

BREMERTON-KITSAP COUNTY HEALTH DISTRICT
ENVIRONMENTAL HEALTH DIVISION
WATER QUALITY PROGRAM

**RESULTS OF WELL WATER MONITORING IN THE
VICINITY OF THE DAY ROAD INDUSTRIAL PARK,
BAINBRIDGE ISLAND, WASHINGTON**

By

Mike McNickle, RS
Environmental Health Specialist
Water Quality Program
Environmental Health Division

December 1998

Funded by:

The City of Bainbridge Island

CONTENTS

List of Figures	i
List of Tables	ii
List of Appendices	iii
1.0 INTRODUCTION	1
2.0 GOALS AND OBJECTIVES	2
3.0 METHODS	2
4.0 RESULTS AND DISCUSSION	5
4.1 Cyanide and Metals	5
4.2 Volatile Organic Compounds and Semi-Volatile Organic Compounds	5
4.3 Coliform Bacteria	7
5.0 CONCLUSIONS	7
6.0 RECOMMENDATIONS	9

LIST OF FIGURES

<u>Figure #</u>	<u>Description</u>	<u>Page #</u>
1	Approximate Location of Private Wells Sampled on August 26, 1998	3

LIST OF TABLES

<u>Table #</u>	<u>Description</u>	<u>Page #</u>
1	Summary of Well Monitoring Results from Wells in the Vicinity of the Day Road Industrial Park, August 26, 1998	6

LIST OF APPENDICES

<u>Appendix #</u>	<u>Description</u>	<u>Page#</u>
A-1	Laboratory Analysis Sheets	10

BREMERTON-KITSAP COUNTY HEALTH DISTRICT
ENVIRONMENTAL HEALTH DIVISION
WATER QUALITY PROGRAM

**Results of Well Water Monitoring in the Vicinity of the Day Road Industrial Park,
Bainbridge Island, Washington**

Prepared by:

Mike McNickle, RS
Environmental Health Specialist

1.0 INTRODUCTION

Since 1989, the Bremerton-Kitsap County Health District (Health District) has conducted six rounds of well water monitoring in private wells near Day Road Industrial Park (the Park). The first monitoring project was conducted due to nearby residents' concerns about waste disposal practices occurring on-site. Initially, trichloroethylene (TCE) and cyanide were detected in the well servicing the Park, but no contamination was found in two downgradient wells. Since then, no contamination has been found in any of the downgradient wells above the State Drinking Water Standard (Chapter 246-290 WAC [Group A], and Bremerton-Kitsap County Board of Health Ordinance 1998-6, *Rules and Regulations for Private and Public Water Supplies*, July 1, 1998).

Due to continuing concerns about potential groundwater contamination, the Health District has recommended annual monitoring of wells downgradient from the Park. As recommended in the Health District's report, *Results of Groundwater Monitoring of Wells in the Vicinity of the Day Road Industrial Park, Bainbridge Island, Washington* (June, 1996), and after recent events at the Park, the Health District determined that a seventh round of private well sampling in the vicinity of the Park was necessary to:

1. Determine if area drinking water wells have been contaminated from historical and recent industrial park activities; and
2. Screen for any adverse impacts to area drinking water wells from the recently confirmed illegal industrial waste discharges from Sound Publishing, Inc. (Sound Publishing).

The Health District was informed through an anonymous complaint that the on-site sewage system (OSS) servicing Sound Publishing was failing in February 1998. Site inspections indicated that the OSS was failing, in part, because of the additional industrial wastewater discharged to the OSS by Sound Publishing.

In response, the Health District issued a Notice and Order to Correct Violation (NOCV) letter to Sound Publishing on April 17, 1998 for violating the *Bremerton-Kitsap Board of Health Ordinance #1996-11, Rules and Regulations Governing On-Site Sewage Systems (May 1, 1996)*, specifically:

- Section 6.B.1., "Insanitary Conditions that Violate the Regulations";
- Section 6.C., "Material Prohibited from Entering On-Site Sewage Systems"; and
- Section 10.C.1.i., "Commercial Source with Industrial Wastewater."

The NOCV required Sound Publishing to immediately cease discharging industrial wastewater to the OSS, seal all floor and wall drains within 30 days, submit a repair plan to correct the failing OSS by May 18, 1998, and complete installation of the repair prior to June 18, 1998.

In addition to the Health District response, Washington State Department of Ecology (Ecology) fined Sound Publishing \$23,000, and subsequently required the company to produce and submit a groundwater monitoring plan to Ecology. As part of the plan, the company will be required to install monitoring wells downgradient of the OSS to determine if contamination has occurred. Furthermore, both the Health District and Ecology have provided technical assistance in developing plans to install non-polluting production systems that will eliminate the possibility of future contamination.

The City of Bainbridge Island authorized the Health District to conduct a seventh round of well sampling in August 1998. The event was conducted on August 26, 1998 and the results are summarized herein.

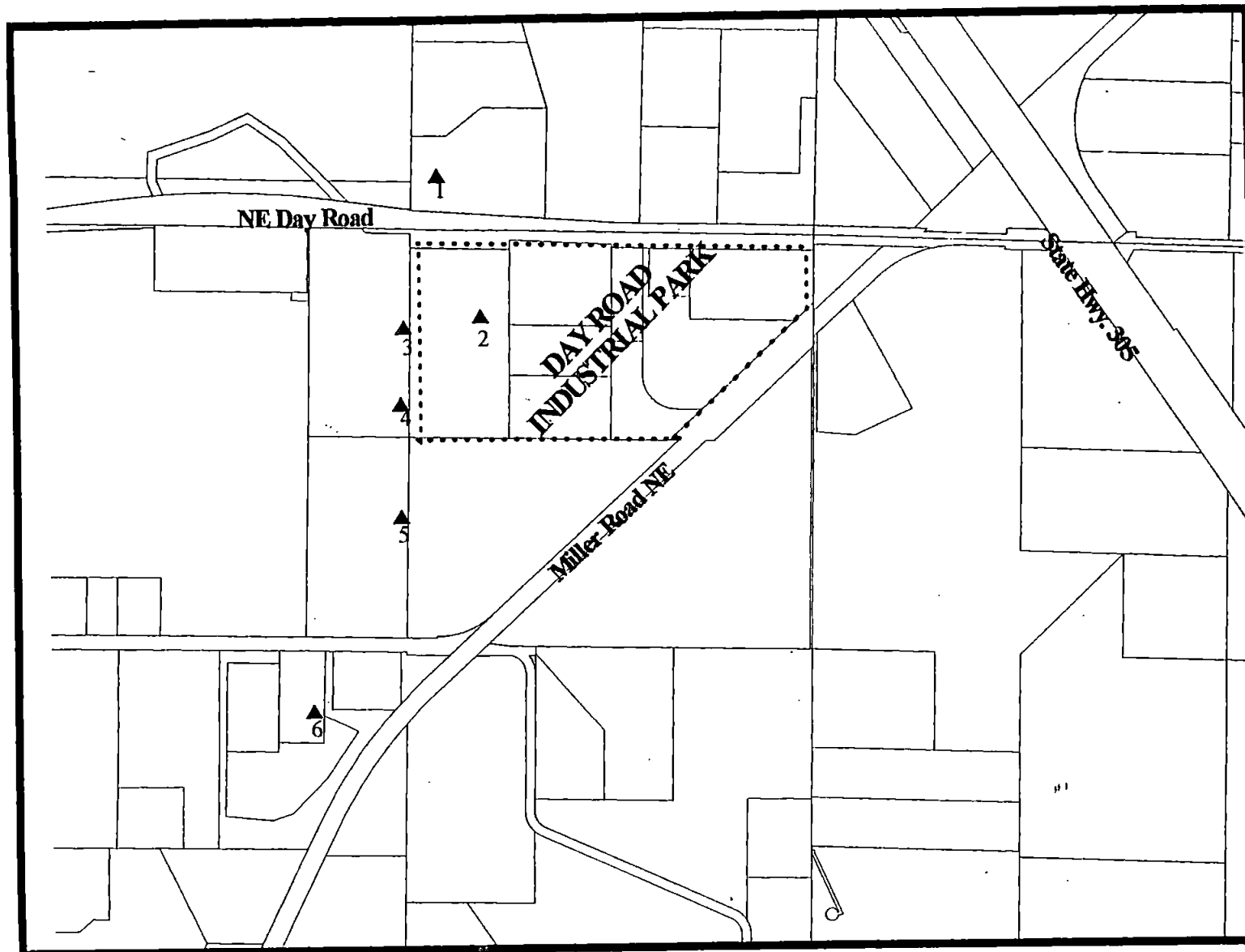
2.0 GOALS AND OBJECTIVES

The goal of the seventh sampling round was to determine if current and historical waste disposal practices at the Park have contaminated drinking water wells in the surrounding area and screen for any adverse impacts to area drinking water wells from the recently confirmed illegal industrial waste discharges from Sound Publishing. To achieve this goal, the Health District sampled downgradient private wells for the constituents of concern.

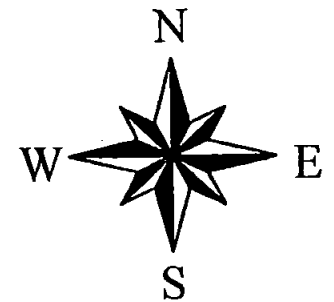
3.0 METHODS

On August 26, 1998, samples were collected from five drilled domestic wells (Burke, Voll, Sound Publishing, Martin and Browning), and one shallow dug domestic well (Voll). **Figure 1** illustrates the approximate location of each well site.

FIGURE 1
APPROXIMATE LOCATION OF PRIVATE WELLS SAMPLED ON AUGUST 26, 1998
DAY ROAD INDUSTRIAL PARK PROJECT



- 1 = Browning's Drilled Well
- 2 = Sound Publishing, Inc. Drilled Well
- 3 = Voll's Dug Well
- 4 = Voll's Drilled Well
- 5 = Burke's Drilled Well
- 6 = Martin's Drilled Well



All samples, except for the Sound Publishing well, were obtained from a water tap close to the wellhead, prior to storage tanks or individual treatment systems. The Sound Publishing well water sample was collected from a tap inside the business, as this was the only available access. Well water samples collected during this event were analyzed for the following parameters:

- Volatile Organic Compounds (including TCE), using EPA method #8260;
- Metals (arsenic, cadmium, chromium, copper, zinc) using EPA method series #6010-7000;
- Cyanide, using EPA method #335.2;
- Total Coliform, using EPA method #9223;
- Temperature, using a calibrated YSI Conductivity Meter;
- pH, using a calibrated pH Meter; and
- Conductivity, using a calibrated YSI Conductivity Meter.

In addition, two additional parameters have been added to the sampling parameter list since the sixth sampling round that took place in March 1996. Analysis of the waste discharges at Sound Publishing contained contaminants that had not been tested for in prior sampling events. Therefore, the Health District added these new parameters to the sampling list. The new parameters analyzed were:

- Semi-Volatile Organic Compounds, using EPA method #8270 (including Hydroquinone); and
- Silver utilizing EPA method #272.2.

A YSI S-C-T field meter was used to determine temperature and conductivity in the field; it was calibrated according to the manufacturer's specifications before use. Wells were allowed to purge for at least 20 minutes before samples were collected. Temperature and conductivity readings were taken every five (5) minutes during the 20 minute period to verify that both water temperature and conductivity had stabilized before sample collection.

All samples were immediately stored in a cooler at 4 degrees Celsius and were transported to the analytical laboratory the same day sampled. Quality assurance/control consisted of a field replicate for TCE, matrix spike duplicates, and laboratory duplicates for the other parameters tested. Field notes are on file at the Health District and are available upon request.

4.0 RESULTS AND DISCUSSION

Table 1 summarizes the sample results for the six wells monitored during the August 26, 1998 monitoring event. Laboratory analysis sheets are contained in **Appendix A**. The wells tested during this event are listed along the far left column; across the top row in each dark shaded area are the chemical parameters which were tested for during this event. Along the bottom row in the shaded areas are the respective maximum contaminant limit (MCL) for the Drinking Water Standards (DWS) per Chapter 246-290 WAC; the Groundwater Standards (GS) per Chapter 173-200 WAC for each parameter, and their respective detection limits. All field and laboratory quality assurance/control measures were acceptable for this monitoring event. Please note that the DWS are human health-risk based while the GS are used as an early warning detection method and clean-up standard.

4.1 Cyanide and Metals

- Cyanide was not detected in any of the wells sampled.
- Of the metals tested (arsenic [As], cadmium [Cd], chromium [Cr], copper [Cu], and zinc [Zn]), none were found in concentrations at, or near, the DWS during this monitoring event. However, arsenic was found at levels above the GS in two out of the six wells sampled. Arsenic is known to occur naturally in Kitsap County soils and groundwater, and has been found in these wells in the past.
- Silver (Ag), a metal contaminant of concern from Sound Publishing, was not detected in any of the wells sampled.

4.2 Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs)

- Neither TCE (a VOC) nor hydroquinone (a semi-VOC) were detected in any of the wells tested during this sampling event.
- Chloroform (a VOC) was detected at the Sound Publishing well at 13.0 ppb, which is higher than the GS of 7.0 ppb. Chloroform was not detected in any of the other wells sampled. The source of the chloroform is unknown. At present, there is no maximum contaminant level (MCL) within state or local DWS for chloroform alone. There is a MCL for total trihalomethanes (TTHM) --- the sum of four trihalomethane (THM) compounds (trichloromethane [chloroform],

TABLE 1
SUMMARY OF WELL MONITORING RESULTS FROM WELLS IN THE VICINITY OF
THE DAY ROAD INDUSTRIAL PARK, AUGUST 26, 1998

Tested Wells Owners Name/ Location	VOCs ppb	SVOCs ppb	Cyanide ppm	As ppm	Cd ppm	Cr ppm	Cu ppm	Ag ppm	Zn ppm	Total Coliform	Conduc- tivity µmhos/cm	Temp. °C
Sound Publishing, Inc. 7659 Day Road	13.0 ¹	ND	ND	ND	ND	ND	0.037	ND	0.008	Fail	170	11.0
Voll (drilled well) 7453 NE Day Road	ND	2.4 ²	ND	0.002 ³	ND	ND	0.003	ND	0.072	Pass	110	14.0
Voll (dug well) 7453 NE Day Road	ND	ND	ND	ND	ND	ND	0.010	ND	0.012	Fail	84	11.5
Burke 7578 Bergman Rd. NE	ND	ND	ND	ND	ND	ND	ND	ND	0.004	Fail	102	11.0
Browning (upgradient) Browning Research	ND	ND	ND	ND	ND	ND	0.003	ND	0.050	Fail	145	11.5
Martin 7471 Bergman Rd. NE	ND	1.0 ²	ND	0.002 ³	ND	ND	0.014	ND	0.011	Fail	90	16.0
State Drinking Water Standard (ppm)	Variable	Variable	0.20	0.05	0.005	0.1	3.0	0.1	5.0	Pass	700	Variable
State Groundwater Standard (ppm)	Variable	Variable	---	0.00005	0.01	0.05	0.03	0.05	5.0	1 FC /100 ml	---	---
Detection Limit	ppb	ppb	0.004 ppm	0.001 ppm	0.0002 ppm	0.005 ppm	0.002 ppm	0.003 ppm	0.004 ppm	---	---	---

Notes:

ppb = parts per billion.

ppm = parts per million.

ND = Not Detected at the reported detection limit.

--- = Information not applicable/not reportable.

1 = Chloroform detected at this level. However, the Drinking Water Standard for total trihalomethanes (TTHM) is the concentrations of four trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane, and tribromomethane) are added together to determine the TTHM for water supplies (100.0 ppb).

2 = bis (2-Ethylhexyl)phthalate. A common laboratory contaminant. These values are below both the State DWS and GS.

3 = Arsenic is commonly found in Kitsap County groundwater. This value is below the State DWS.

VOCs = Volatile Organic Compounds (including TCE)

SVOCs = Semi-Volatile Organic Compounds

Metals = As = arsenic, Cd = cadmium, Cr = chromium, Cu = copper, Ag = silver, Zn = zinc

dibromochloromethane, bromodichloromethane, and tribromomethane). The state DWS for TTHM is 100 ppb. In order to be a violation of the DWS, sampling results for TTHM levels must be equal to or above the MCL for either one, or a combination of one or more of the four THM compounds. **As shown, chloroform was the only THM contaminant found, and was below the level of state and local DWS.** Since the Sound Publishing well is not a public water supply, and does not have chloroform levels above the DWS for TTHM, the Health District has determined that there is no immediate public health hazard present from chloroform at this time.

- Of the Sound Publishing contaminants of concern, the SVOC bis(2-Ethylhexyl)phthalate was found in two of the six wells, but in concentrations below both the state DWS and GS. This SVOC is a common laboratory contaminate, which would explain the sampling result.

4.3 Coliform Bacteria

Of the six domestic wells tested for the presence of total coliform bacteria during the event, five (5) were determined unsatisfactory (Sound Publishing, Voll dug well, Browning, Martin, and Burke). An unsatisfactory result indicated the presence of coliform bacteria. Further sampling and investigation of these water-supply wells is required to determine the source of contamination in the wells servicing Sound Publishing, Browning, Martin, and Burke. These coliform results were forwarded to the Health District's Drinking Water Program. The Drinking Water Program will be conducting further investigation and sampling to confirm the presence of coliform contamination and to determine the potential source(s) of the contamination in these five wells.

The Voll's dug well was expected to have unsatisfactory results, since it a very common problem associated with shallow dug wells. No further action is required since this well is not used as a drinking water supply, and no potential cross-connections exist.

5.0 CONCLUSIONS

From the results gathered during the seventh well monitoring event, the Health District determined the following:

- TCE was not detected in any of the wells sampled.
- Cyanide was not detected in any of the wells sampled.

- Except for arsenic, none of the metals tested for in the wells were found in the sampling results. Arsenic was found at levels above the GS in two out of the six wells sampled. Arsenic is known to occur naturally in Kitsap County soils and groundwater, and has been found in these wells in the past.
- Chloroform was detected in one well (Sound Publishing). There is no human health-risk based DWS for chloroform (a trihalomethane) alone. The DWS for TTHM (the sum of the concentrations of four trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane, and tribromomethane) is 100.0 ppb. The chloroform levels detected (13.0 ppb in the Sound Publishing well) were well below the standard. No other trihalomethane compound was detected in any of the other wells tested. The GS for chloroform is 7.0 ppb. The source of the chloroform contamination is unknown.
- Five of the six wells monitored for total coliform bacteria were found to be unsatisfactory. More investigation and sampling are required to confirm these results and to determine the potential source(s) of the contamination occurring in these wells.

Of the contaminants of concern in the waste discharges from Sound Publishing:

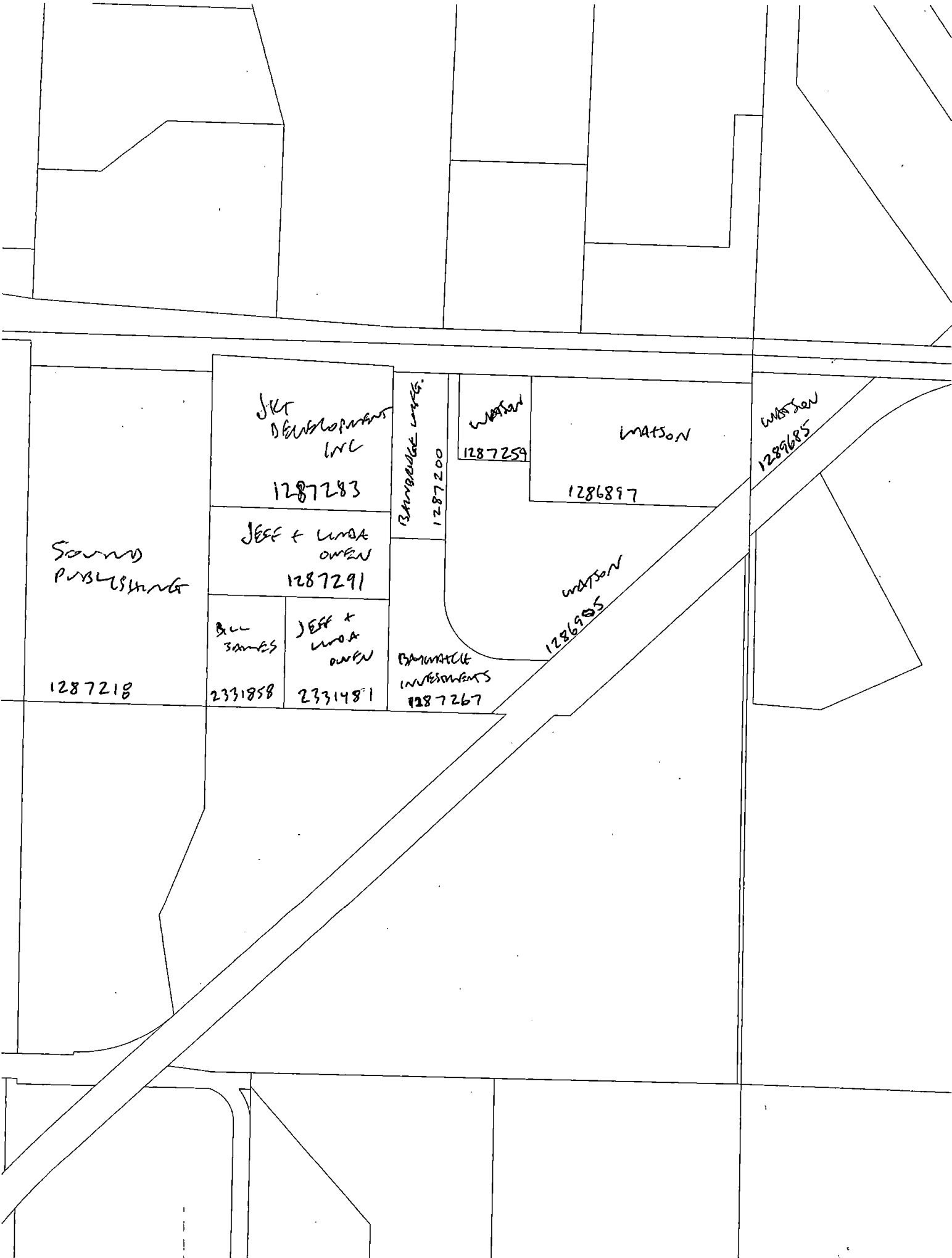
- Neither hydroquinone nor silver (Ag) were detected in any of the wells sampled; and
- The SVOC bis(2-Ethylhexyl)phthalate found in two of the six wells was most likely introduced as a laboratory contaminate at the time of examination. The results were below both the State DWS and GS.

6.0 RECOMMENDATIONS

From the results of the seventh round of sampling at the Park, the Health District recommends the following:

1. In light of the groundwater monitoring activities required by Ecology for Sound Publishing at the Park, the Health District's Drinking Water Program should assess the need to continue annual monitoring of the six wells identified in this report. If needed, continued annual monitoring of these six wells will provide long-term data about the quality of the groundwater in the area, and provide the residents who utilize the groundwater with yearly updates about their water supply.
2. The Health District, in concert with Ecology, should ensure that all potential industrial discharges from production equipment and/or processes at Sound Publishing are either eliminated or properly disposed.
3. Once in place, and on an ongoing basis, the Health District's Drinking Water Program should review the monitoring results produced under the Sound Publishing groundwater monitoring plan required by Ecology at the Park.
4. The Health District should evaluate the need for an ongoing inspection program for industrial/business parks utilizing OSS to determine if illegal industrial waste discharges are occurring.

APPENDIX A-1
LABORATORY ANALYSIS SHEETS



APN	TAXPAYER DATA
1286897	WATSON GRAHAME & BARBARA
1286897	P O BOX 4603
1286897	ROLLING BAY WA 980610603
1286905	WATSON GRAHAME & BARBARA
1286905	P O BOX 4603
1286905	ROLLING BAY WA 980610603
1287200	BAINBRIDGE MFG INC
1287200	7873 N E DAY RD
1287200	BAINBRIDGE ISLAND WA 98110
1287218	SOUND PUBLISHING INC
1287218	7689 NE DAY RD
1287218	BAINBRIDGE ISLAND WA 98110
1287259	WATSON GRAHAME & BARBARA
1287259	P O BOX 4603
1287259	ROLLING BAY WA 980610603
1287267	BAYWATCH INVESTMENTS INC
1287267	7075 NE BAY HILL ROAD
1287267	BAINBRIDGE ISLAND WA 98110
1287283	JKT DEVELOPMENT INC
1287283	1033 OLD BLYN HWY
1287283	SEQUIM WA 98382
1287291	OWEN JEFFREY D & LINDA M
1287291	7869 NE DAY RD W
1287291	BAINBRIDGE ISLAND WA 98110
2331858	JAMES WILLIAM E
2331858	31 PHILLIPS AVE
2331858	ROCKPORT MA 01966

**DEPARTMENT OF ECOLOGY -- TOXICS CLEANUP PROGRAM
INTEGRATED SITE INFORMATION SYSTEM
SITE DATA SUMMARY
AS OF 12/20/2000**

FACILITY SITE ID: 2611 **SITE NAME:** DAY ROAD INDUSTRIAL PARK **TCP ID:** N-18-5001-000

SITE LOCATION INFORMATION

ADDRESS: DAY RD W & HWY 305

DEGREES MINUTES SECONDS

LATITUDE: 47 40 45.41
LONGITUDE: 122 32 20.76

TOWNSHIP RANGE SECTION

25N 2E 3

CITY: BAINBRIDGE ISLAND

ZIP CODE: 98110

COUNTY: KITSAP

TAX PARCEL #:

LEGISLATIVE DISTRICT #: 23

CONGRESSIONAL DISTRICT #: 1

SITE STATUS INFORMATION

ECOLOGY STATUS: 4 Independent RA

INDEPENDENT STATUS: 2 Ind. Site assessment or interim RA report received

PROGRAM PLAN:

RESPONSIBLE UNIT: NORTHWEST

SITE MANAGER: ATKINSON, ELAINE

ENTERED DATE: 3/1/88

SITE UPDATE DATE: 8/20/96

WARM BIN #: 5

STATUTE: 2

ERTS ID:

LUST ID:

PROJECT CODE:

MTCA only

NFA CODE:

NFA DATE:

SITE COMMENTS

Part of site reviewed under IRAP. 7865 NE Day Rd. W. Health Dist. sampled residential wells in vicinity. No TCE detected 6/96.

AFFECTED MEDIA AND CONTAMINANTS INFORMATION

MEDIA	STATUS	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	DW TYPE:
1 Groundwater	C		C																2
6 Drinking Water	S		S																
4 Soil	S		S																

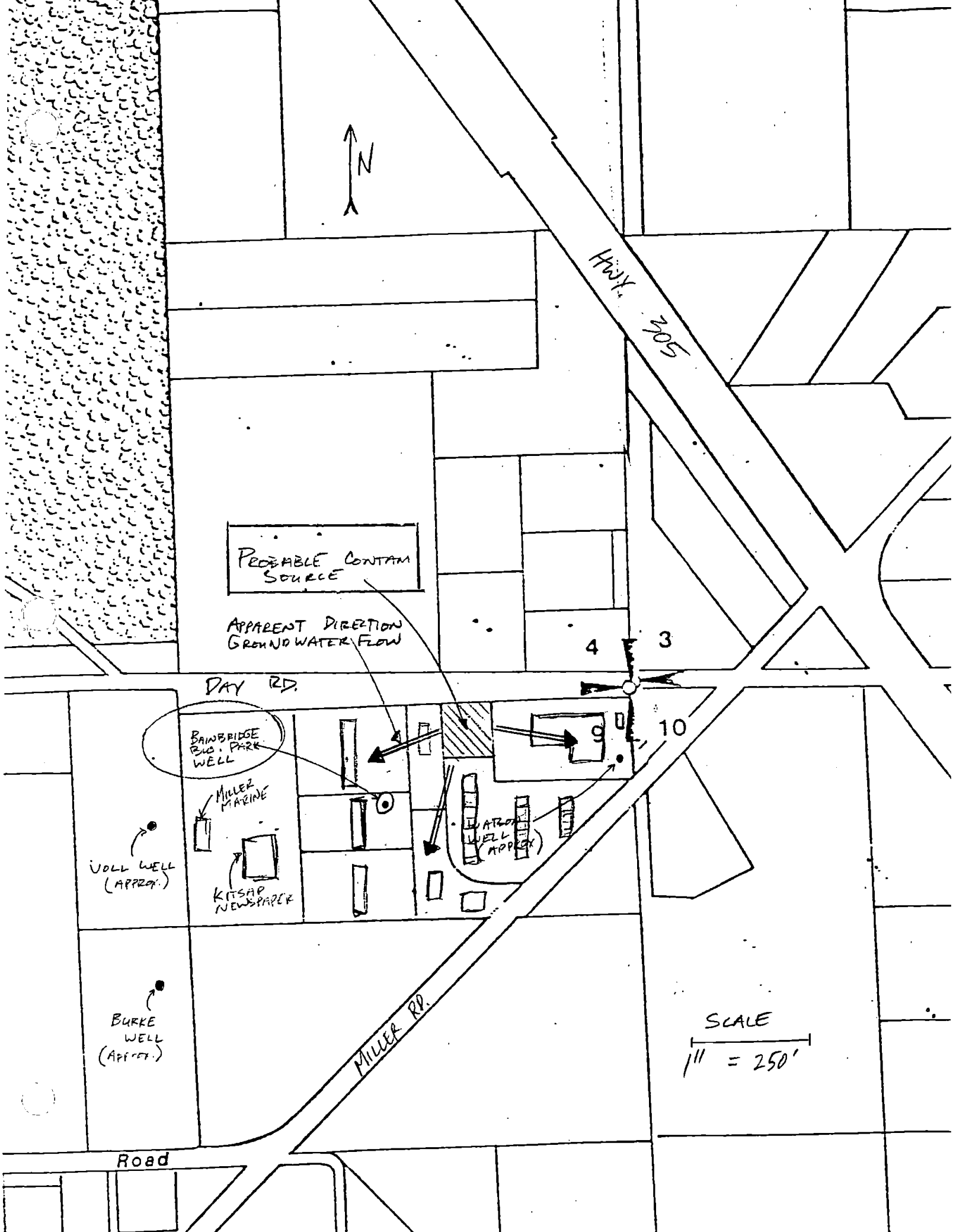
Post-It Fax Note	7671	Date	12/20/00	# of pages	2
To	John Kress	From	[Signature]	Co.	
Co/Dept.	Kitsap Co.	Phone #		Fax #	602-6684

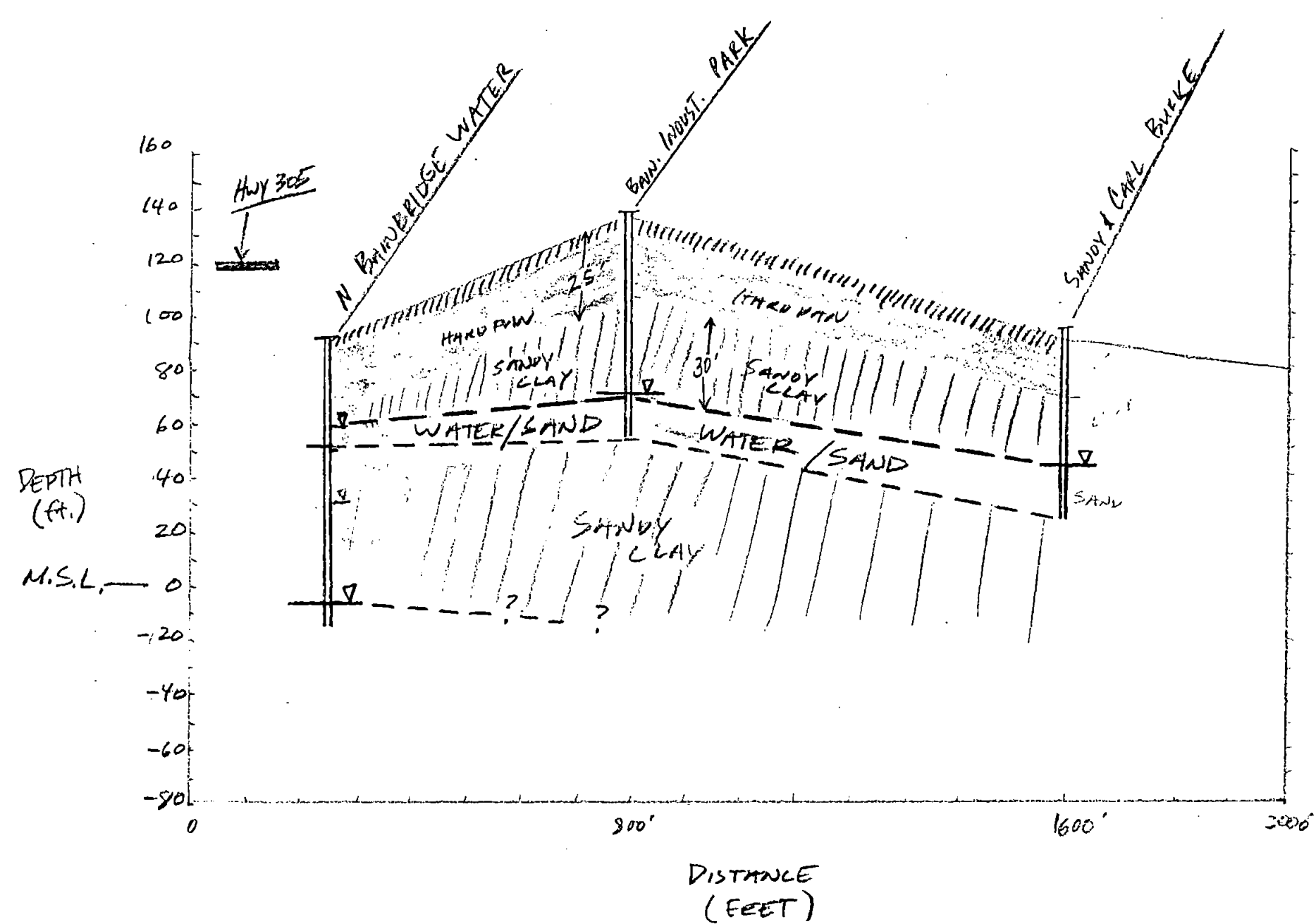
AFFECTED MEDIA AND

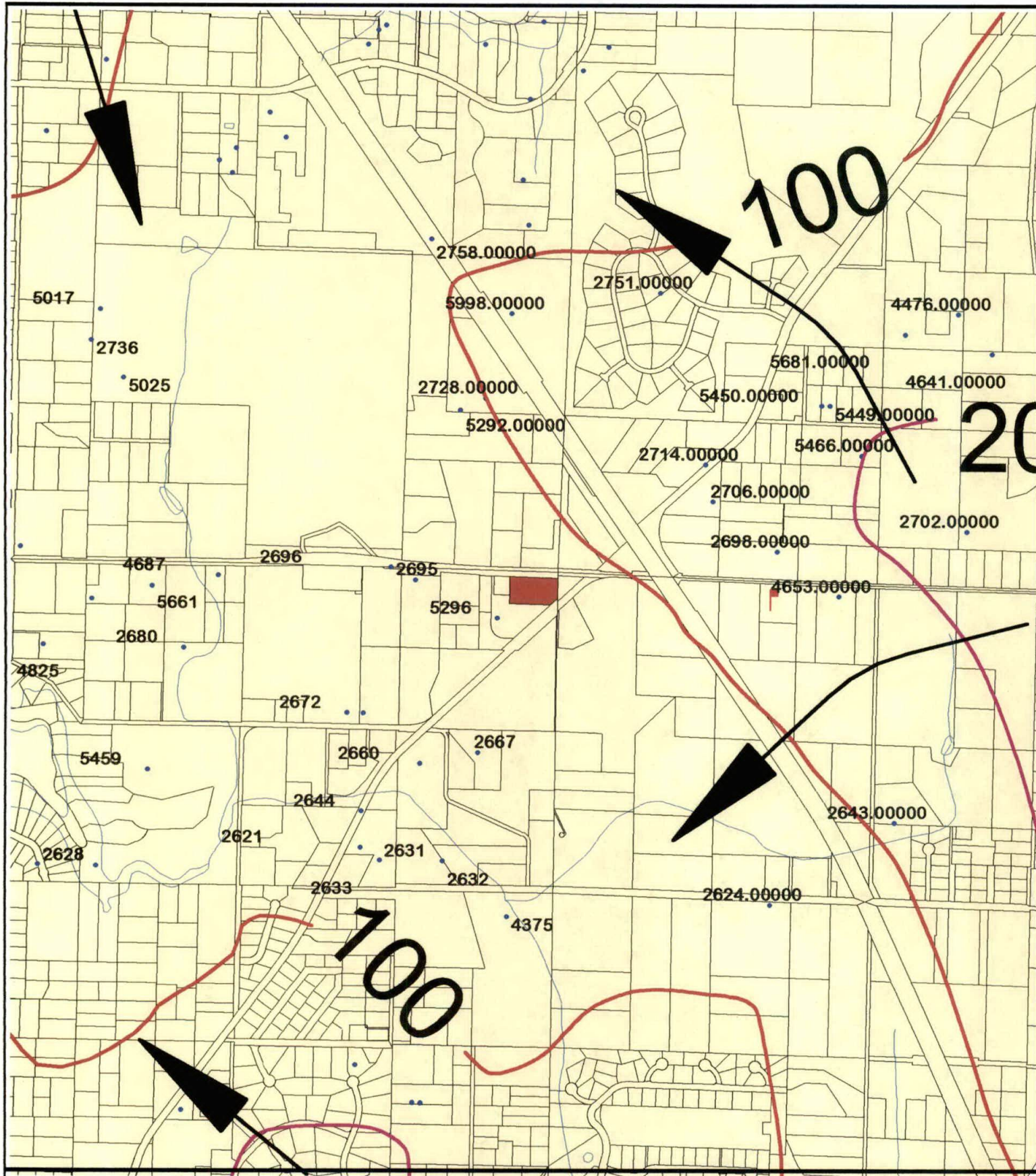
#1 = Base/Neutral Organics
#2 = Halogenated Organic Compounds
#3 = Metals-Priority Pollutants
#4 = Metals-Other
#5 = PCB
#6 = Pesticides

#7 = Petroleum Products
#8 = Phenolic Compounds
#9 = Non-Halogenated Solvents
#10 = Dioxins
#11 = PAH
#12 = Reactive Wastes

#13 = Corrosive Wastes
#14 = Radioactive Wastes
#15 = Conventional Contaminants, Organic
#16 = Conventional Contaminants, Inorganic
#17 = Asbestos



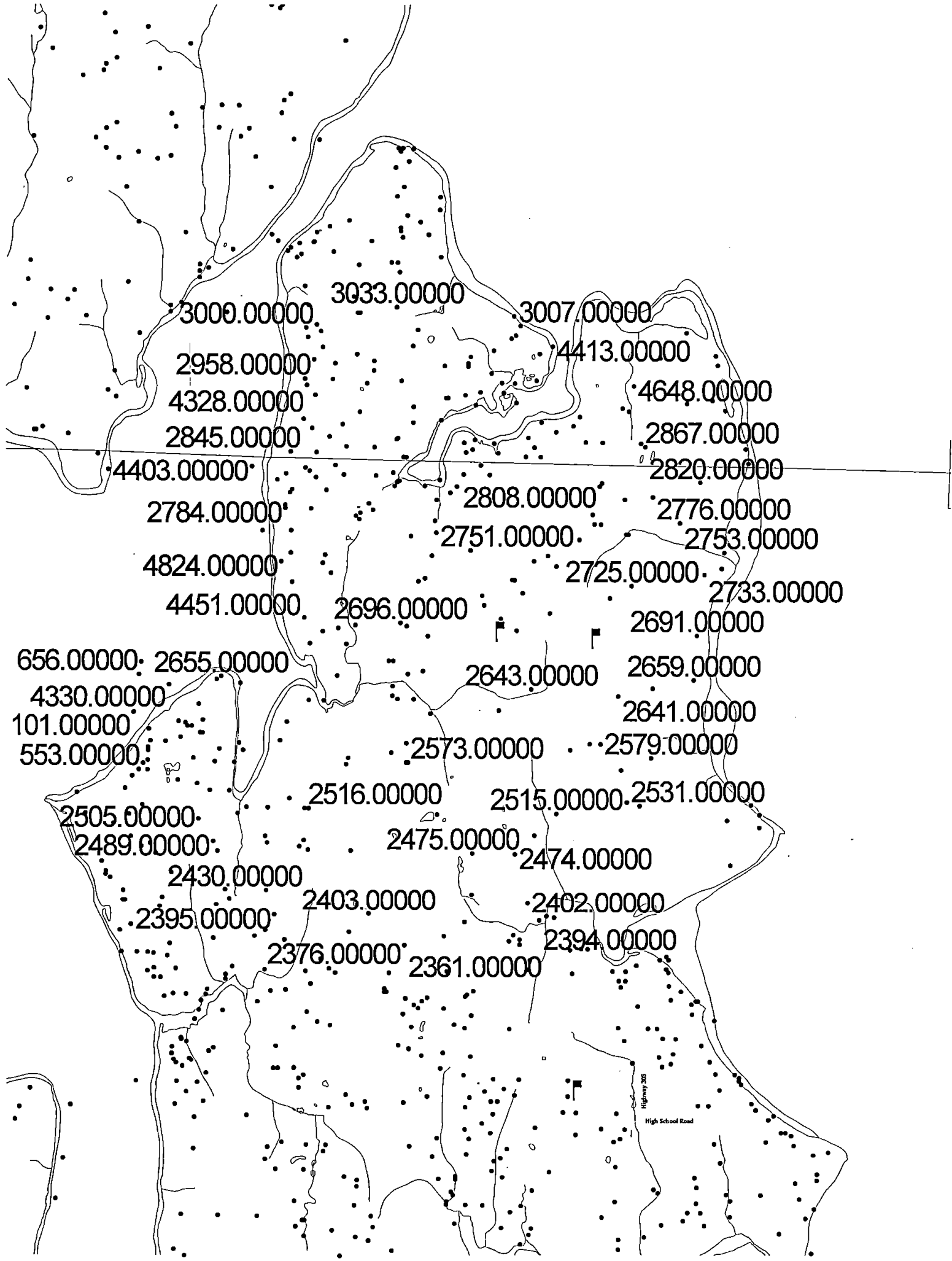




500 0 500 Feet



Day Road Ind. Park



3000.00000 3033.00000 3007.00000
2958.00000 4413.00000
4328.00000 4648.00000
2845.00000 2867.00000
4403.00000 2820.00000

2784.00000 2808.00000 2776.00000
2751.00000 2753.00000
4824.00000 2725.00000 2733.00000
4451.00000 2696.00000 2691.00000

656.00000 2655.00000 2643.00000 2659.00000
4330.00000 2641.00000
101.00000 2573.00000 2579.00000
553.00000

2505.00000 2516.00000 2515.00000 2531.00000
2489.00000 2475.00000 2474.00000
2430.00000 2403.00000 2402.00000
2395.00000 2394.00000
2376.00000 2361.00000

Highway 305
High School Road