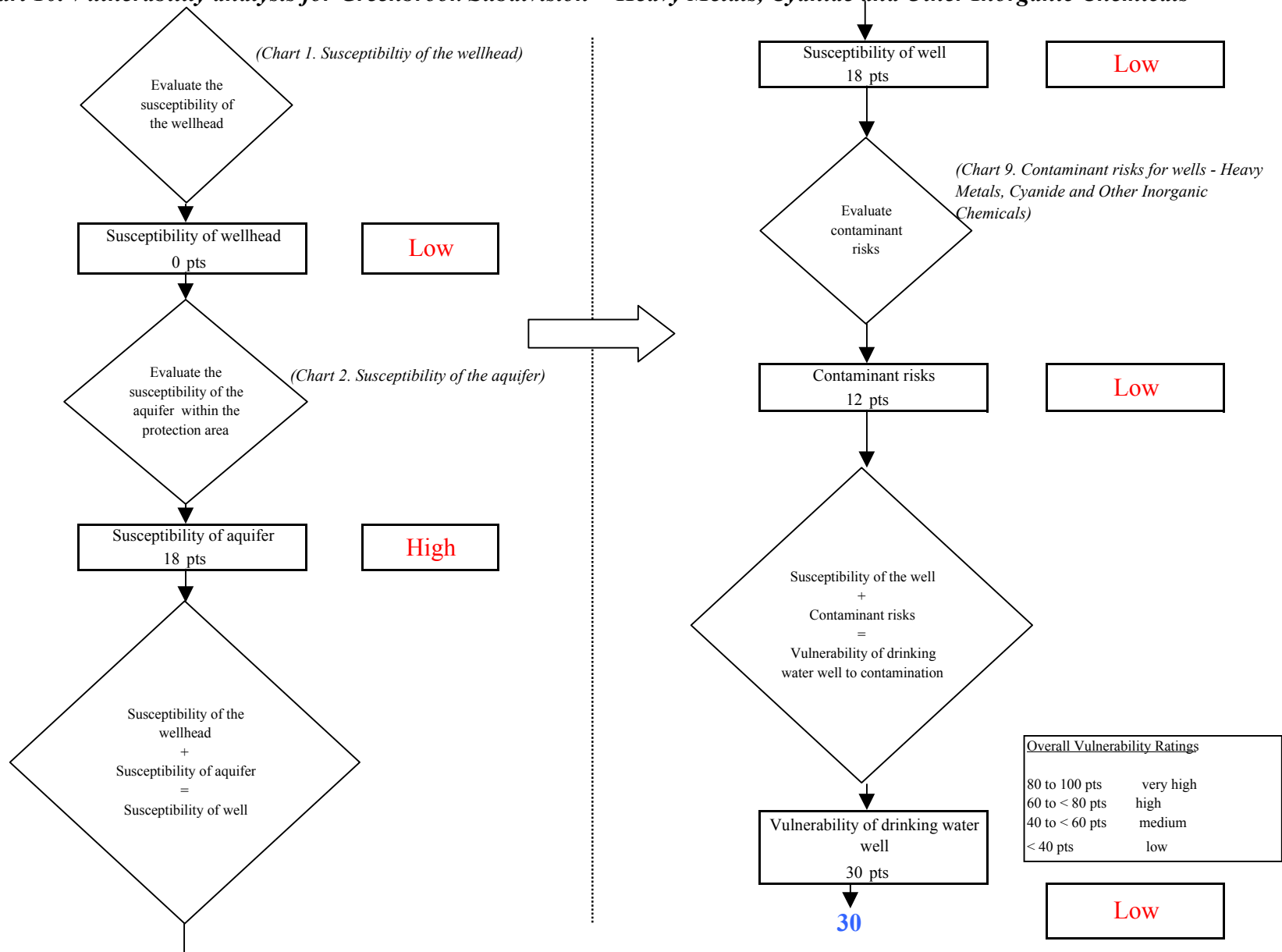


Chart 11. Contaminant risks for Greenbrook Subdivision - Synthetic Organic Chemicals

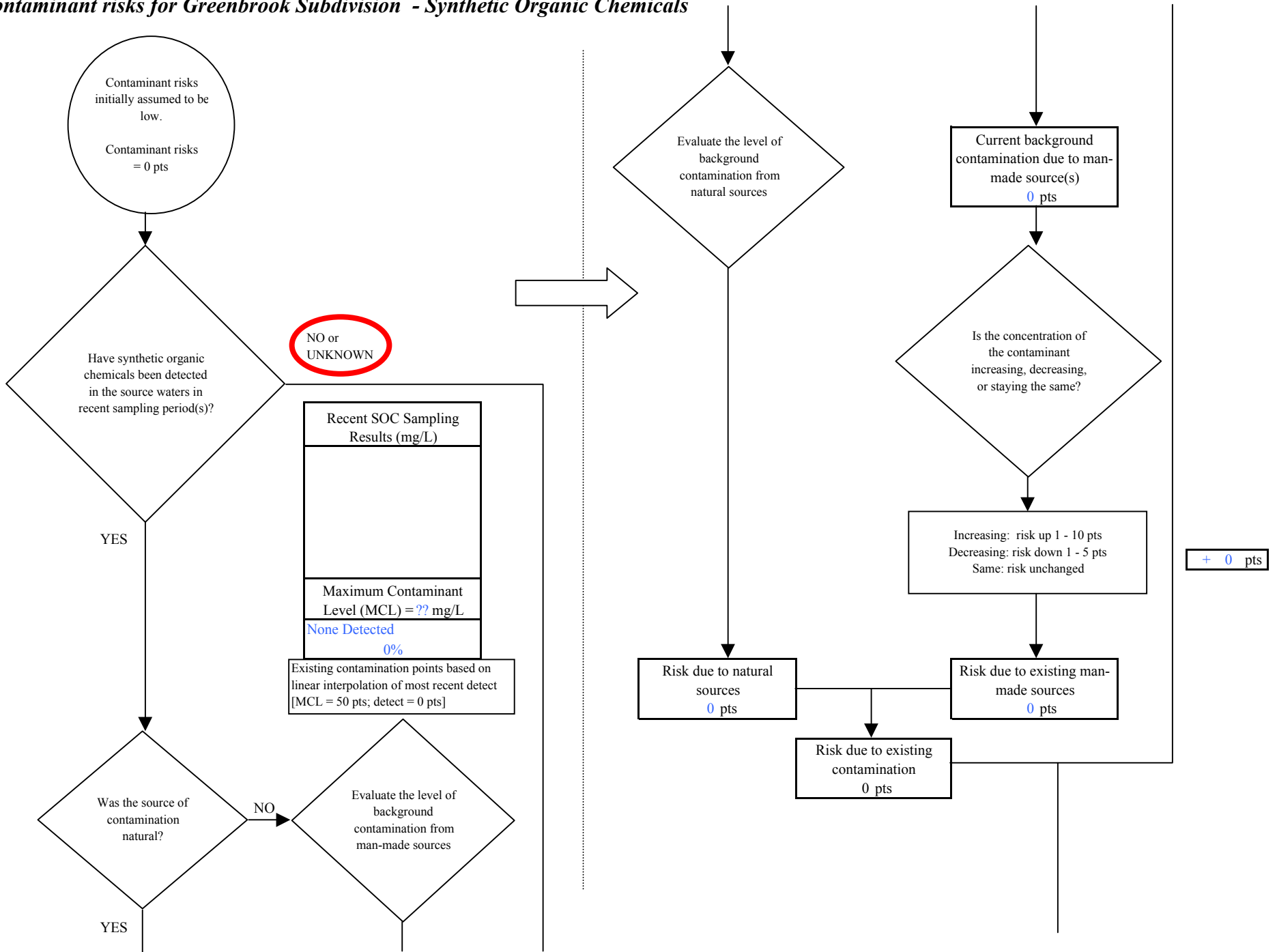
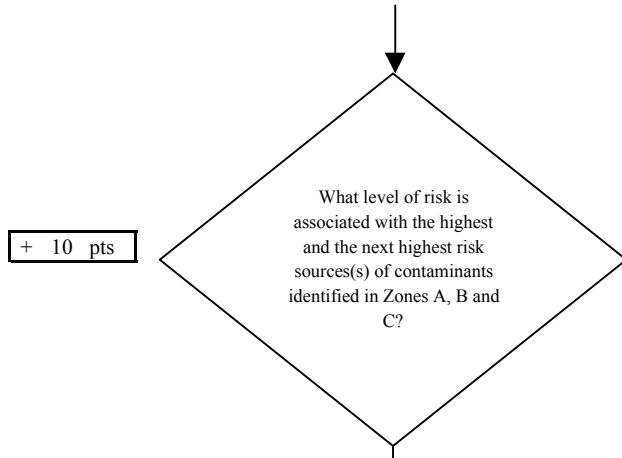


Chart 11. Contaminant risks for Greenbrook Subdivision - Synthetic Organic Chemicals



Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	2	3	5

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

Matrix Score 10

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

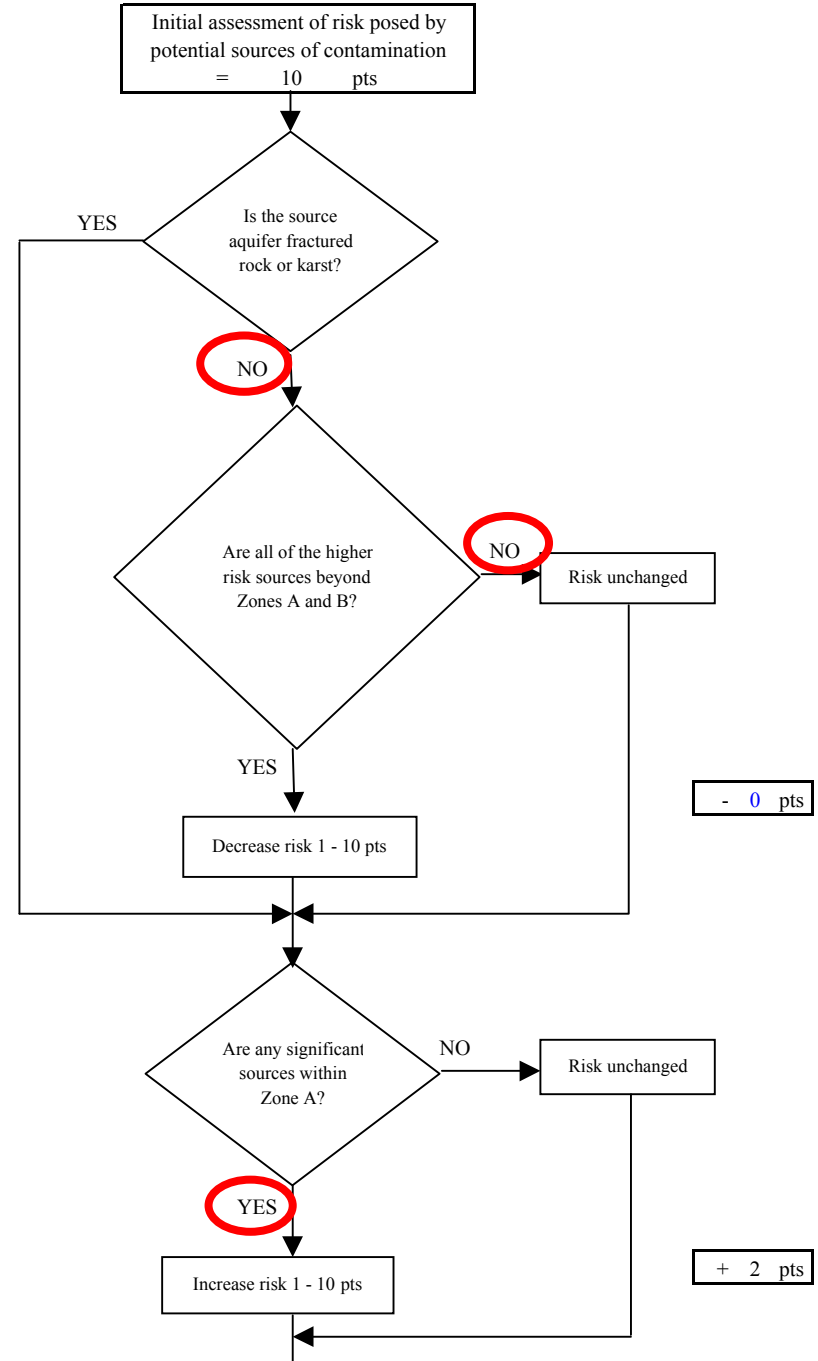
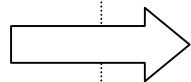


Chart 11. Contaminant risks for Greenbrook Subdivision - Synthetic Organic Chemicals

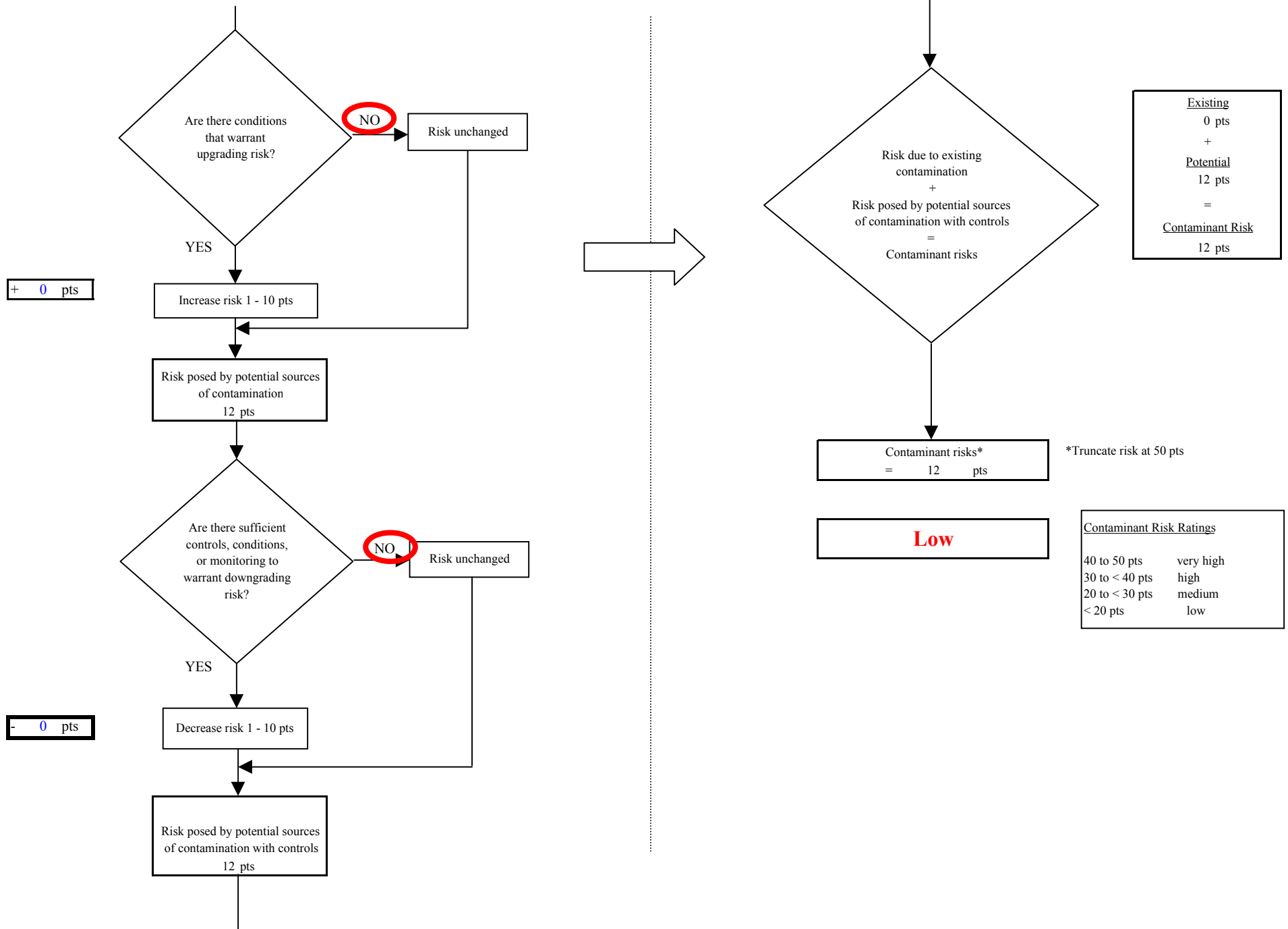


Chart 12. Vulnerability analysis for Greenbrook Subdivision - Synthetic Organic Chemicals

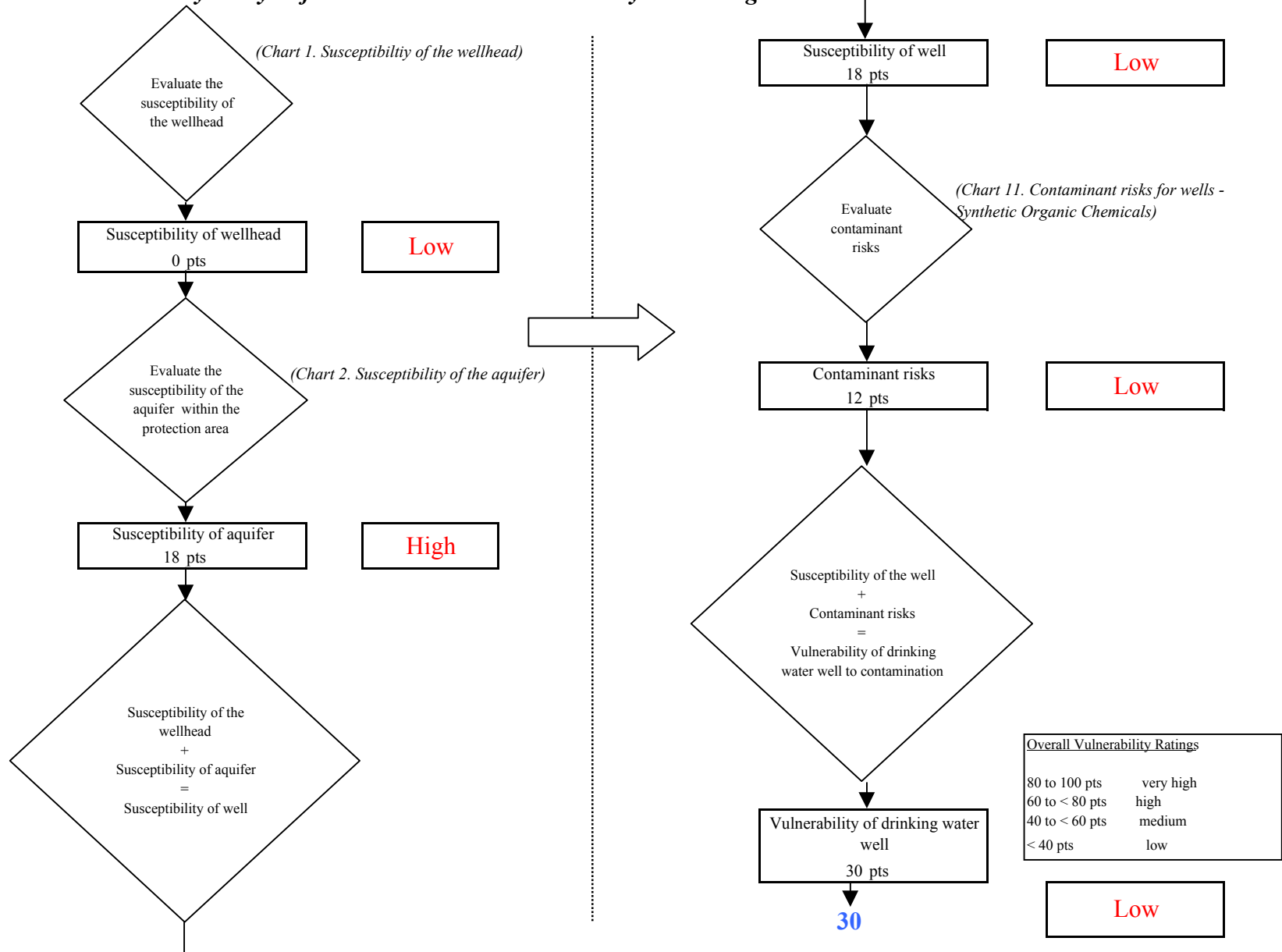


Chart 13. Contaminant risks for Greenbrook Subdivision - Other Organic Chemicals

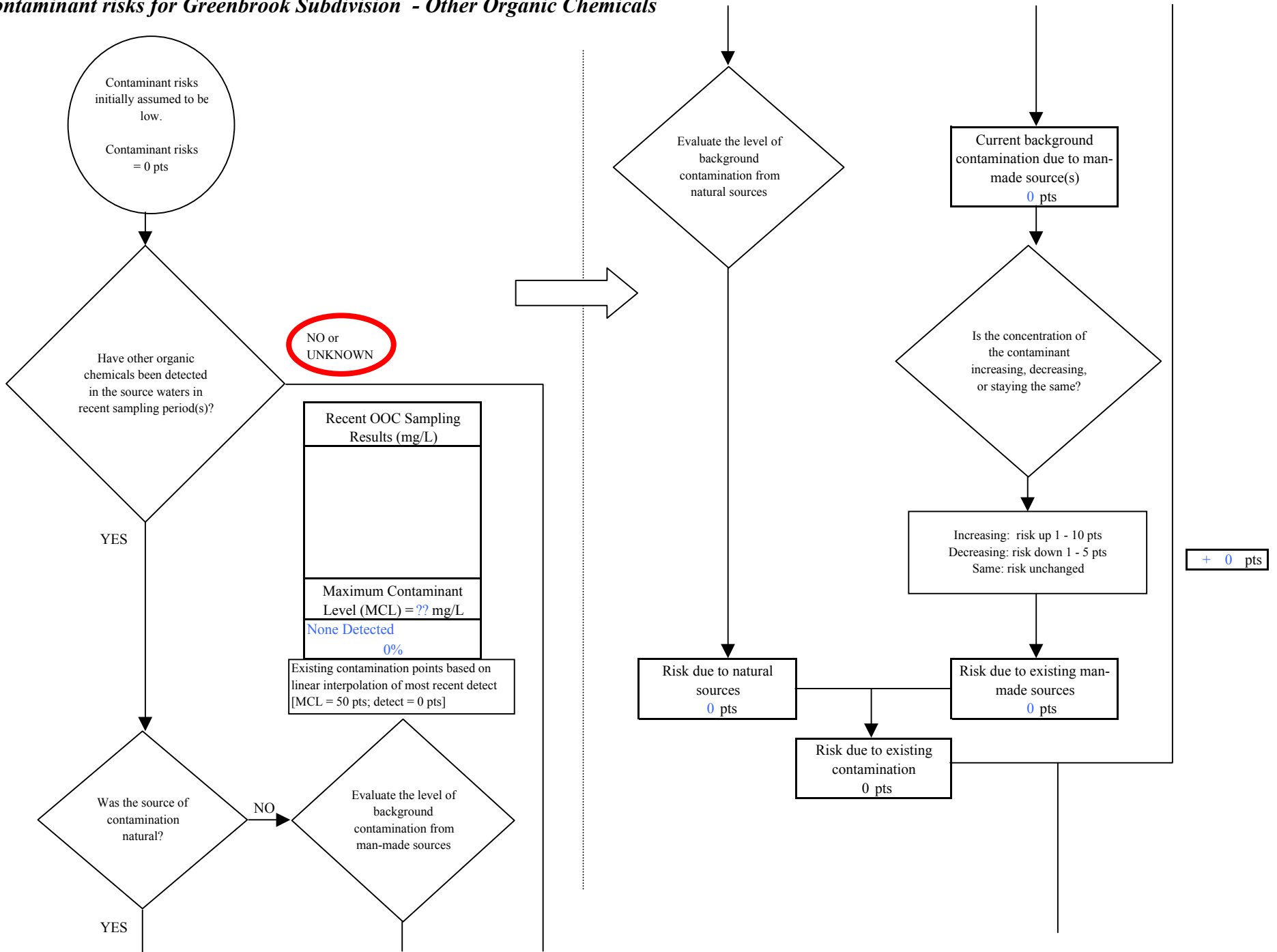
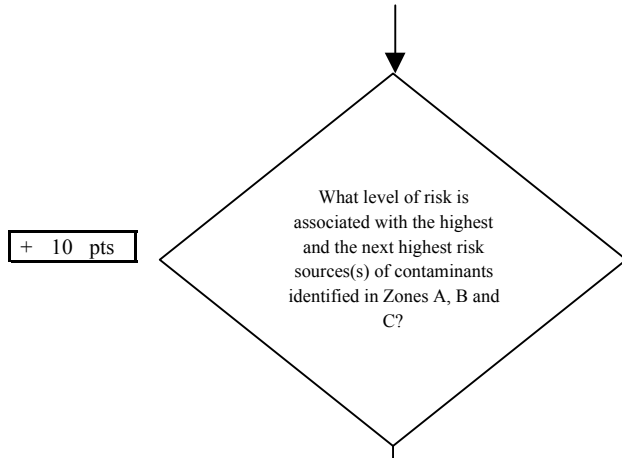


Chart 13. Contaminant risks for Greenbrook Subdivision - Other Organic Chemicals



Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	3	4	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.

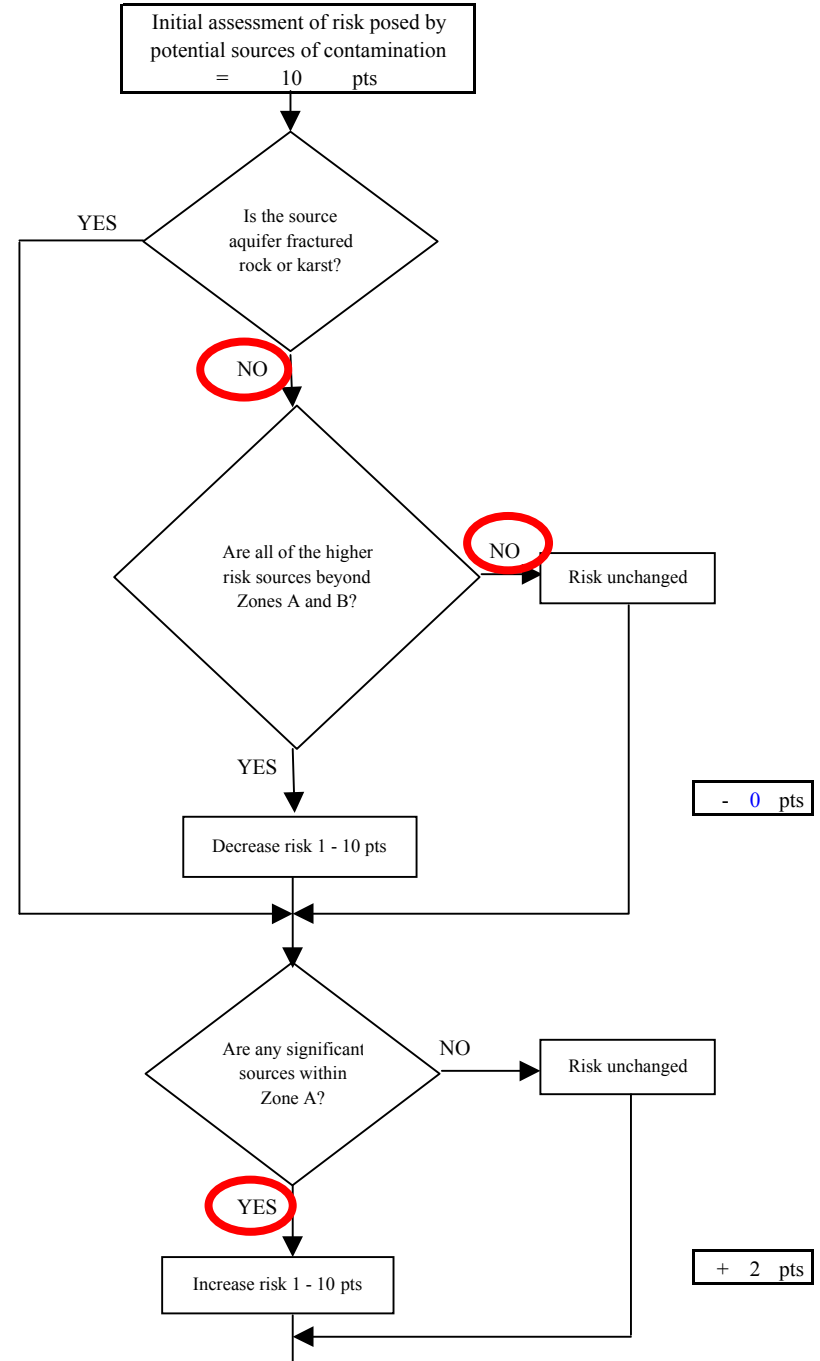
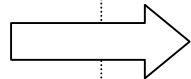


Chart 13. Contaminant risks for Greenbrook Subdivision - Other Organic Chemicals

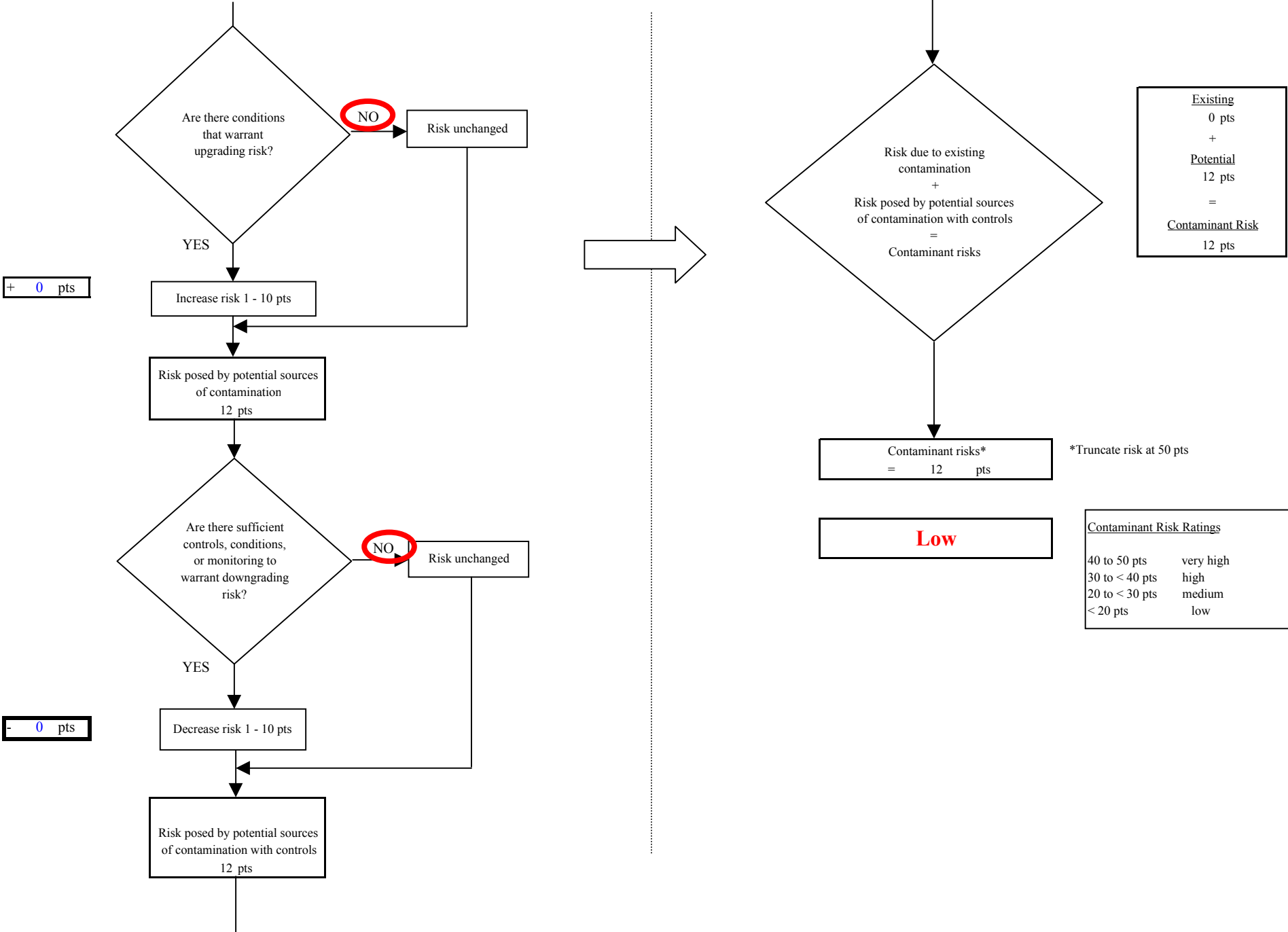


Chart 14. Vulnerability analysis for Greenbrook Subdivision - Other Organic Chemicals

