Hydrogeologic Susceptibility and Vulnerability Assessment for Municipality of Anchorage Drinking Water Well #10, Anchorage, Alaska

DRINKING WATER PROTECTION PROGRAM REPORT 15

June 2001

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By MICHAEL J. CROTTEAU

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ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION: 2001

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Hydrogeologic Susceptibility and Vulnerability Assessment for Municipality of Anchorage (MOA) Well #10 Public Drinking Water Source, Anchorage, Alaska

By Michael J. Crotteau

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Municipality of Anchorage (MOA) Well #10 is a Class A (community) drinking water source consisting of one well. Identified potential and current sources of contaminants for MOA Well #10 include: residential septic systems, gravel roads, a public utility corridor containing two natural gas pipelines, and approximately 200 acres of residential area. 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 synthetic organic chemicals. Overall, MOA Well #10 public water source received a vulnerability rating of **Low** for bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other synthetic organic chemicals.

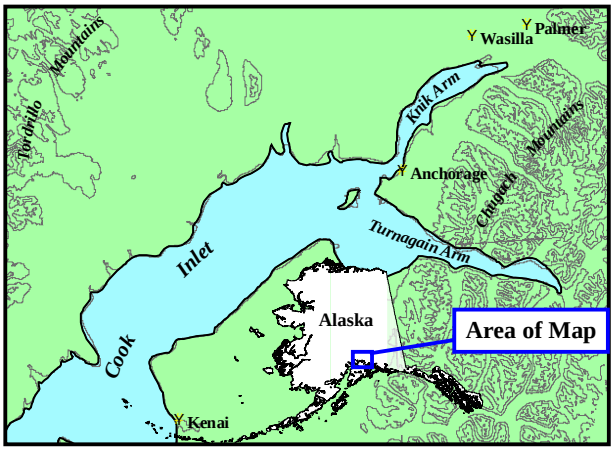

Figure 1. Index map showing the location of Anchorage, Alaska

INTRODUCTION

The purpose of this environmental assessment is to provide public water system owners/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 MOA Well #10 source of public drinking water. This source 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.

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 3700 feet in elevation above sea level.

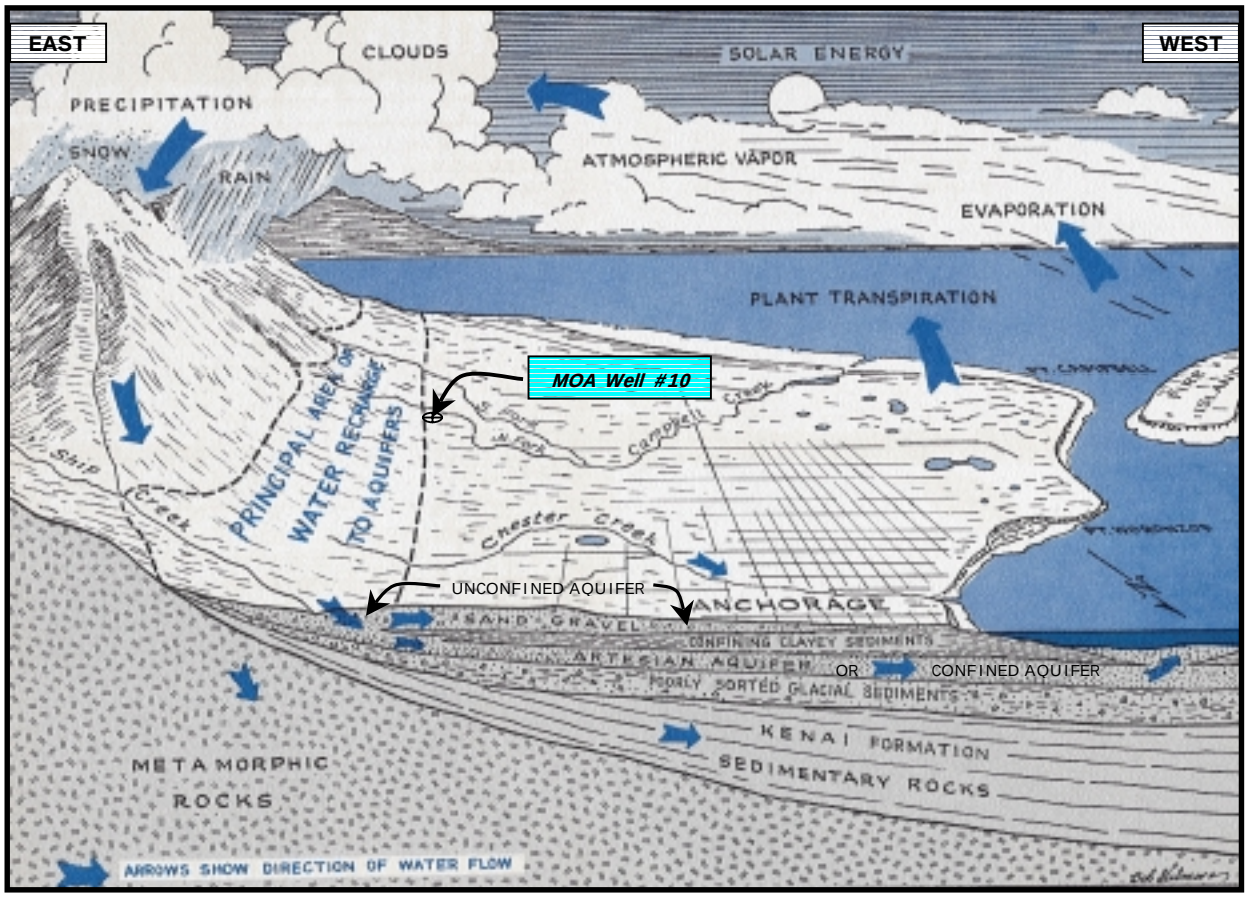

Figure 2. Generalized hydrologic cycle in the Anchorage-area [*Barnwell, George, Dearborn,Weeks, and Zenone,* 1972].

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 mounts of precipitation typified by gulf coast regions. Mean annual precipitation at the Anchorage International Airport is approximately 16 inches per year. On the average, Anchorage receives a total snow accumulation of 69 inches per year. Precipitation generally increased 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 the Knik and Turnagain Arms to well over 5000 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, 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.

MOA WELL #10 PUBLIC WATER SOURCE

MOA Well #10 public water source is a Class A (community) water source, which is owned by and operated by the Municipality of Anchorage – Anchorage Water & Wastewater Utility (AWWU). The source consists of one well near the base of the Chugach Mountains and is at an elevation of 420 feet above sea level. The well is located approximately 4200 feet southeast of where Muldoon Road turns into Tudor Road and 900 feet north of the North Fork of Campbell Creek (see Figure 2). According to the well log, MOA Well #10 does not appear to be grouted and penetrates clayey sandy gravel, sandy gravel, hard silty sandy gravel, gravelly clay and clay to a total depth of 95 feet below land surface. The well is screened from 73 to 91 feet below land surface and had a static water level of 42 feet below land surface at the time of drilling (2/16/71).

The water from MOA Well #10 is pumped directly into the distribution system for the Anchorage area. This water source operates year round. AWWU's drinking water sources collectively serve approximately 212,000 residents and non-residents through multiple service connections. More information on AWWU can be obtained from their website at http://www.awwu.ci.anchorage.ak.us/website/default.htm.

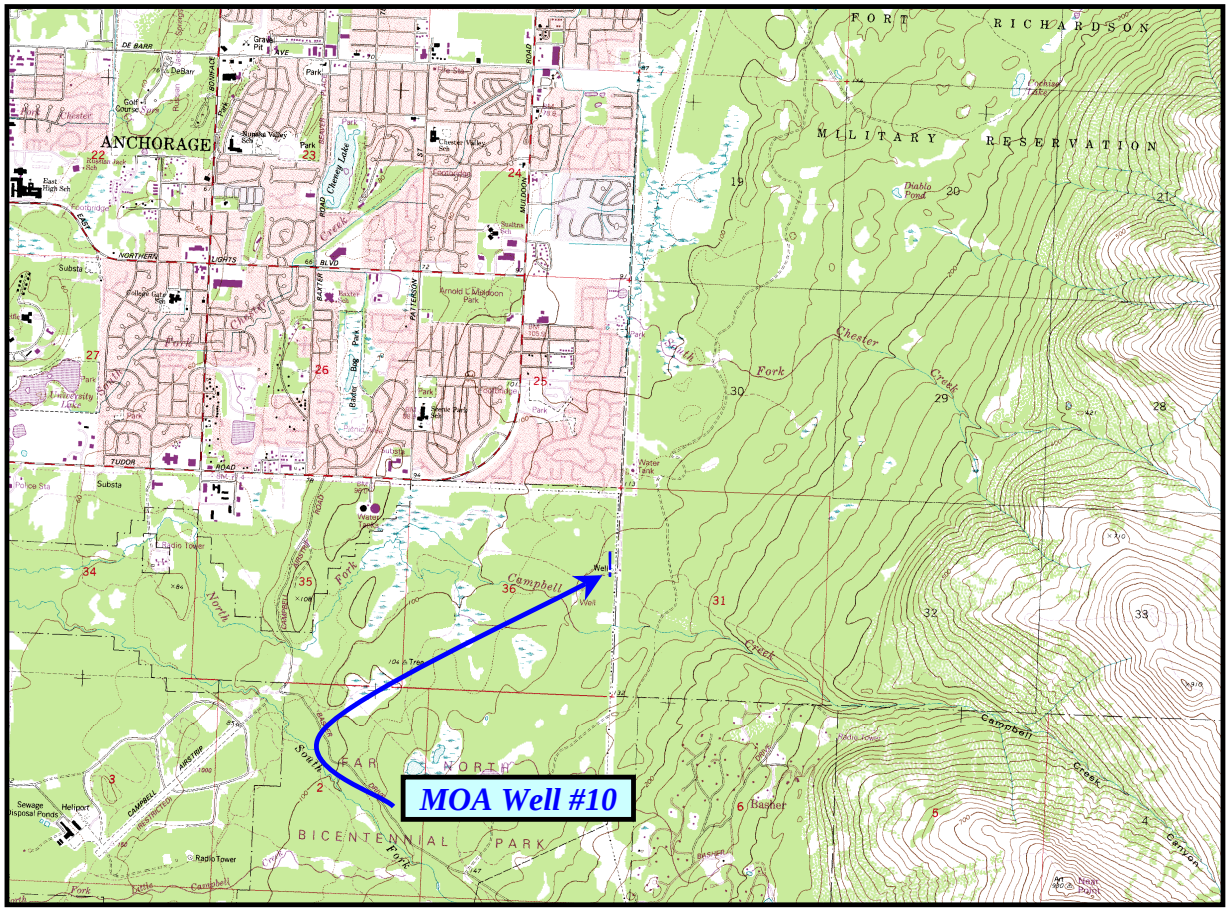

Figure 3. Map showing the location of the drinking water sources for MOA Well #10 [Base: USGS Anchorage A8 NE].

ASSESSMENT AND PROTECTION AREA FOR MOA WELL #10 DRINKING WATER SOURCE

The Drinking Water Protection and Assessment Area that has been established for MOA Well #10 is the area that is most sensitive to contamination. This area has served as a basis for assessing the risk of the drinking water source to contamination. This zone around the drinking water source is the most critical area for the preservation of the quality of the drinking water for this source. For simplicity, this area will be known as your Drinking Water Protection Area and will serve as the area of 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 calculate 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 MOA Well #10. Additional methods were further employed to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful and conservative protection area 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 Areas for MOA Well #10 contain two zones, Zone A and Zone B (See Map 1 in Appendix B). Zone A corresponds to the area between the well 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 well may be on the order of several days to several hours. Zone A also extends downgradient from the well to take into account the area of the aquifer that is influenced by pumping of the well.

The Zone B protection area for MOA Well #10 corresponds to a time-of-travel of less than two years and extends to the top of the watershed divide for the North Fork of Campbell Creek.

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within MOA Well #10 Drinking Water Protection Area. This survey was completed through a search of agency records and other publicly available information, and verified by AWWU.

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; and
- Other synthetic organic chemicals.

Maps 2 through Map 4 in Appendix C depict the Contaminant Source Inventory for MOA Well #10. Inventoried potential sources of contamination within Zones A through Zone B were associated with residential and light industrial type activities (see Table 1 in Appendix A). Below is a summary of the contaminant sources inventoried within the MOA Well #10 protection area:

- residential septic systems;
- approximately 200 acres of residential area;
- activities associated with gravel roads; and
- a public utility corridor.

These potential contaminant sources present risk for all six categories of drinking water contaminants for MOA Well #10 drinking water source.

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 well.

VULNERABILITY OF MOA WELL #10 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 has been analyzed and an overall vulnerability score of 0 to 100 is ultimately assigned:

Natural Susceptibility (0 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

Vulnerability of the
Drinking Water Source to Contamination (0 – 100).

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

Susceptibility of the Wellhead (0 – 25 Points)
+
Susceptibility of the Aquifer (0 – 25 Points)

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

MOA Well #10 is completed in a confined or semi-confined aquifer setting. The well penetrates mostly silty and clayey gravel as well as thirteen feet of clay. This clay layer, encountered at 45 feet below land surface, may provide somewhat of a protective barrier for 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. The well does not appear to be properly grouted as indicated previously from information obtained from Department records. The absence of grouting can promote the transport of contaminants along the well casing.

Combining the susceptibility of the wellhead and the aquifer to contamination leads to a score (0 – 50 points) and rating of overall Susceptibility (See Appendix D). Table 1 shows the overall Susceptibility score and rating for MOA Well #10.

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

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	11	Medium
Natural Susceptibility	16	Low

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. Approximately 200 acres of residential area, 85 identified residential septic systems, a public utility corridor, and gravel roads and right-of-ways contribute the highest risk for potential contamination to the MOA's Well #10 source of public drinking water.

A score (0 – 50 points) and rating of Contaminant Risks (See Appendix D) is assigned based on the findings of the Contaminant Source Inventory (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

Contaminant Risks	Score	Rating
Bacteria and Viruses	20	Medium
Nitrates and/or Nitrites	23	Medium
Volatile Organic Chemicals	11	Low
Heavy Metals, Cyanide, and other Inorganic Chemicals	10	Low
Synthetic Organic Chemicals	10	Low
Other Synthetic Organic Chemicals	10	Low

Appendix D contains fourteen charts, which together form the 'Vulnerability Analysis' for a source water assessment for a public drinking water source. Chart 1 analyzes the 'Susceptibility of the Wellhead' to contamination by looking at the construction of the well and its surrounding area. Chart 2 analyzes the' Susceptibility of the Aquifer' to contamination by looking at the naturally occurring attributes of the water source and influences on the groundwater system that might lead to contamination. Chart 3 analyzes 'Contaminant Risks' for the drinking water source with respect to bacteria and viruses. The 'Contaminant Risks' portion of the analysis considers potential sources of contaminants as well as a review of contamination that has or may have occurred but has not arrived or been detected at the well. Lastly, Chart 4 contains the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 14 contain the Contaminant Risks and Vulnerability Analysis for nitrates and nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other synthetic organic chemicals, respectively.

Vulnerability of the drinking water source 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 MOA Well #10 Public Drinking Water Source to Contamination by Category

Category	Score	Rating
Bacteria and Viruses	35	Low
Nitrates and Nitrites	35	Low
Volatile Organic Chemicals	25	Low
Heavy Metals, Cyanide, and other Inorganic Chemicals	25	Low
Synthetic Organic Chemicals	25	Low
Other Synthetic Organic Chemicals	25	Low

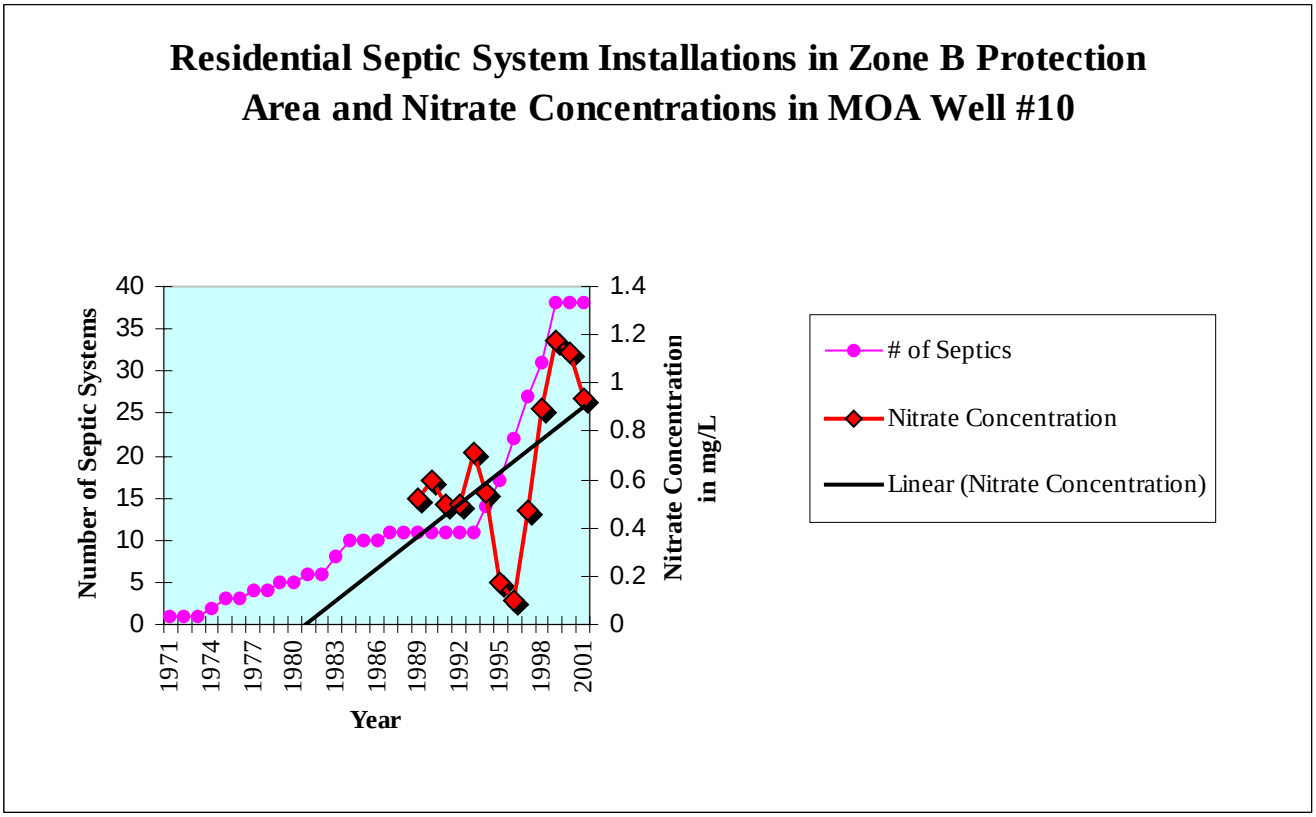

Figure 4. Residential septic system installations in MOA Well #10 Zone B Protection Area and Nitrate Concentration.

Tables 2 through 7 in Appendix A contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals, heavy metals, synthetic organic chemicals, and other synthetic organic chemicals.

The high concentration of residential septic systems in Zone B is the driving factor in determining contaminant risks for all categories of contaminants except other synthetic organic chemicals (See "Overall Rank after Analysis" in Table 2 – 7 of Appendix A).

Nitrates and/or nitrites are found in natural background concentrations at the site, as elsewhere in the Alaska. Sampling history of MOA Well #10 source waters indicate low concentrations of nitrate (See Chart 6 – Contaminant Risks for Nitrates/Nitrites in Appendix D). Existing nitrate contamination is approximately 9% of the allowable limit (MCL) for this contaminant. The Maximum Contaminant Level or 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 in soil, moving at approximately the same rate as water. Since 1996, nitrate levels in MOA Well #10 have seen a notable increase (2 - 10 fold). It is unknown whether existing contamination is naturally occurring or human influenced. This increase may be due to the increase in residential septic systems within the Zone B Protection Area. Installation of septic systems in the Zone B Protection Area began in the early 1970's. However, the number of septic system installations began to increase rapidly in 1994 and reached a maximum in 1999. Figure 4 depicts a possible correlation between residential septic system installations in the Zone B Protection Area and nitrate concentration in MOA Well #10. Nevertheless, the current nitrate concentration in MOA Well #10 remains at safe levels with respect to human health.

Overall, contaminant risks for the nitrate/nitrite category is medium with the residential septic systems driving the score. Combining this potential nitrates and/or nitrites contamination risk with the susceptibility of the well yields an overall vulnerability to contamination of medium for this source of public drinking water.

Two natural gas pipelines traverse the Zone A Protection Area within 300 feet of MOA Well #10. Natural gas does not pose a contaminant threat to drinking water supplies. However, this area is an active public utility corridor. This utility corridor, though not heavily used, represents a very low contamination risk from volatile organic chemicals due to activities along the corridor. Overall, this corridor ranks as a low potential source of contamination due to its proximity to MOA Well #10. However, one pipeline owner reserves the right to pump other products such as diesel fuel on an as needed basis. Therefore, depending on the product being transported in the pipelines along this corridor, the contaminant risks may significantly increase within a category (e.g. volatile organic chemicals).

SUMMARY

A *Source Water Assessment* has been completed for the MOA Well #10 source of public drinking water. The overall vulnerability of this source to contamination is **Low** for bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other synthetic organic chemicals. This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of the Anchorage Water & Wastewater Utility 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.

REFERENCES CITED

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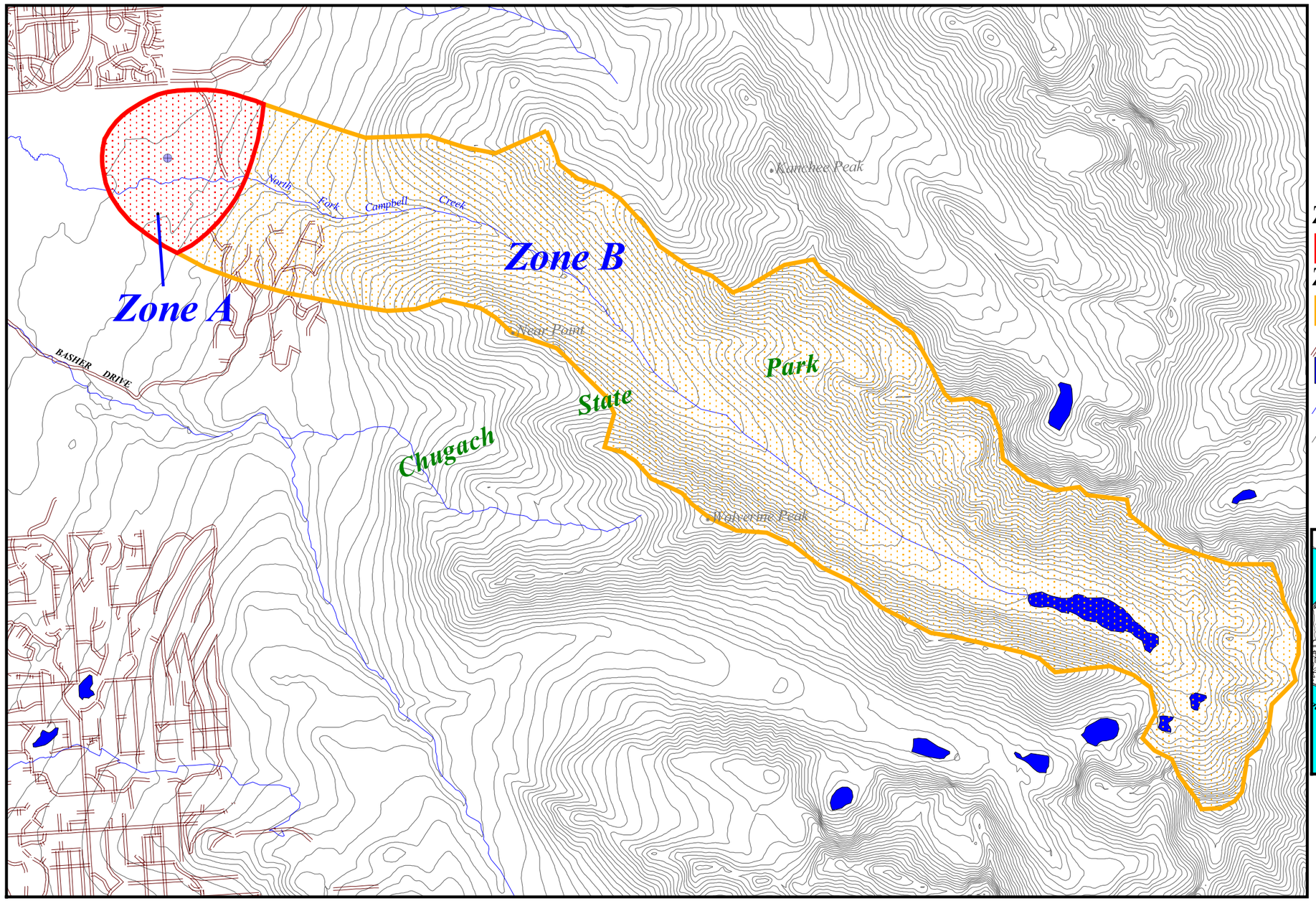
Western Regional Climate Center, 2000, August 24, Web extension to the *Western Regional Climate Center* [WWW document]. URL http://www.wrcc.dri.edu/index.html

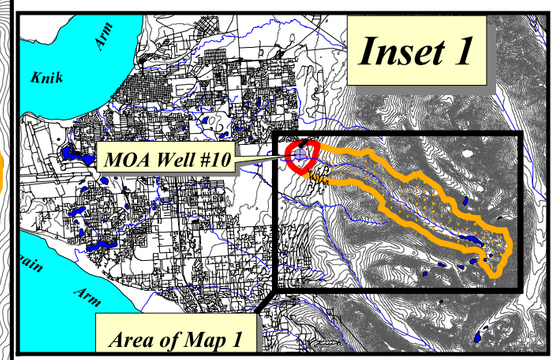
APPENDIX A

MOA Well #10
Drinking Water Protection Area

Drinking Water Protection Area for MOA Well #10



MOA Well #10
Zone A Protection Area
Several Months Travel Time
Zone B Protection Area
Less Than 2-Years Travel Time
Roads
Lakes
Streams
Elevation Contours



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PWSID 210906.023

Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for MOA Well #10

Table 1

Contaminant Source Inventory for MOA Well #10

PWSID 210906.023

Contaminant Source Category	Contaminant Source ID	CS ID tag	Zone	Location	Map	Comments
Public utility easements/corridors	X42	X42-1	A	North-south along USGS map Sections 25 and 30	2	Two natural gas pipelines along cooridor
Lawns and gardens	R1	R1-1	B	Northern portion of Stuckagain Heights Subdivision	2	
Septic systems (serves one or more single-family homes)	R2	R2-1	B	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	B	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	B	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	B	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	COPPER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	FARPOINT DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-21	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	BASHER DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-44	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-55	B	BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-62	B	NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-66	B	KALMIA DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-67	B	KEW CT	3	
Septic systems (serves one or more single-family homes)	R2	R2-68	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-69	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-70	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-71	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-72	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-73	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-74	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-75	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-76	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-77	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-78	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-79	B	KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-80	B	NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-81	B	NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-82	B	CANTINE CIR	3	
Septic systems (serves one or more single-family homes)	R2	R2-83	B	MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-84	B	MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-85	B	MIDDLEROCK DR	3	
Highways and roads, dirt/gravel	X24	X24-1	B	ATELLER DR	4	
Highways and roads, dirt/gravel	X24	X24-2	B	COPPER DR	4	
Highways and roads, dirt/gravel	X24	X24-3	B	TUNDRA LOOP DR	4	
Highways and roads, dirt/gravel	X24	X24-4	B	MAXMILLIAN DR	4	
Highways and roads, dirt/gravel	X24	X24-5	B	CHENEGA DR	4	
Highways and roads, dirt/gravel	X24	X24-6	B	FARPOINT DR	4	
Highways and roads, dirt/gravel	X24	X24-7	B	BASHER DR	4	

Highways and roads, dirt/gravel	X24	X24-8	B	KEW CT	4	
Highways and roads, dirt/gravel	X24	X24-9	B	KALMIA DR	4	
Highways and roads, dirt/gravel	X24	X24-10	B	BURNING BUSH DR	4	
Highways and roads, dirt/gravel	X24	X24-11	B	NEARPOINT DR	4	

Table 2

Potential and Existing Sources of Contamination for MOA Well #10 Bacteria and Viruses

PWSID 210906.023

Contaminant Source Category	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map	Comments
Lawns and gardens	R1	R1-1	B	Low	1	Northern portion of Stuckagain Heights Subdivision	2	
Septic systems (serves one or more single-family homes)	R2	R2-1	B	Very Low	2	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	B	Very Low	3	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	B	Very Low	4	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	B	Very Low	5	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Very Low	6	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Very Low	7	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Very Low	8	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Very Low	9	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Very Low	10	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Very Low	11	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low	12	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low	13	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low	14	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low	15	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low	16	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low	17	COPPER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low	18	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low	19	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low	20	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		FARPOINT DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		BASHER DR	3	

Potential and Existing Sources of Contamination for MOA Well #10 Bacteria and Viruses

Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-55	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-62	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-66	B	Very Low		KALMIA DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		KEW CT	3	
Septic systems (serves one or more single-family homes)	R2	R2-68	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-69	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-70	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-71	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-72	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-73	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-74	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-75	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-76	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-77	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-78	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-79	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-80	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-81	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-82	B	Very Low		CANTINE CIR	3	
Septic systems (serves one or more single-family homes)	R2	R2-83	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-84	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-85	B	Very Low		MIDDLEROCK DR	3	
Highways and roads, dirt/gravel	X24	X24-1	B	Very Low		ATELLER DR	4	
Highways and roads, dirt/gravel	X24	X24-2	B	Very Low		COPPER DR	4	
Highways and roads, dirt/gravel	X24	X24-3	B	Very Low		TUNDRA LOOP DR	4	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low		MAXMILLIAN DR	4	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low		CHENEGA DR	4	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low		FARPOINT DR	4	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low		BASHER DR	4	

Potential and Existing Sources of Contamination for MOA Well #10 Bacteria and Viruses

Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		KEW CT	4	
Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		KALMIA DR	4	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		BURNING BUSH DR	4	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		NEARPOINT DR	4	

Table 3

Potential and Existing Sources of Contamination for MOA Well #10 Nitrates and Nitrites

PWSID 210906.023

Contaminant Source Category	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map	Comments
Lawns and gardens	R1	R1-1	B	Low	1	Northern portion of Stuckagain Heights Subdivision	2	
Septic systems (serves one or more single-family homes)	R2	R2-1	B	Very Low	2	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	B	Very Low	3	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	B	Very Low	4	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	B	Very Low	5	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Very Low	6	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Very Low	7	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Very Low	8	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Very Low	9	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Very Low	10	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Very Low	11	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low	12	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low	13	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low	14	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low	15	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low	16	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low	17	COPPER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low	18	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low	19	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low	20	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		FARPOINT DR	3	

Potential and Existing Sources of Contamination for MOA Well #10 Nitrates and Nitrites

Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		BASHER DR	3	

Potential and Existing Sources of Contamination for MOA Well #10 Nitrates and Nitrites

Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-55	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-62	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-66	B	Very Low		KALMIA DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		KEW CT	3	
Septic systems (serves one or more single-family homes)	R2	R2-68	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-69	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-70	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-71	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-72	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-73	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-74	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-75	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-76	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-77	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-78	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-79	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-80	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-81	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-82	B	Very Low		CANTINE CIR	3	
Septic systems (serves one or more single-family homes)	R2	R2-83	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-84	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-85	B	Very Low		MIDDLEROCK DR	3	
Highways and roads, dirt/gravel	X24	X24-1	B	Very Low		ATELLER DR	4	
Highways and roads, dirt/gravel	X24	X24-2	B	Very Low		COPPER DR	4	
Highways and roads, dirt/gravel	X24	X24-3	B	Very Low		TUNDRA LOOP DR	4	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low		MAXMILLIAN DR	4	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low		CHENEGA DR	4	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low		FARPOINT DR	4	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low		BASHER DR	4	

Potential and Existing Sources of Contamination for MOA Well #10 Nitrates and Nitrites

Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		KEW CT	4	
Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		KALMIA DR	4	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		BURNING BUSH DR	4	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		NEARPOINT DR	4	

Table 4

Potential and Existing Sources of Contamination for MOA Well #10 Volatile Organic Chemicals (VOCs)

PWSID 210906.023

Contaminant Source Category	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map	Comments
Lawns and gardens	R1	R1-1	B	Low	1	Northern portion of Stuckagain Heights Subdivision	2	
Public utility easements/corridors	X42	X42-1	A	Low	2	North-south along USGS map Sections 25 and 30	2	Two natural gas pipelines along cooridor
Septic systems (serves one or more single-family homes)	R2	R2-1	B	Very Low	3	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	B	Very Low	4	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	B	Very Low	5	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	B	Very Low	6	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Very Low	7	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Very Low	8	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Very Low	9	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Very Low	10	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Very Low	11	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Very Low	12	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low	13	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low	14	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low	15	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low	16	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low	17	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low	18	COPPER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low	19	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low	20	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low		MAXMILLIAN DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		BASHER DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-55	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-62	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		KALMIA DR	3	

Septic systems (serves one or more single-family homes)	R2	R2-66	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		KEW CT	3	
Septic systems (serves one or more single-family homes)	R2	R2-68	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-69	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-70	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-71	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-72	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-73	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-74	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-75	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-76	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-77	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-78	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-79	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-80	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-81	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-82	B	Very Low		CANTINE CIR	3	
Septic systems (serves one or more single-family homes)	R2	R2-83	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-84	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-85	B	Very Low		MIDDLEROCK DR	3	
Highways and roads, dirt/gravel	X24	X24-1	B	Very Low		ATELLER DR	4	
Highways and roads, dirt/gravel	X24	X24-2	B	Very Low		COPPER DR	4	
Highways and roads, dirt/gravel	X24	X24-3	B	Very Low		TUNDRA LOOP DR	4	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low		MAXMILLIAN DR	4	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low		CHENEGA DR	4	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low		FARPOINT DR	4	

Potential and Existing Sources of Contamination for MOA Well #10 Volatile Organic Chemicals (VOCs)

Highways and roads, dirt/gravel	X24	X24-7	B	Very Low		BASHER DR	4	
Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		KEW CT	4	
Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		KALMIA DR	4	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		BURNING BUSH DR	4	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		NEARPOINT DR	4	

Table 5

Contaminant Source Inventory for MOA Well #10 Heavy Metals, Cyanide, and other Inorganic Chemicals

PWSID 210906.023

Contaminant Source Category	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map	Comments
Lawns and gardens	R1	R1-1	B	Low	1	Northern portion of Stuckagain Heights Subdivision	2	
Septic systems (serves one or more single-family homes)	R2	R2-1	B	Very Low	2	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	B	Very Low	3	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	B	Very Low	4	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	B	Very Low	5	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Very Low	6	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Very Low	7	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Very Low	8	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Very Low	9	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Very Low	10	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Very Low	11	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low	12	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low	13	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low	14	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low	15	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low	16	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low	17	COPPER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low	18	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low	19	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low	20	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		FARPOINT DR	3	

Contaminant Source Inventory for MOA Well #10 Heavy Metals, Cyanide, and other Inorganic Chemicals

Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		BASHER DR	3	

Contaminant Source Inventory for MOA Well #10 Heavy Metals, Cyanide, and other Inorganic Chemicals

Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-55	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-62	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-66	B	Very Low		KALMIA DR	3	

Contaminant Source Inventory for MOA Well #10 Heavy Metals, Cyanide, and other Inorganic Chemicals

Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		KEW CT	3	
Septic systems (serves one or more single-family homes)	R2	R2-68	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-69	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-70	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-71	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-72	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-73	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-74	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-75	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-76	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-77	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-78	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-79	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-80	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-81	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-82	B	Very Low		CANTINE CIR	3	
Septic systems (serves one or more single-family homes)	R2	R2-83	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-84	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-85	B	Very Low		MIDDLEROCK DR	3	
Highways and roads, dirt/gravel	X24	X24-1	B	Very Low		ATELLER DR	4	
Highways and roads, dirt/gravel	X24	X24-2	B	Very Low		COPPER DR	4	
Highways and roads, dirt/gravel	X24	X24-3	B	Very Low		TUNDRA LOOP DR	4	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low		MAXMILLIAN DR	4	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low		CHENEGA DR	4	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low		FARPOINT DR	4	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low		BASHER DR	4	

Contaminant Source Inventory for MOA Well #10 Heavy Metals, Cyanide, and other Inorganic Chemicals

Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		KEW CT	4	
Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		KALMIA DR	4	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		BURNING BUSH DR	4	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		NEARPOINT DR	4	

Table 6

Contaminant Source Inventory for MOA Well #10 Synthetic Organic Chemicals (SOCs)

PWSID 210906.023

Contaminant Source Category	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map	Comments
Lawns and gardens	R1	R1-1	B	Low	1	Northern portion of Stuckagain Heights Subdivision	2	
Septic systems (serves one or more single-family homes)	R2	R2-1	B	Very Low	2	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	B	Very Low	3	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	B	Very Low	4	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	B	Very Low	5	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Very Low	6	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Very Low	7	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Very Low	8	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Very Low	9	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Very Low	10	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Very Low	11	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low	12	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low	13	FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low	14	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low	15	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low	16	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low	17	COPPER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low	18	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low	19	CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low	20	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		FARPOINT DR	3	

Contaminant Source Inventory for MOA Well #10 Synthetic Organic Chemicals (SOCs)

Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		BASHER DR	3	

Contaminant Source Inventory for MOA Well #10 Synthetic Organic Chemicals (SOCs)

Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-55	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-62	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-66	B	Very Low		KALMIA DR	3	

Contaminant Source Inventory for MOA Well #10 Synthetic Organic Chemicals (SOCs)

Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		KEW CT	3	
Septic systems (serves one or more single-family homes)	R2	R2-68	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-69	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-70	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-71	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-72	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-73	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-74	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-75	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-76	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-77	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-78	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-79	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-80	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-81	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-82	B	Very Low		CANTINE CIR	3	
Septic systems (serves one or more single-family homes)	R2	R2-83	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-84	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-85	B	Very Low		MIDDLEROCK DR	3	

Table 7

Contaminant Source Inventory for MOA Well #10 Other Synthetic Organic Chemicals (OOCs)

PWSID 210906.023

Contaminant Source Category	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Overall Rank after Analysis	Location	Map	Comments
Highways and roads, dirt/gravel	X24	X24-1	B	Very Low	1	ATELLER DR	4	
Highways and roads, dirt/gravel	X24	X24-2	B	Very Low	2	COPPER DR	4	
Highways and roads, dirt/gravel	X24	X24-3	B	Very Low	3	TUNDRA LOOP DR	4	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low	4	MAXMILLIAN DR	4	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low	5	CHENEGA DR	4	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low	6	FARPOINT DR	4	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low	7	BASHER DR	4	
Highways and roads, dirt/gravel	X24	X24-8	B	Very Low	8	KEW CT	4	
Highways and roads, dirt/gravel	X24	X24-9	B	Very Low	9	KALMIA DR	4	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low	10	BURNING BUSH DR	4	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low	11	NEARPOINT DR	4	
Lawns and gardens	R1	R1-1	B	Very Low	12	Northern portion of Stuckagain Heights Subdivision	2	
Septic systems (serves one or more single-family homes)	R2	R2-1	B	Very Low	13	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	B	Very Low	14	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	B	Very Low	15	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	B	Very Low	16	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Very Low	17	ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Very Low	18	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Very Low	19	TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low	20	MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Very Low		ATELLER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Very Low		MAXMILLIAN DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low		TUNDRA LOOP DR	3	

Contaminant Source Inventory for MOA Well #10 Other Synthetic Organic Chemicals (OOCs)

Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low		TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low		TUNDRA LOOP DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low		COPPER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		CHENEGA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		FARPOINT DR	3	

Contaminant Source Inventory for MOA Well #10 Other Synthetic Organic Chemicals (OOCs)

Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		FARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-55	B	Very Low		BASHER DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		BURNING BUSH DR	3	

Contaminant Source Inventory for MOA Well #10 Other Synthetic Organic Chemicals (OOCs)

Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		BURNING BUSH DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-62	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-66	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		KEW CT	3	
Septic systems (serves one or more single-family homes)	R2	R2-68	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-69	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-70	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-71	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-72	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-73	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-74	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-75	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-76	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-77	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-78	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-79	B	Very Low		KALMIA DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-80	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-81	B	Very Low		NEARPOINT DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-82	B	Very Low		CANTINE CIR	3	
Septic systems (serves one or more single-family homes)	R2	R2-83	B	Very Low		MIDDLEROCK DR	3	

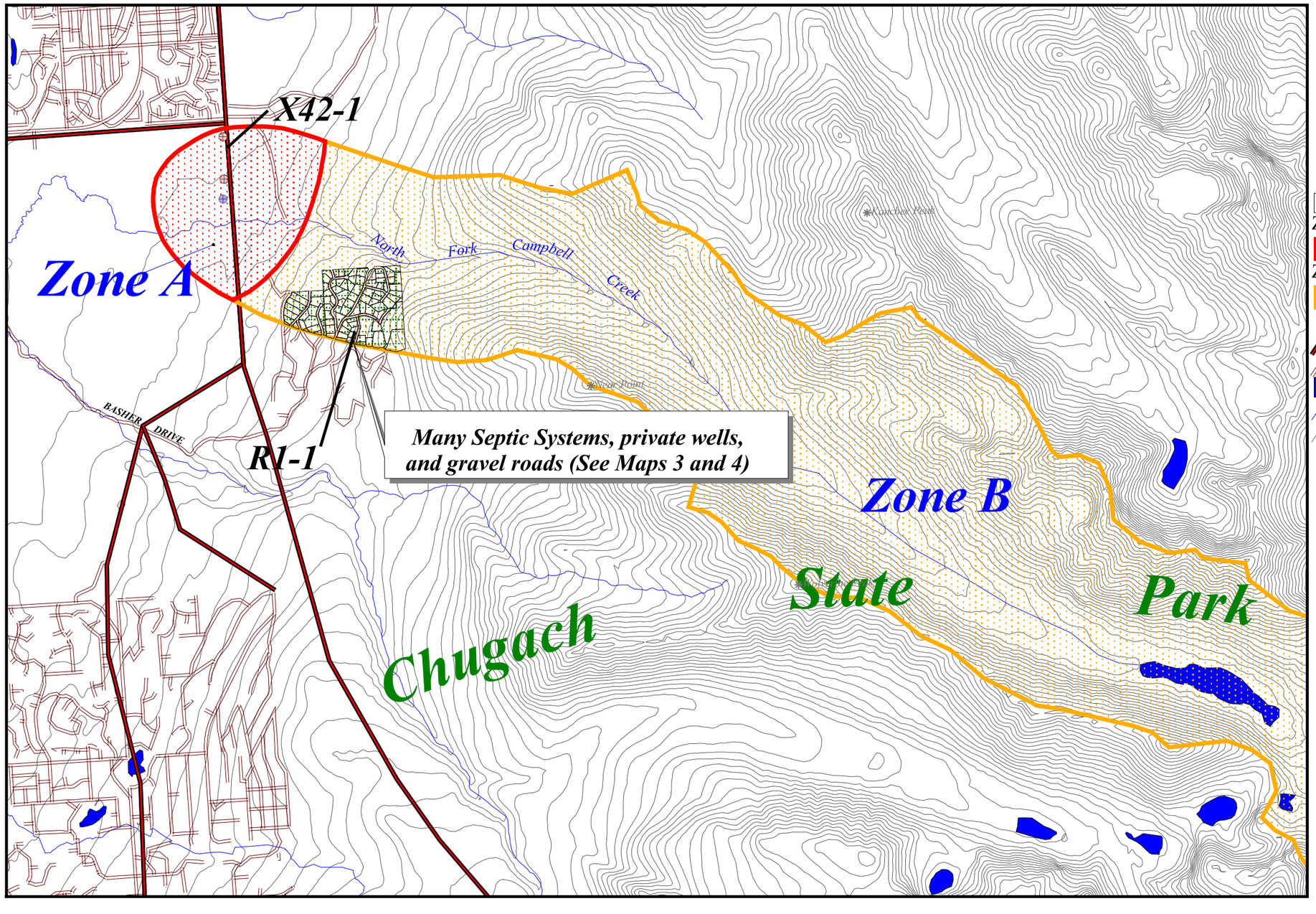
Contaminant Source Inventory for MOA Well #10 Other Synthetic Organic Chemicals (OOCs)

Septic systems (serves one or more single-family homes)	R2	R2-84	B	Very Low		MIDDLEROCK DR	3	
Septic systems (serves one or more single-family homes)	R2	R2-85	B	Very Low		MIDDLEROCK DR	3	

APPENDIX C

MOA Well #10
Drinking Water Protection Area
and Potential & Existing Contaminant Sources

Drinking Water Protection Area for MOA Well #10 and Potential & Existing Sources of Contamination



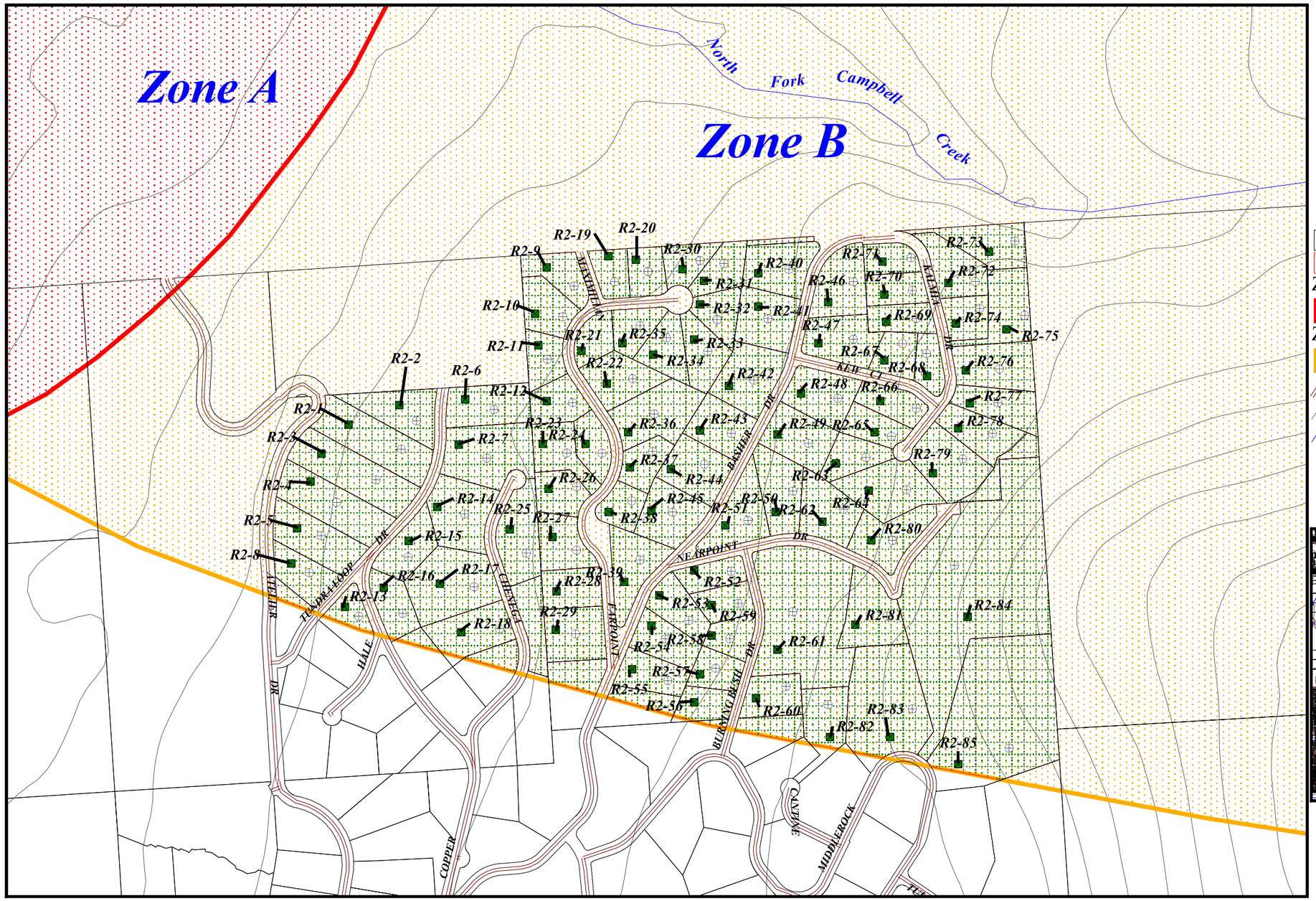
MOA Well #10
Lawns and Gardens (R1)
Zone A Protection Area
Several Months Travel Time
Zone B Protection Area
Less Than 2-Years Travel Time
Public & Private Drinking Water Wells
Pipelines - Public Utility Cooridor (X42)
Roads
Lakes
Streams
Elevation Contours

N
W
E
S

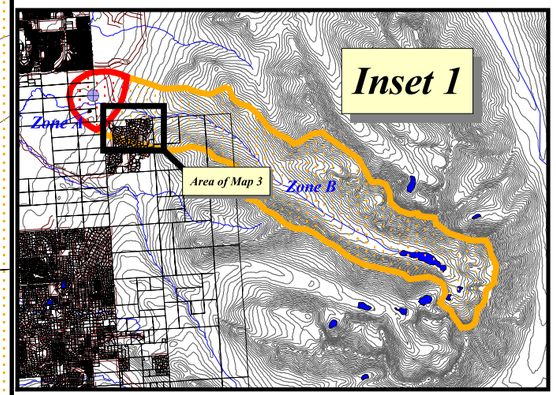
PWSID 210906.023

Map 2

Drinking Water Protection Area for MOA Well #10 and Potential & Existing Sources of Contamination



Private & Public Drinking Water Wells
Septic Systems (Residential) (R2)
MOA Land Pracels
Lawns and Gardens
Zone A Protection Area
Several Months Travel Time
Zone B Protection Area
Less Than 2-Years Travel Time
Roads
Elevation Contours
Streams



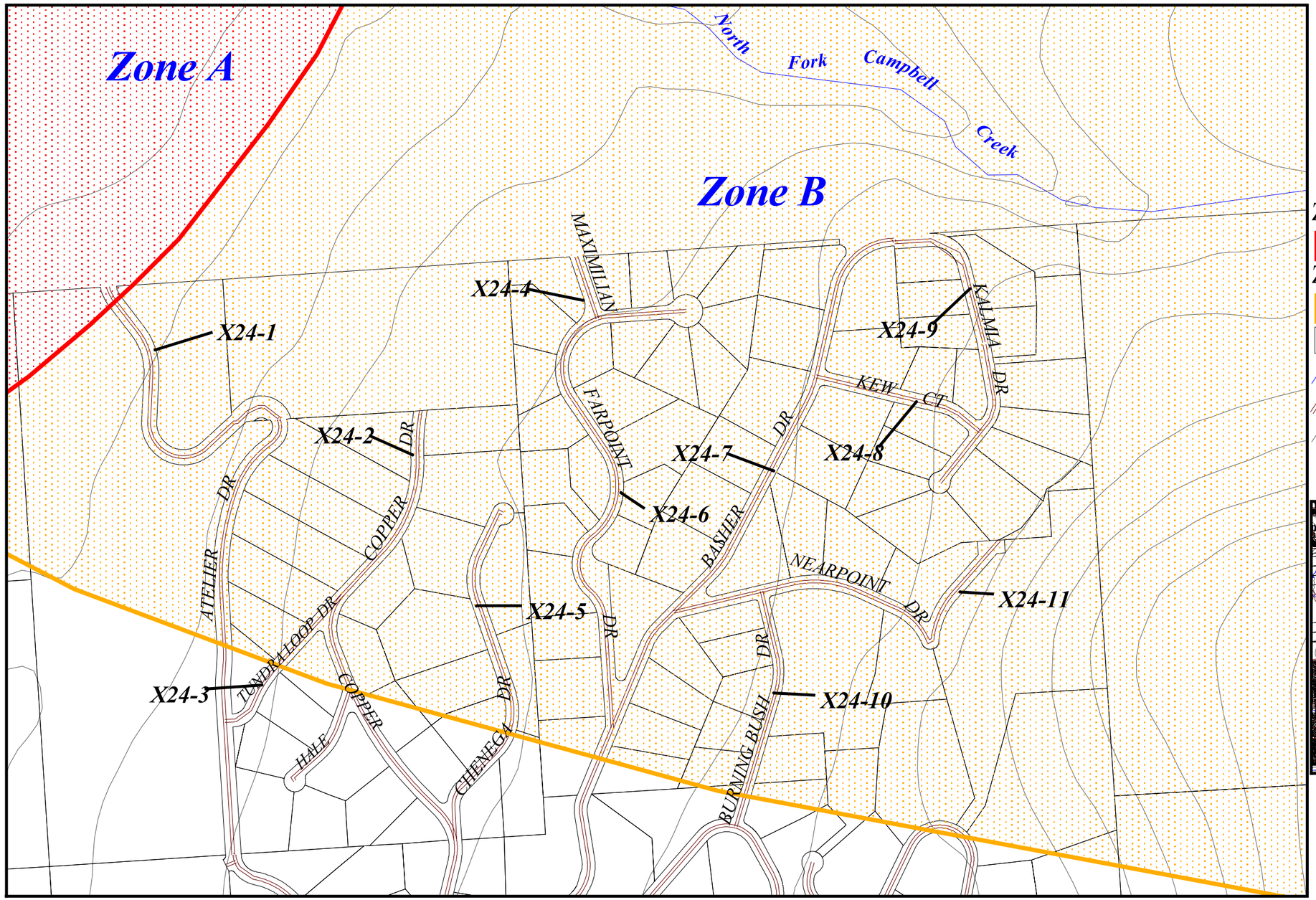
N
W
E
S

1000 0 1000 Feet

PWSID 210906.023

Map 3

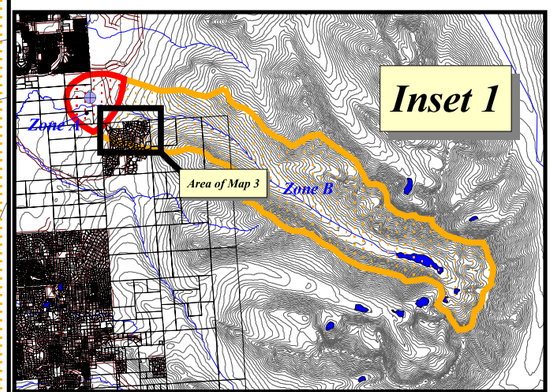
Drinking Water Protection Area for MOA Well #10 and Potential & Existing Sources of Contamination



Zone A Protection Area
- Several Months Travel Time

Zone B Protection Area
- Less Than 2-Years Travel Time

MOA Land Parcels
Streams
Roads
Elevation Contours



N
W
E
S

500 0 500 Feet

PWSID 210906.023

Map 4

APPENDIX D

Vulnerability Analysis for MOA Well #10
Public Drinking Water Source

Chart 1. Susceptibility of the wellhead – MOA Well #10

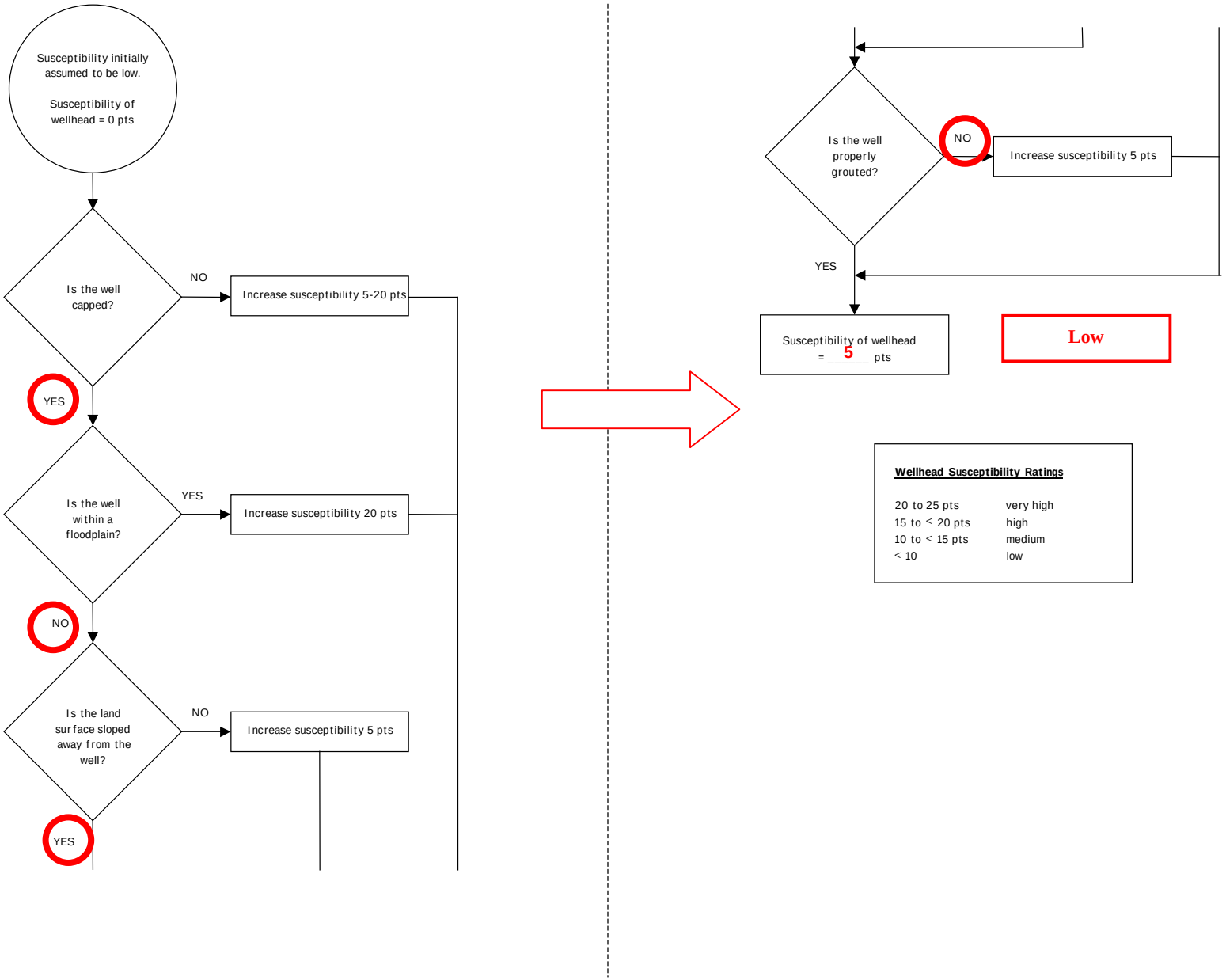
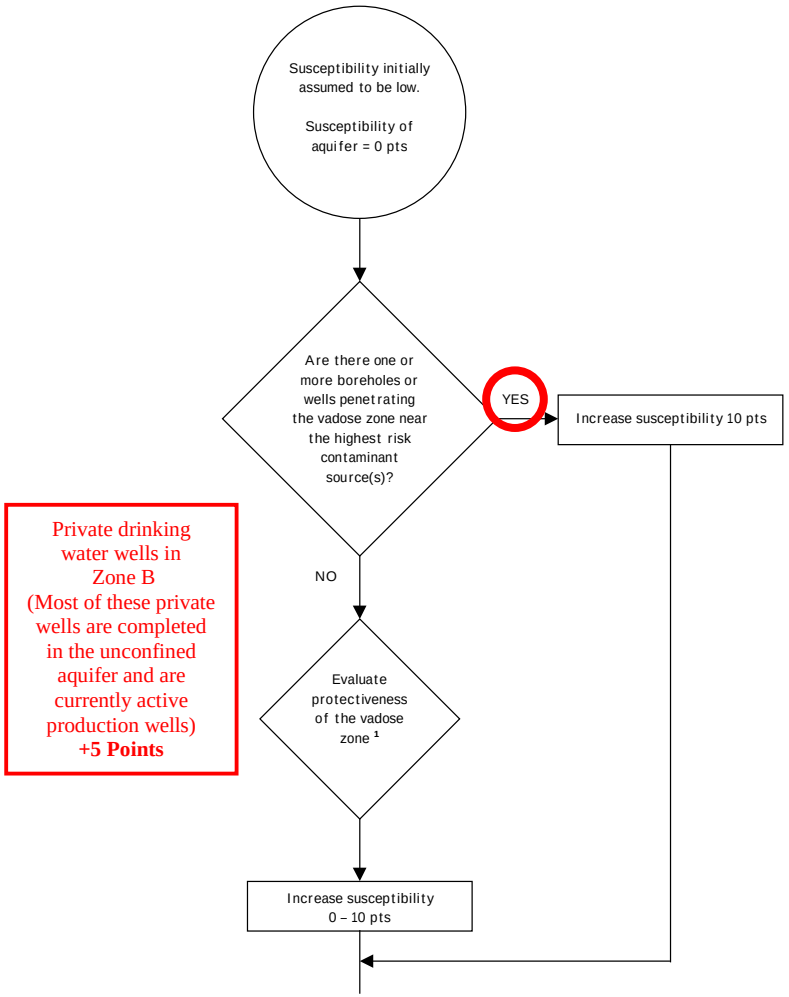
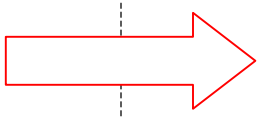
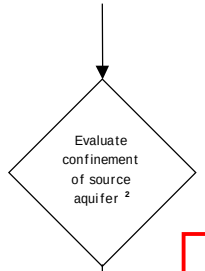


Chart 2. Susceptibility of the aquifer – MOA Well #10



Private drinking water wells in Zone B (Most of these private wells are completed in the unconfined aquifer and are currently active production wells) **+5 Points**





+ 6 Points

Increase Susceptibility 0 - 15 pts

Susceptibility of aquifer = 11 pts

Medium

1. Protectiveness of the Vadose Zone

- net recharge (function of precipitation, slope of land surface, & permeability of soils) [0 – 10 pts; 50% weight]
- depth to water table (unconfined aquifer) or top of confining layer (confined aquifer) [interpolate linearly: 100' – 20', 0 – 5 pts; 20' – 0', 5 – 10 pts; 50% weight]

Recharge (20-30 inches per year, base of Chugach Mountains, and silty and clayey gravelly sand) 4/10 = 2 Points
Depth to bottom of confining unit (58 feet) 2/10 = 1 Point

Protectiveness of the Vadose Zone Total = **3/10 Points**
Score does not count as wells in Zone B may provide a quick path to the subsurface

2. Degree of Confinement

- confined verses unconfined aquifer [confined: $K \leq 10^{-6}$ cm/s, minimum thickness of at least one layer = 20 ft, interpolate linearly 100' – 20', 0 – 10 pts; unconfined = 15 pts; 65% weight]
- density of boreholes and wells penetrating the confining layer (confined aquifer) or the water table (unconfined aquifer) [confined: 0 – 15 pts; unconfined = 15 pts; 35% weight]

Confinement (13 feet of clay) 8/15 = 5 Points
Density of boreholes/wells (high density in Zone B) 4/15 = 1 Point

Degree of Confinement Total = **6/15 Points**

Aquifer Susceptibility Ratings

20 to 25 pts	very high
15 to < 20 pts	high
10 to < 15 pts	medium
< 10	low

Medium

Chart 3. Contaminant risks for MOA Well #10 – Bacteria & Viruses

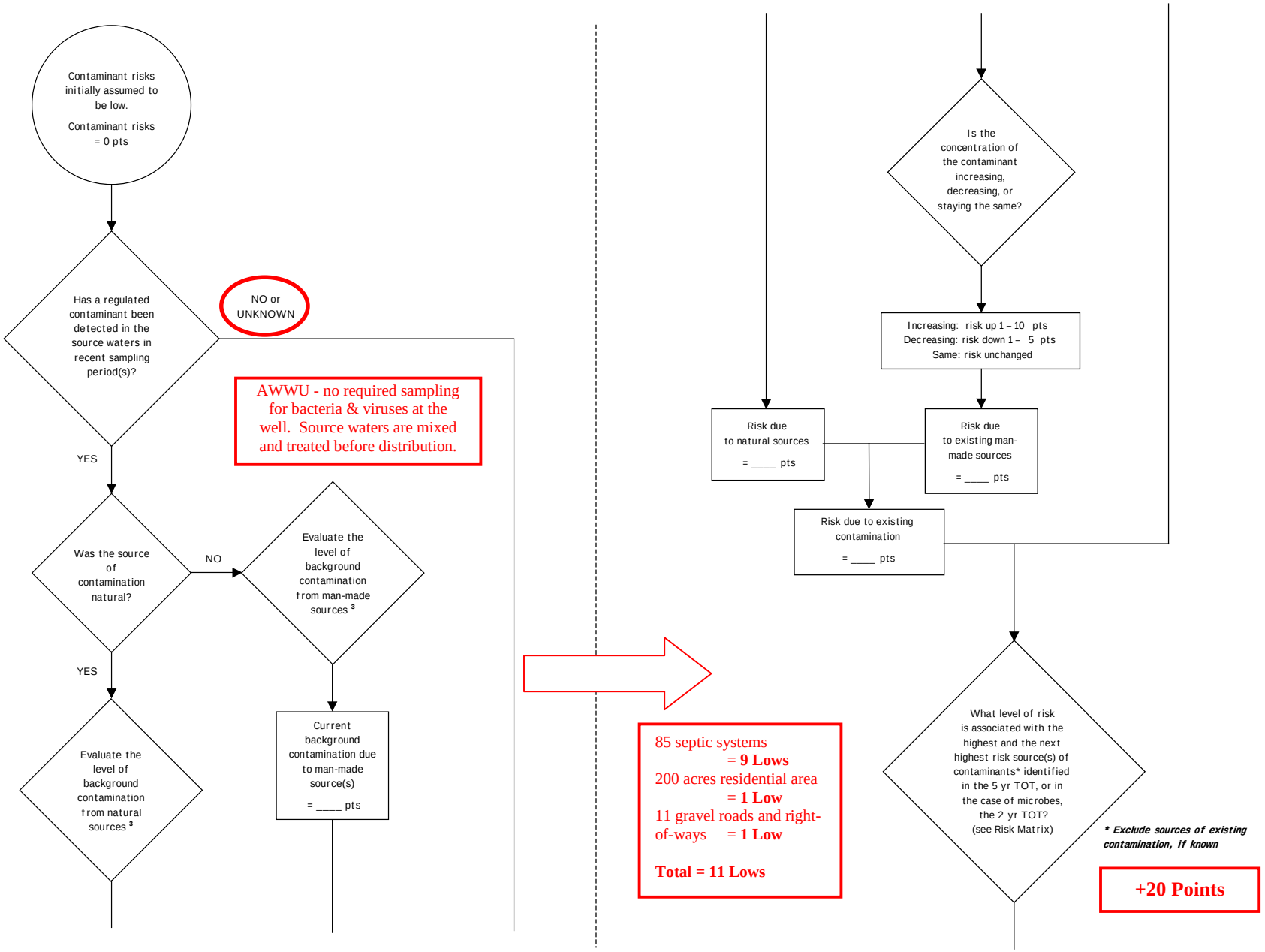


Chart 3. Contaminant risks for MOA Well #10 – Bacteria & Viruses (Continued)

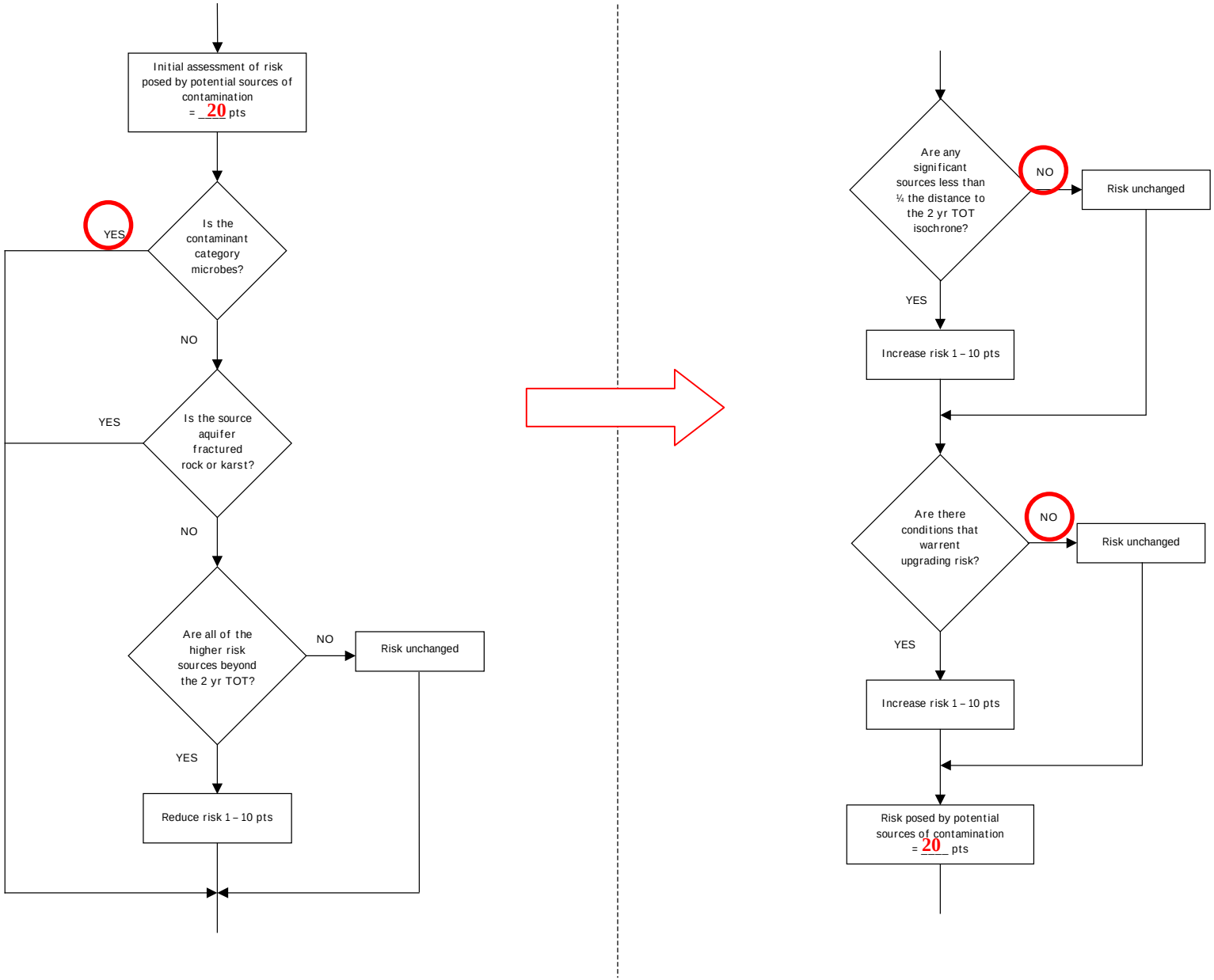
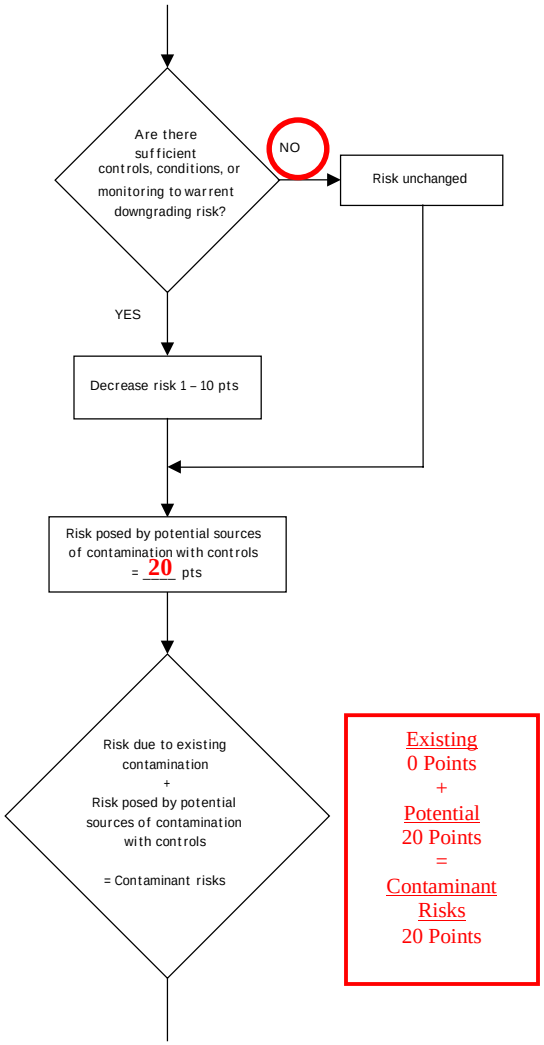
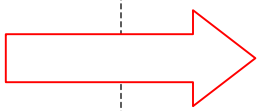
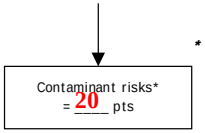


Chart 3. Contaminant risks for MOA Well #10 – Bacteria & Viruses (Continued)



Existing
0 Points
+
Potential
20 Points
=
Contaminant Risks
20 Points





**** Truncate risk at 50 pts***

Medium

3. Level of Background Contamination

> MCL	50 pts
0.5 MCL to < MCL	20 pts
0.2 MCL to < 0.5 MCL	10 pts
'detect' to < 0.2 MCL	5 pts

Contaminant Risk Ratings

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

Table 1. Risk Matrix for Contaminant Sources for MOA Well #10 – Bacteria & Viruses

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)

85 residential septic systems, 11 roads, and 196 acres of residential area	**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

Chart 4. Vulnerability analysis for MOA Well #10 – Bacteria & Viruses

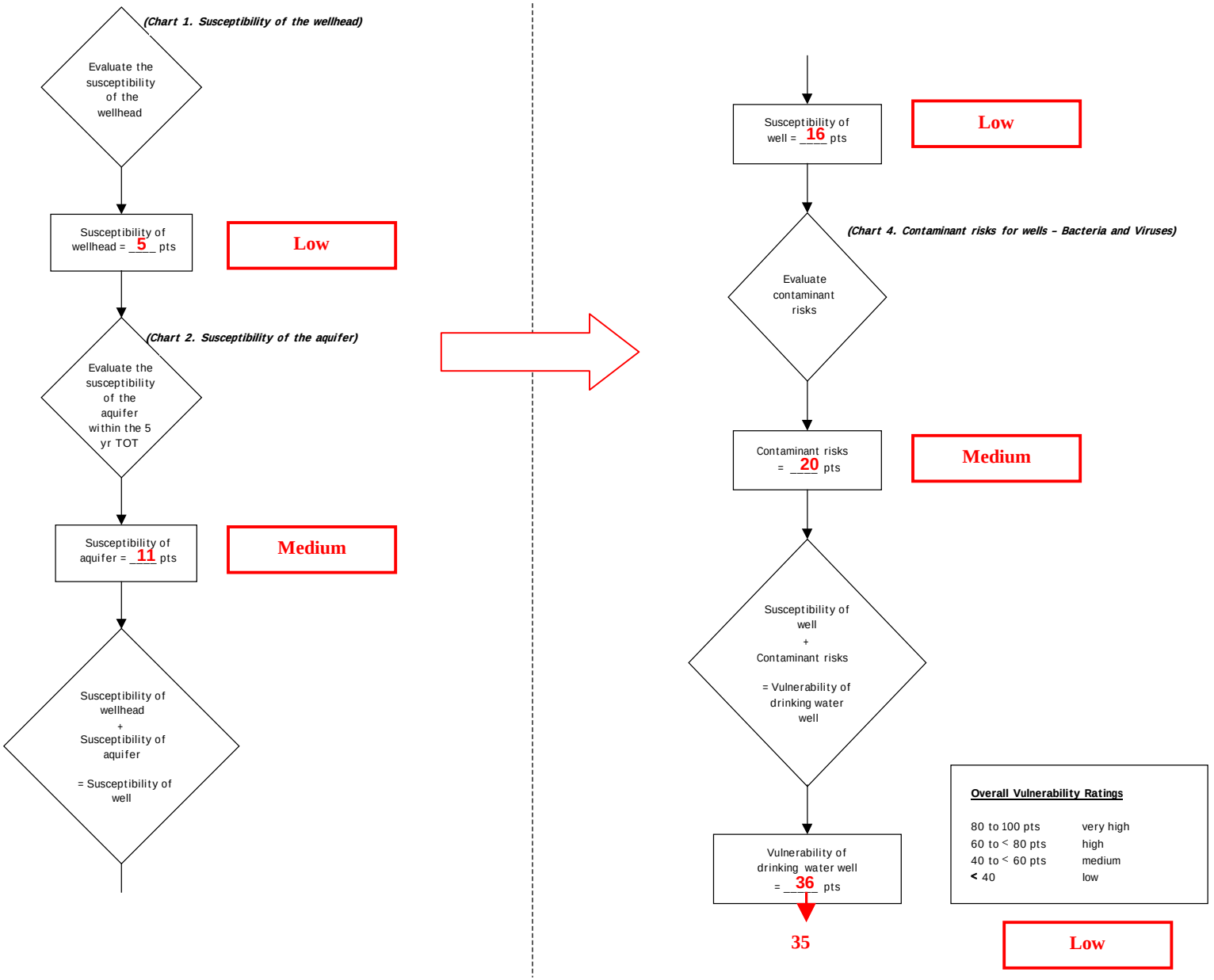


Chart 5. Contaminant risks for MOA Well #10 – Nitrates and Nitrites

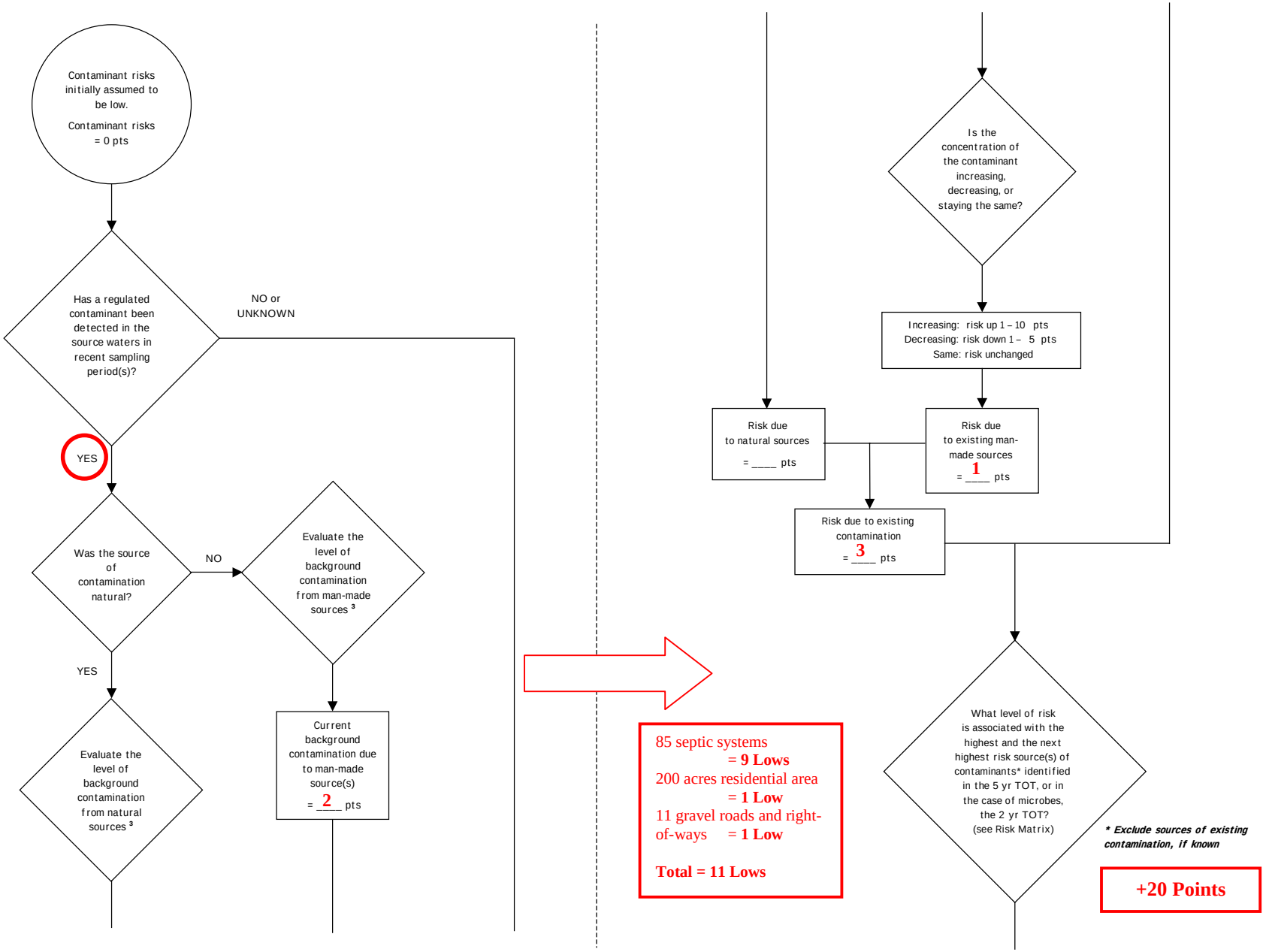


Chart 5. Contaminant risks for MOA Well #10 – Nitrates and Nitrites (Continued)

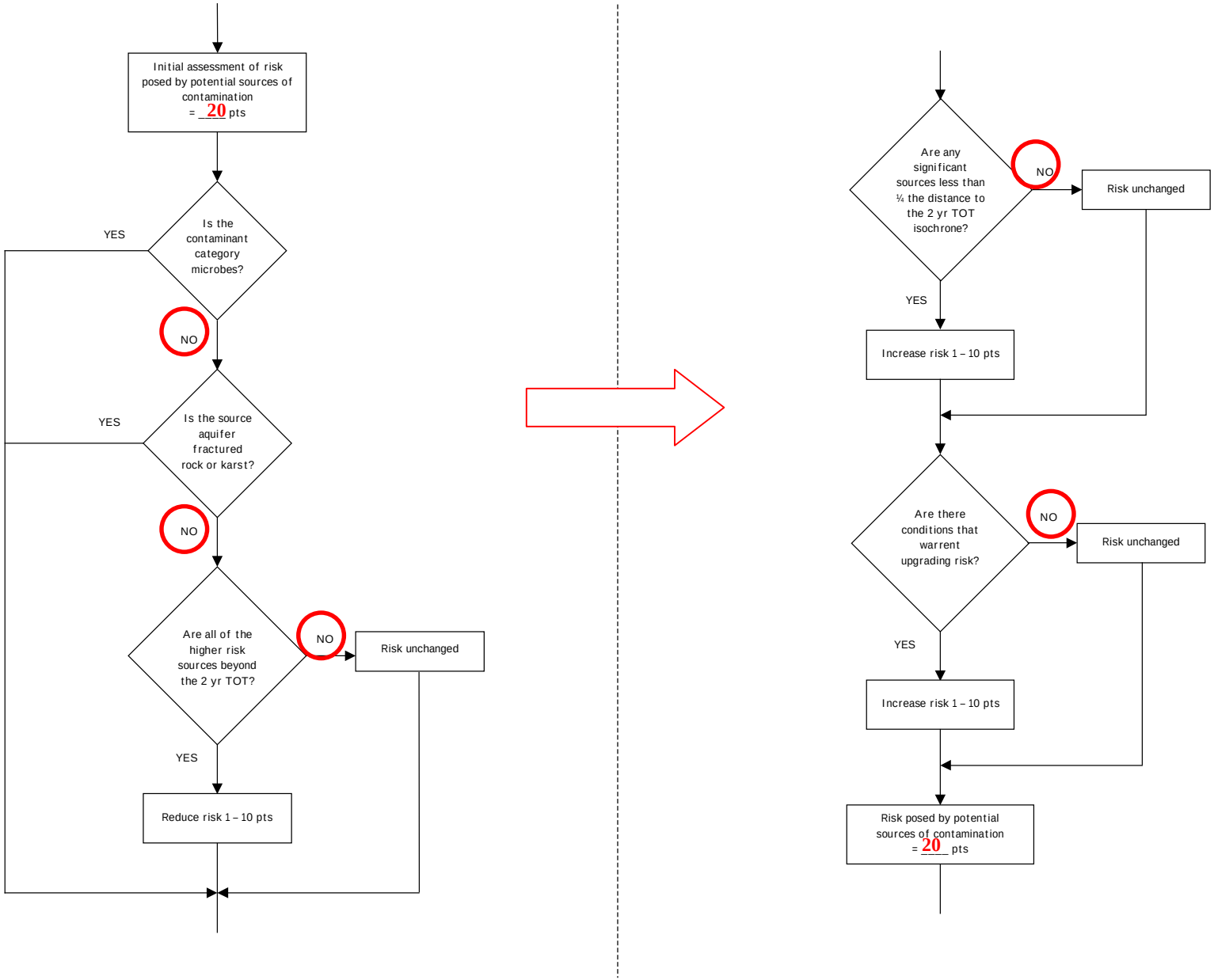
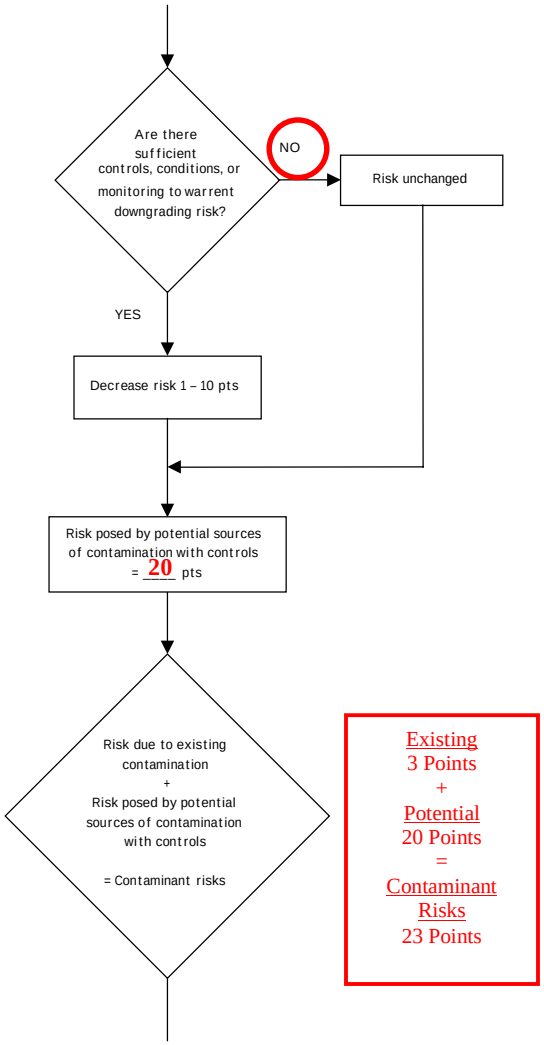
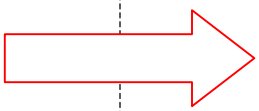
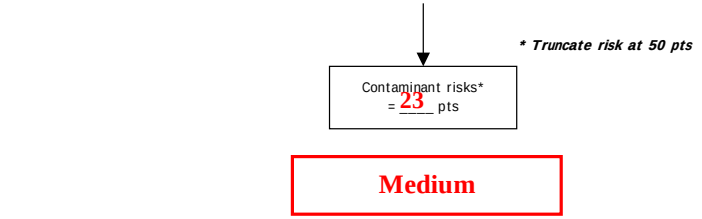


Chart 5. Contaminant risks for MOA Well #10 – Nitrates and Nitrites (Continued)



Existing
3 Points
+
Potential
20 Points
=
Contaminant Risks
23 Points





3. Level of Background Contamination

> MCL	50 pts
0.5 MCL to < MCL	20 pts
0.2 MCL to < 0.5 MCL	10 pts
'detect' to < 0.2 MCL	5 pts

Contaminant Risk Ratings

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

Nitrate
0.937 mg/L on 4/3/01
1.130 mg/L on 5/1/00
1.180 mg/L on 7/14/99
0.896 mg/L on 11/4/98
0.470 mg/L 12/10/97
0.100 mg/L on 11/18/96

Maximum Contaminant Level (MCL)
= 10mg/L
0.937/10
= 0.0937 or 9% of MCL

+2 Points

Table 2. Risk Matrix for Contaminant Sources for MOA Well #10 – Nitrates and Nitrites

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)

85 residential septic systems, 11 roads, and 196 acres of residential area	**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

Chart 6. Vulnerability analysis for MOA Well #10 – Nitrates and Nitrites

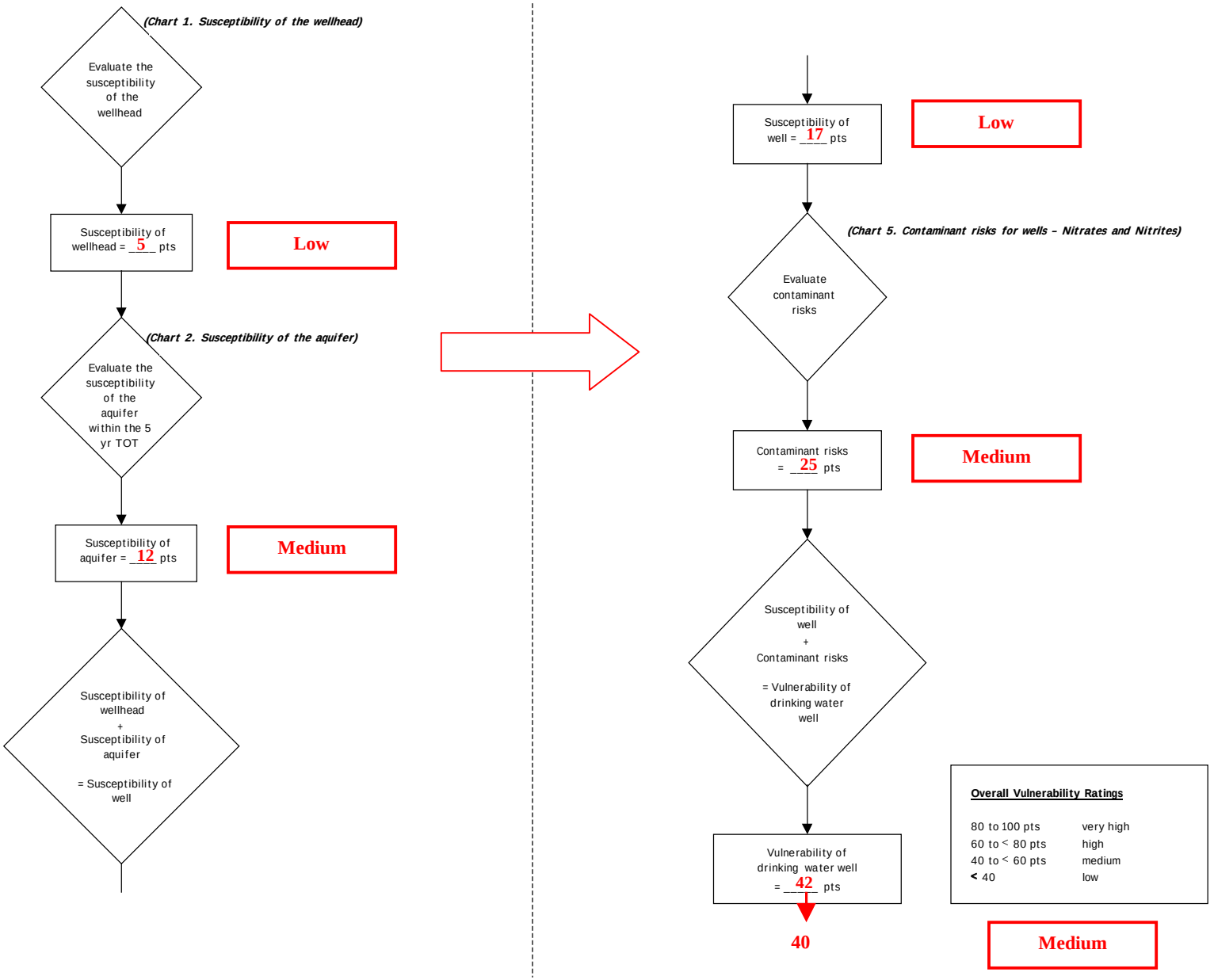


Chart 7. Contaminant risks for MOA Well #10 – Volatile Organic Chemicals

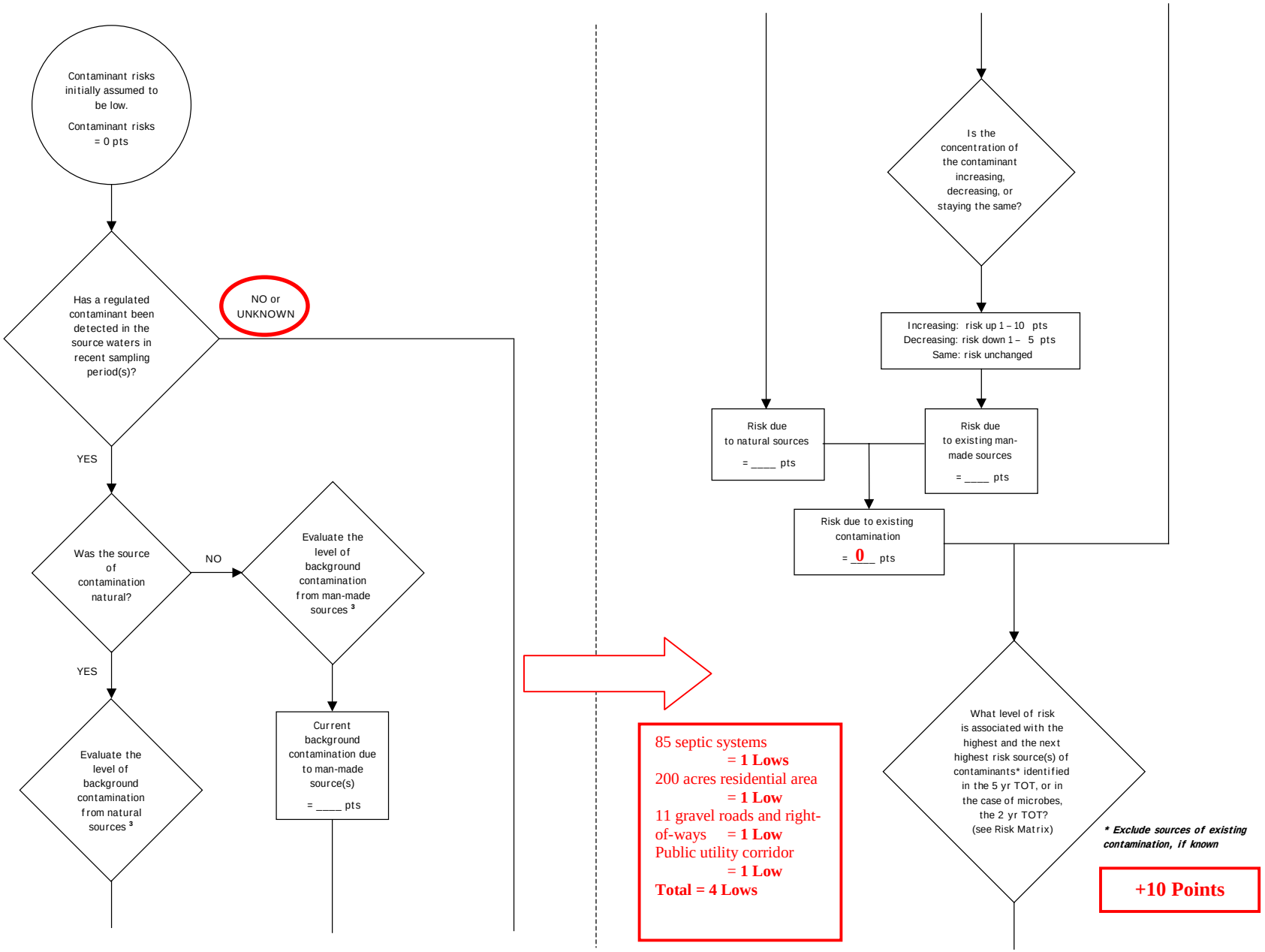


Chart 7. Contaminant risks for MOA Well #10 – Volatile Organic Chemicals (Continued)

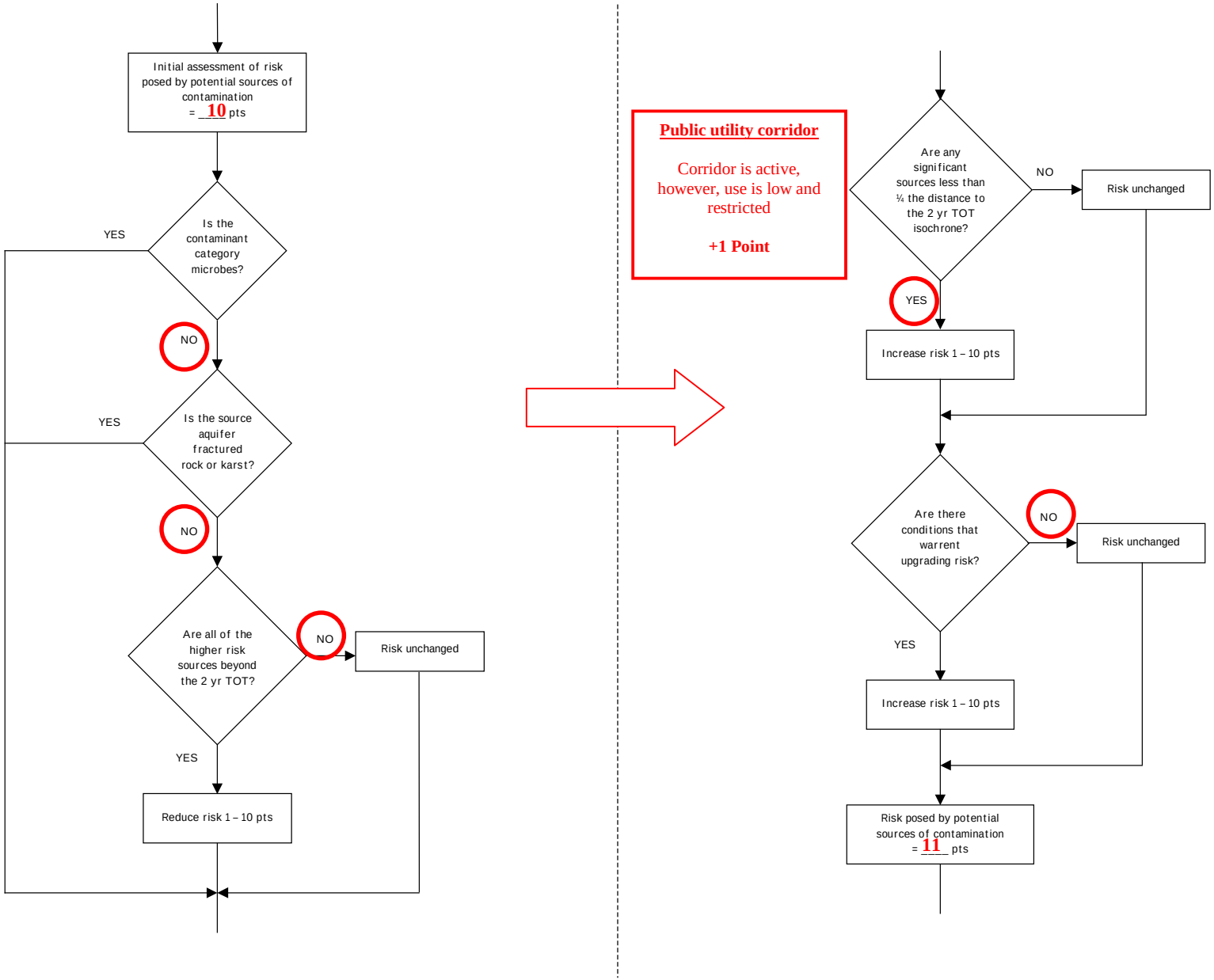
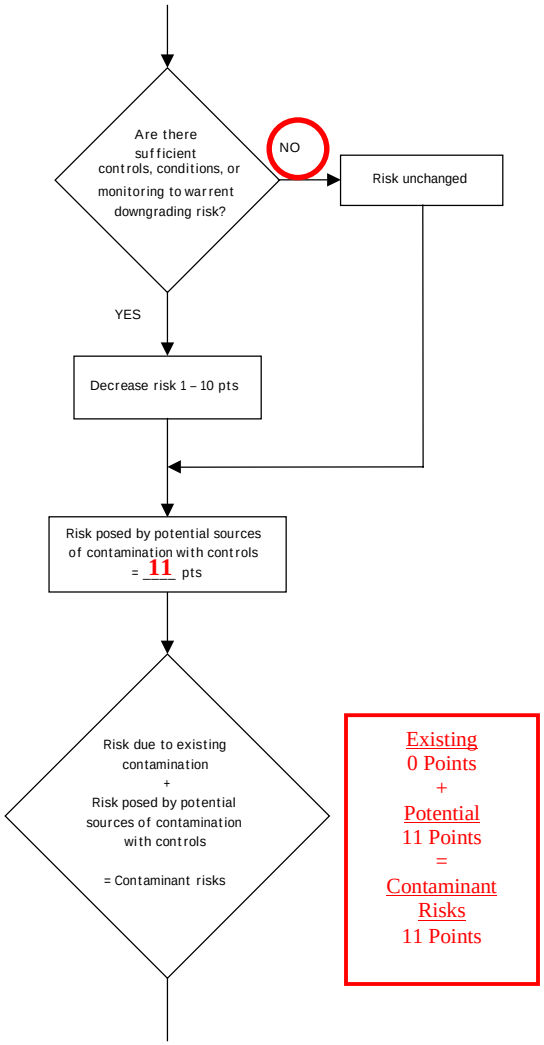
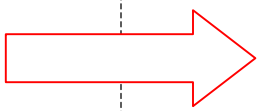
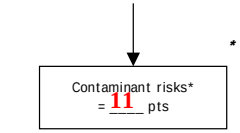


Chart 7. Contaminant risks for MOA Well #10 – Volatile Organic Chemicals (Continued)



Existing
0 Points
+
Potential
11 Points
=
Contaminant Risks
11 Points





**** Truncate risk at 50 pts***

Low

3. Level of Background Contamination

> MCL	50 pts
0.5 MCL to < MCL	20 pts
0.2 MCL to < 0.5 MCL	10 pts
'detect' to < 0.2 MCL	5 pts

Contaminant Risk Ratings

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

Table 3. Risk Matrix for Contaminant Sources for MOA Well #10 – Volatile Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	85 residential septic systems (1 low), 11 roads (1 low), 196 acres of residential area(1 low), and utility corridor (1 low) = 4 lows	**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

Chart 8. Vulnerability analysis for MOA Well #10 – Volatile Organic Chemicals

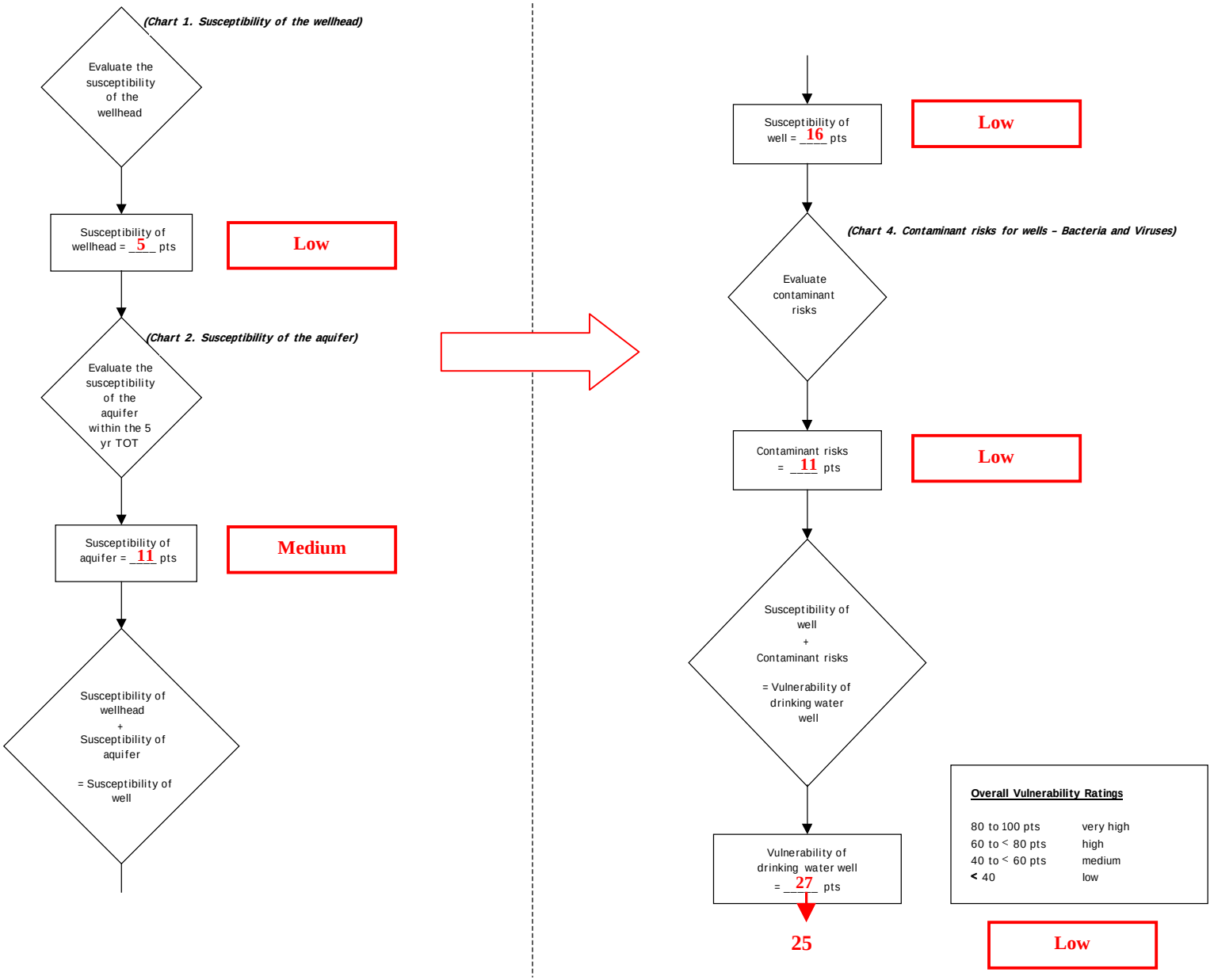


Chart 9. Contaminant risks for MOA Well #10 – Heavy Metals, Cyanide, and Other Inorganic Chemicals

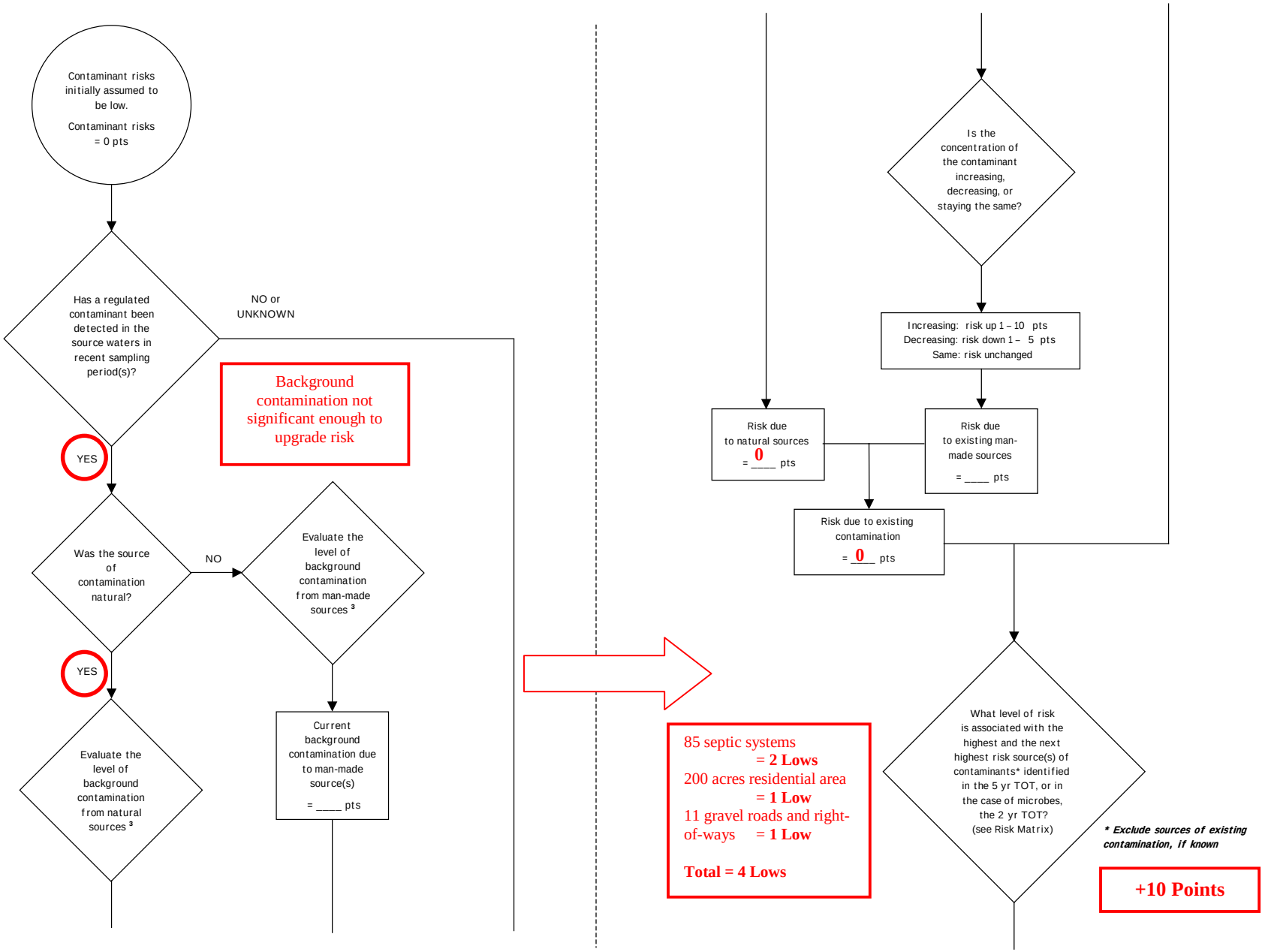


Chart 9. Contaminant risks for MOA Well #10 – Heavy Metals, Cyanide, and Other Inorganic Chemicals (Continued)

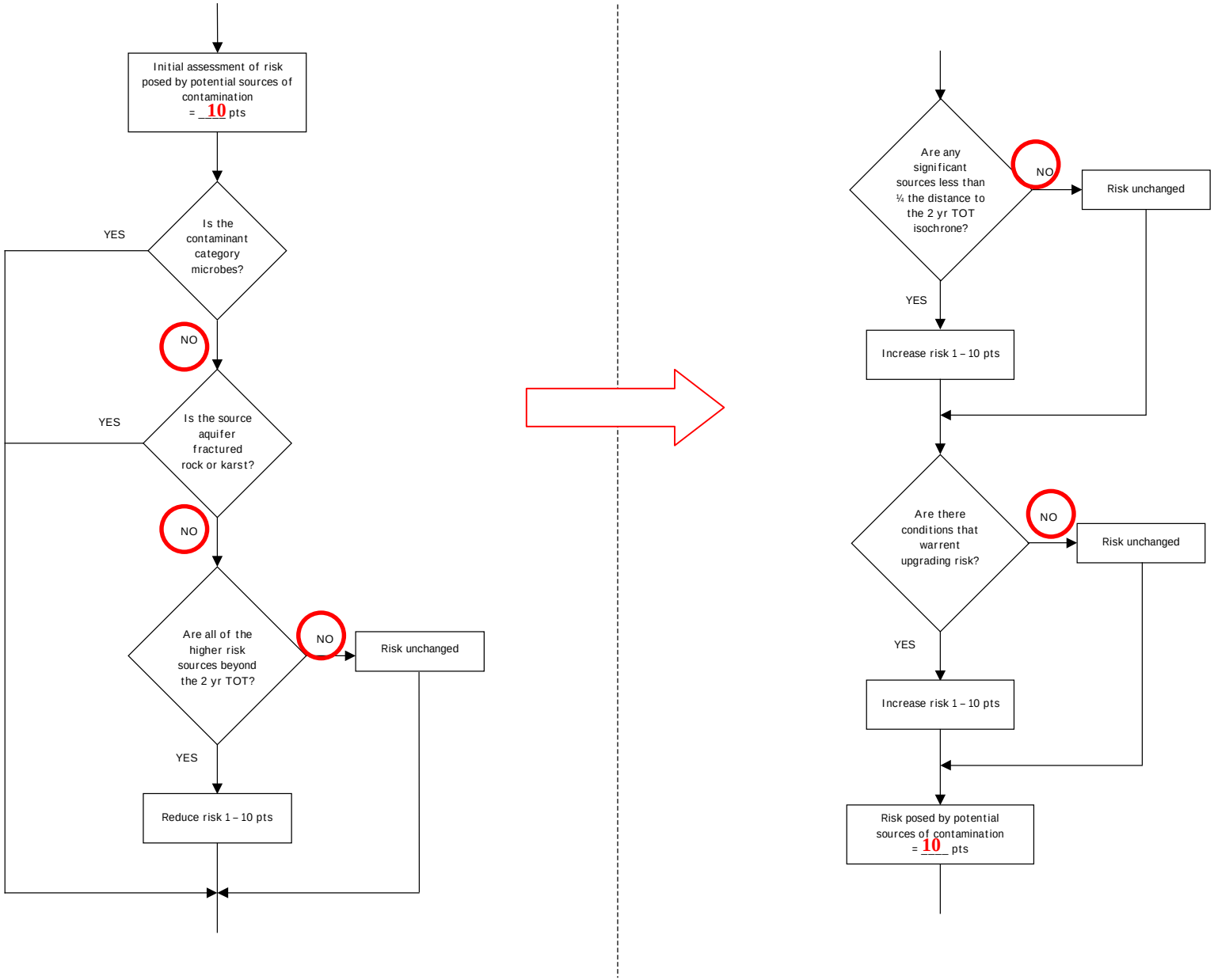
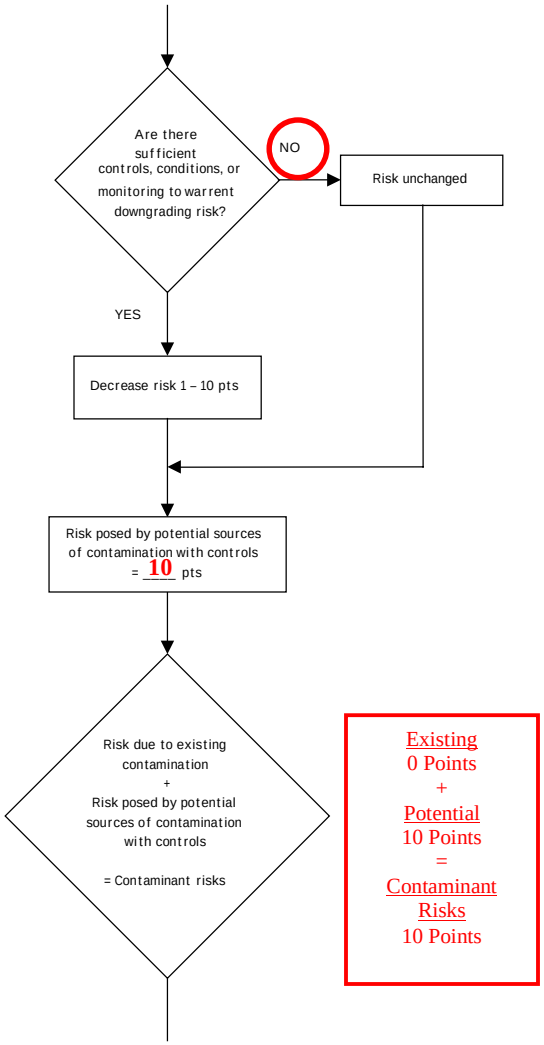
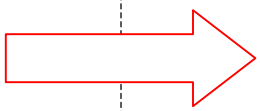


Chart 9. Contaminant risks for MOA Well #10 – Heavy Metals, Cyanide, and Other Inorganic Chemicals (Continued)



Existing
0 Points
+
Potential
10 Points
=
Contaminant Risks
10 Points



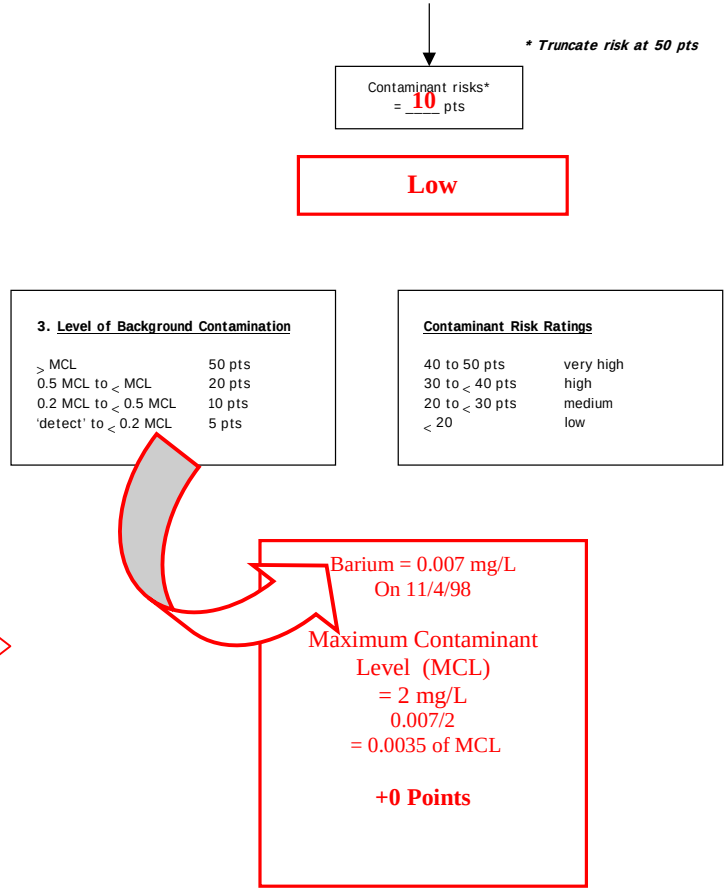


Table 4. Risk Matrix for Contaminant Sources for MOA Well #10 – Heavy Metals, Cyanide, and other Inorganic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)

85 residential septic systems (2 lows), 11 roads (1 low), and 196 acres of residential area(1 low) **= 4 lows**	**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

Chart 10. Vulnerability analysis for MOA Well #10 – Heavy Metals, Cyanide, and other Inorganic Chemicals

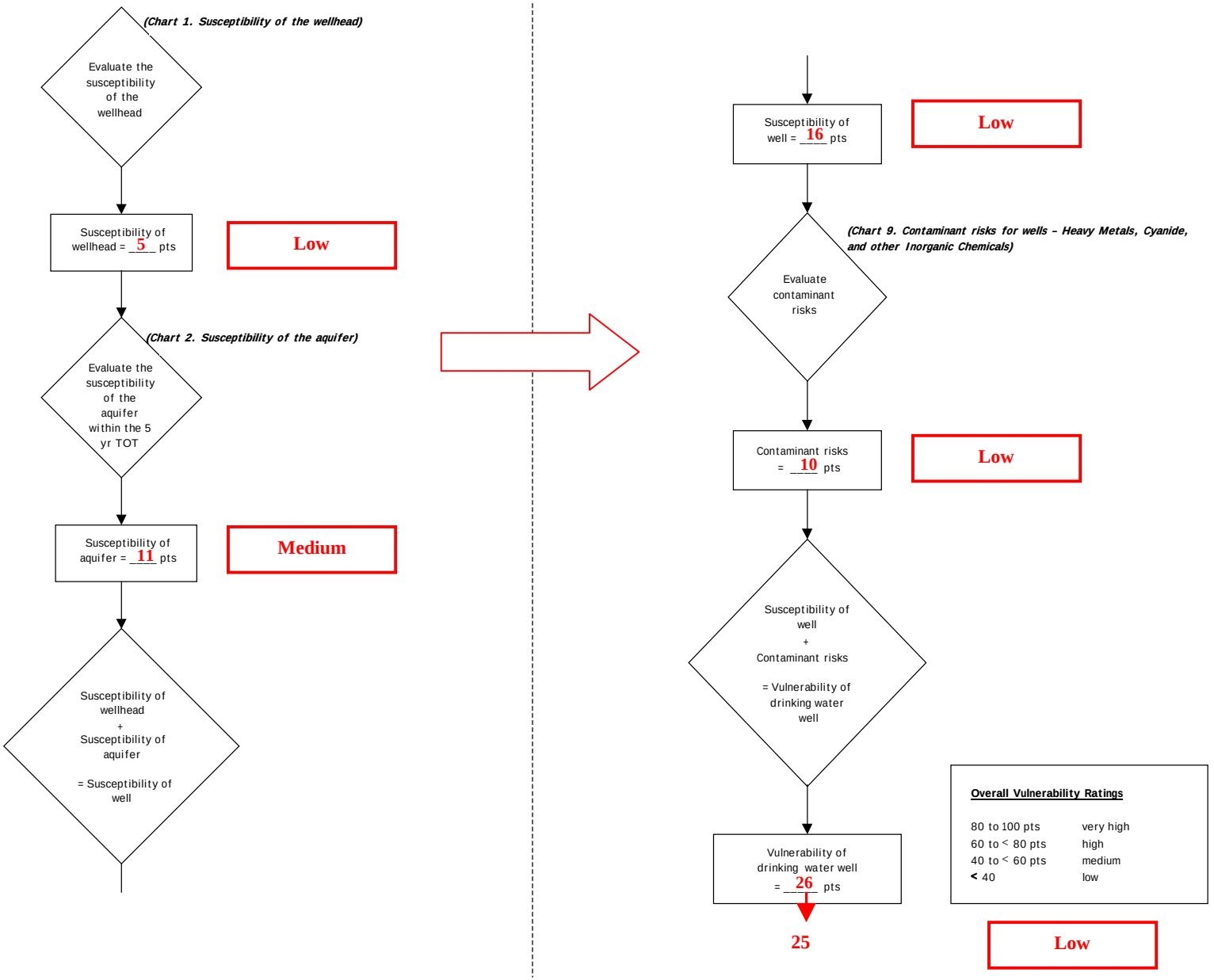


Chart 11. Contaminant risks for MOA Well #10 – Synthetic Organic Chemicals

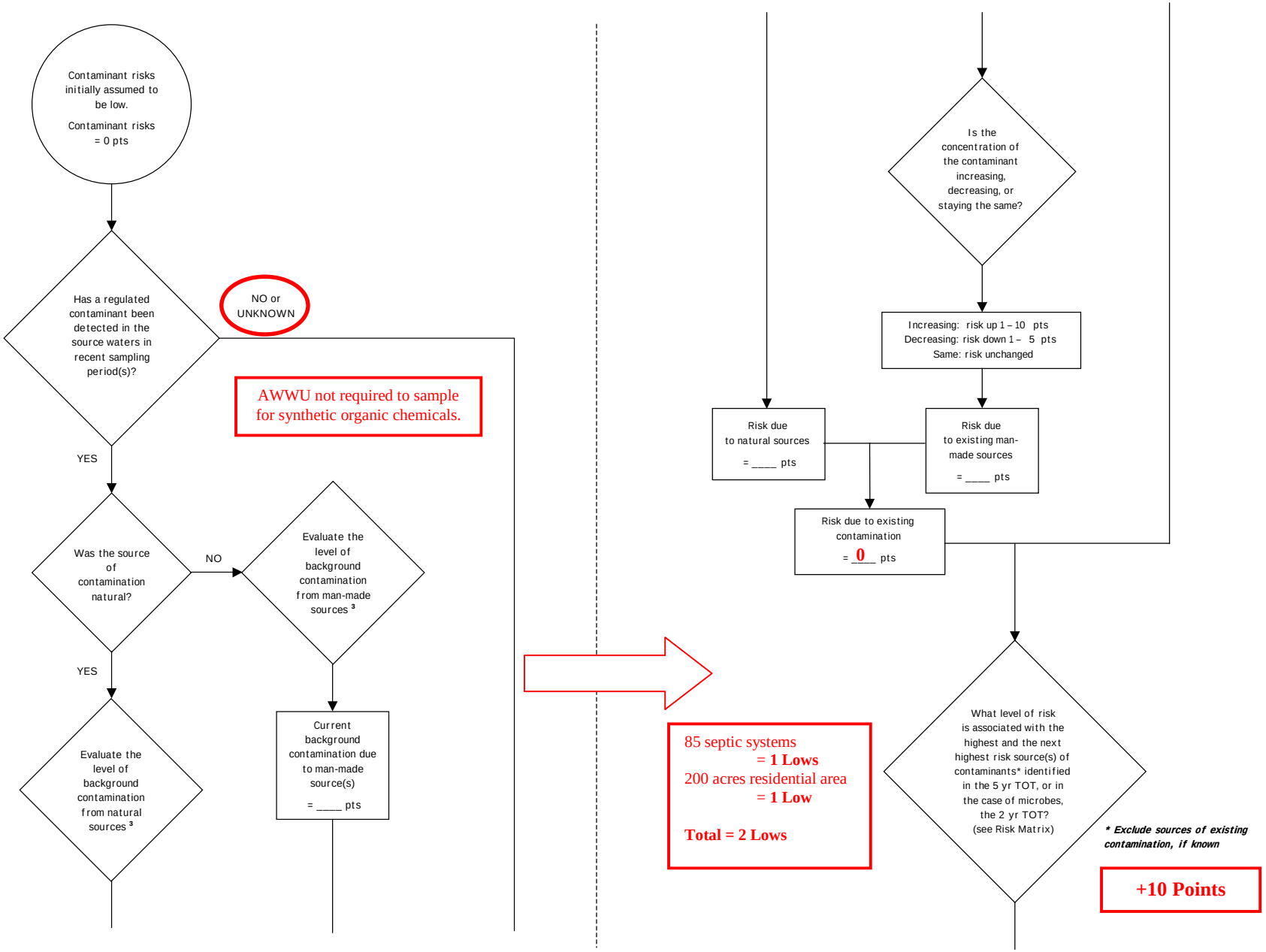


Chart 11. Contaminant risks for MOA Well #10 – Synthetic Organic Chemicals (Continued)

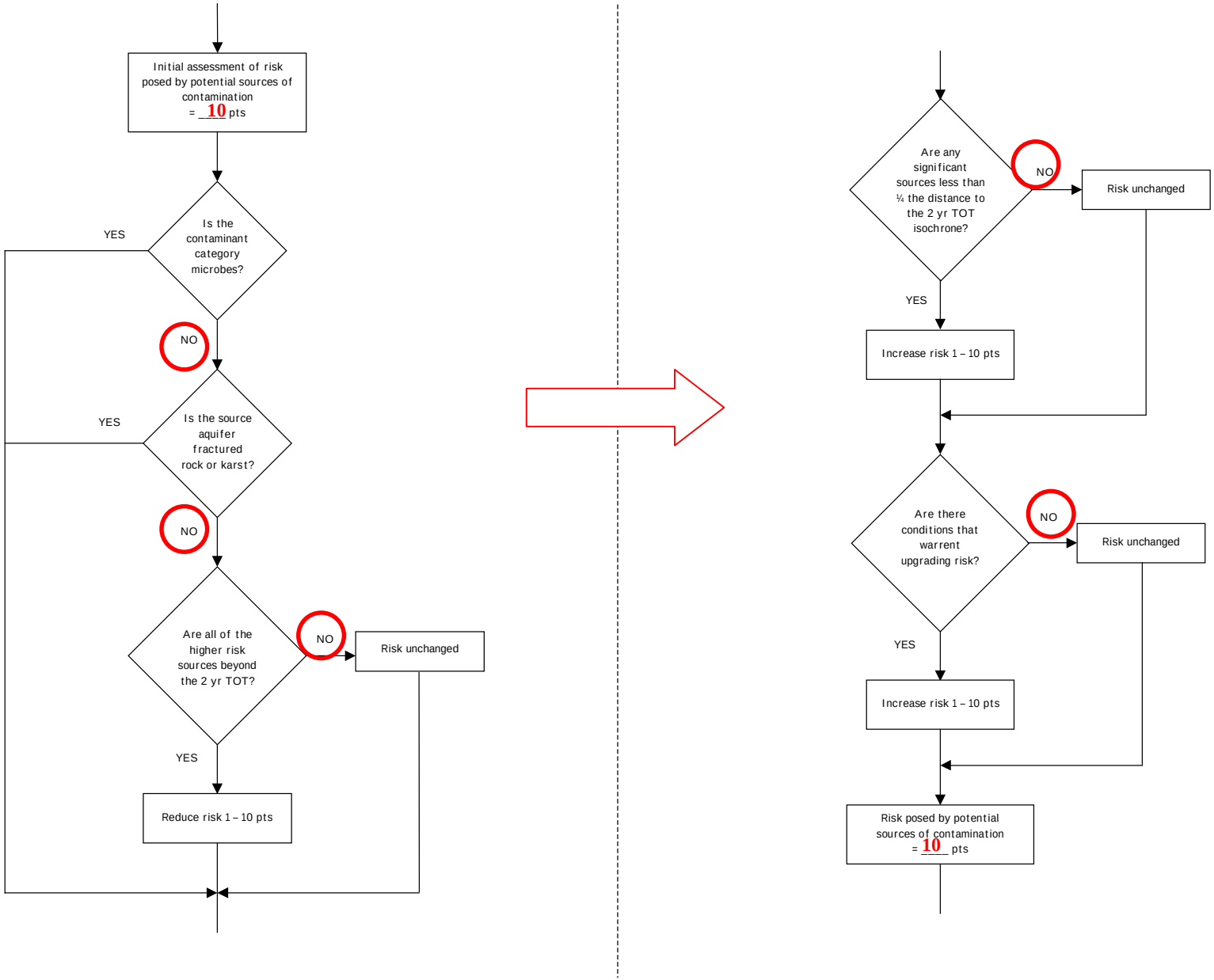
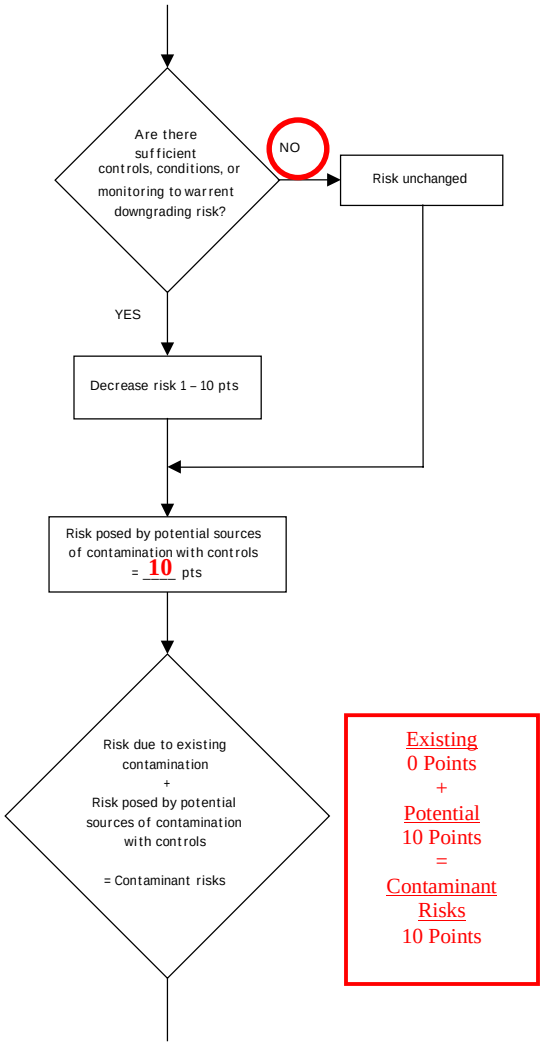


Chart 11. Contaminant risks for MOA Well #10 – Synthetic Organic Chemicals (Continued)



Existing
0 Points
+
Potential
10 Points
=
Contaminant
Risks
10 Points

**** Truncate risk at 50 pts***

Contaminant risks*
= 10 pts

Low

3. Level of Background Contamination

> MCL	50 pts
0.5 MCL to < MCL	20 pts
0.2 MCL to < 0.5 MCL	10 pts
'detect' to < 0.2 MCL	5 pts

Contaminant Risk Ratings

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

Table 5. Risk Matrix for Contaminant Sources for MOA Well #10 – Synthetic Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	85 residential septic systems (1 lows), and 196 acres of residential area (1 low) **= 2 lows**	**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

Chart 12. Vulnerability analysis for MOA Well #10 – Synthetic Organic Chemicals

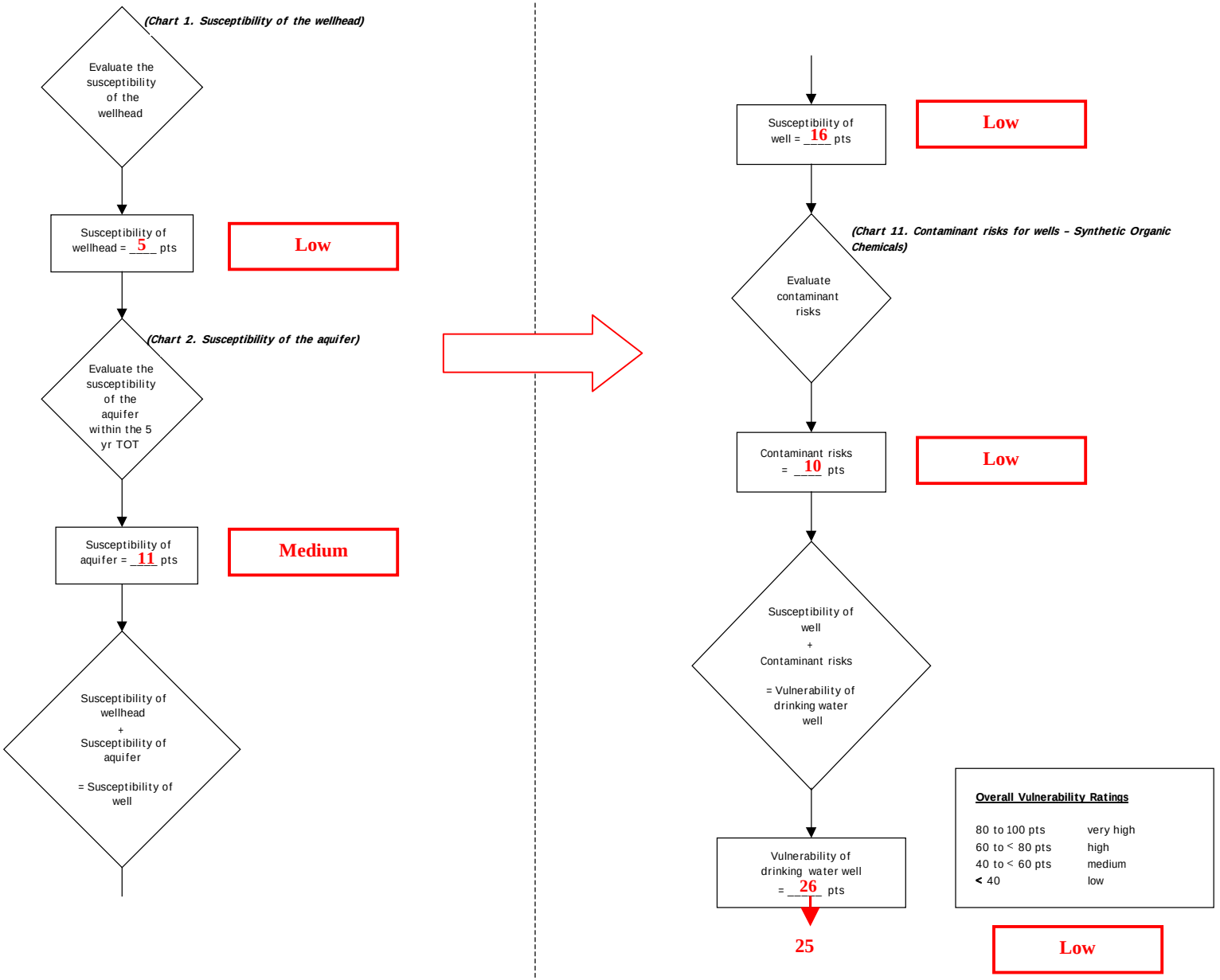


Chart 13. Contaminant risks for MOA Well #10 – Other Synthetic Organic Chemicals

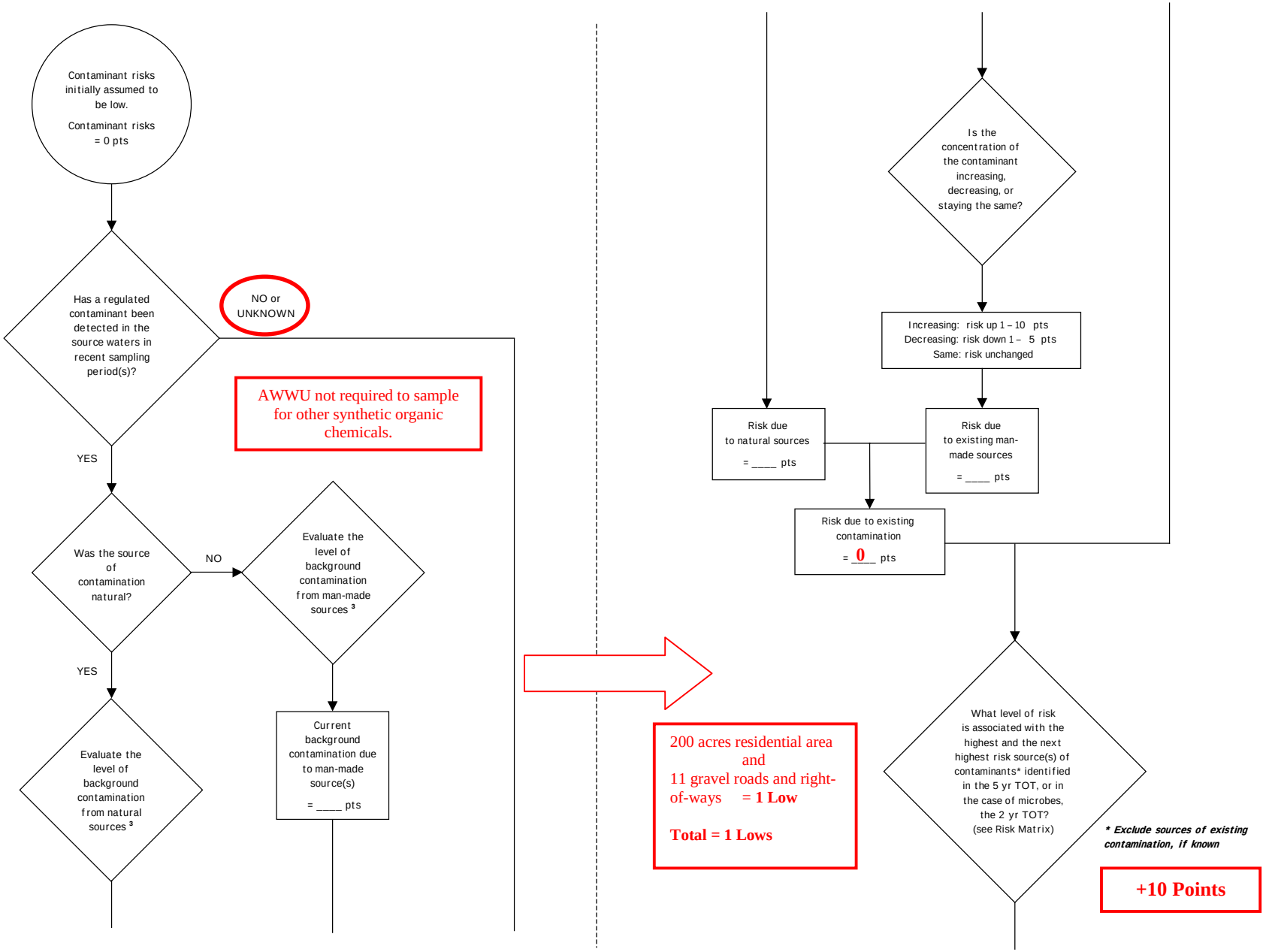


Chart 13. Contaminant risks for MOA Well #10 – Other Synthetic Organic Chemicals (Continued)

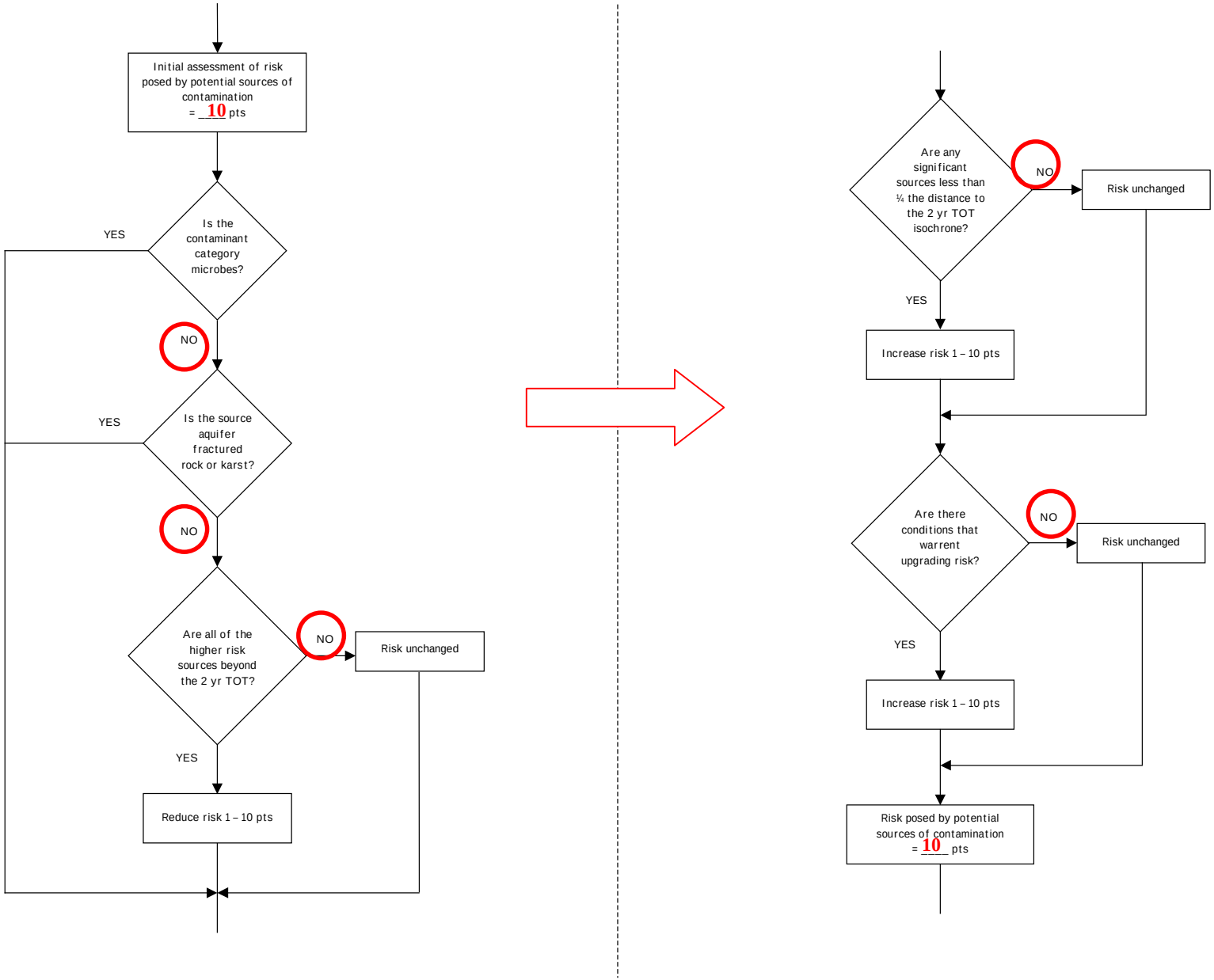
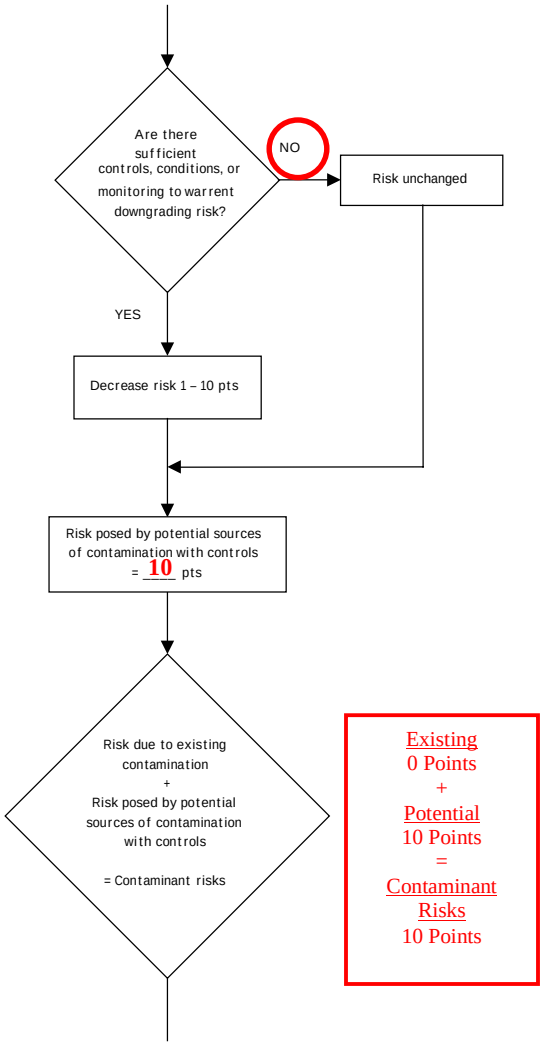
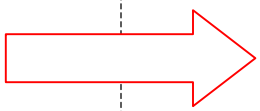
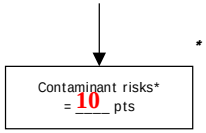


Chart 13. Contaminant risks for MOA Well #10 – Other Synthetic Organic Chemicals (Continued)



Existing
0 Points
+
Potential
10 Points
=
Contaminant Risks
10 Points





**** Truncate risk at 50 pts***

Low

3. Level of Background Contamination

> MCL	50 pts
0.5 MCL to < MCL	20 pts
0.2 MCL to < 0.5 MCL	10 pts
'detect' to < 0.2 MCL	5 pts

Contaminant Risk Ratings

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

Table 6. Risk Matrix for Contaminant Sources for MOA Well #10 – Other Synthetic Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)

196 acres of residential area and 11 roads **= 1 low**	**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

Chart 14. Vulnerability analysis for MOA Well #10 – Other Synthetic Organic Chemicals