Health Consultation

WHITEWAY CLEANERS SITE
(a/k/a WHITE WAY CLEANERS)

MINNEAPOLIS, HENNEPIN COUNTY, MINNESOTA

EPA FACILITY ID: MND981094485

MARCH 22, 2004

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Prepared by:

Minnesota Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

FOREWORD

This document summarizes public health concerns at a hazardous waste site in Minnesota. It is based on a formal site evaluation prepared by the Minnesota Department of Health (MDH). For a formal site evaluation, a number of steps are necessary:

- *Evaluating exposure:* MDH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is found on the site, and how people might be exposed to it. Usually, MDH does not collect its own environmental sampling data. Rather, MDH relies on information provided by the Minnesota Pollution Control Agency (MPCA), the US Environmental Protection Agency (EPA), and other government agencies, private businesses, and the general public.

- *Evaluating health effects:* If there is evidence that people are being exposed—or could be exposed—to hazardous substances, MDH scientists will take steps to determine whether that exposure could be harmful to human health. MDH's report focuses on public health— that is, the health impact on the community as a whole. The report is based on existing scientific information.

- *Developing recommendations:* In the evaluation report, MDH outlines its conclusions regarding any potential health threat posed by a site and offers recommendations for reducing or eliminating human exposure to contaminants. The role of MDH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions to be taken by other agencies—including EPA and MPCA. If, however, an immediate health threat exists, MDH will issue a public health advisory to warn people of the danger and will work to resolve the problem.

- *Soliciting community input*: The evaluation process is interactive. MDH starts by soliciting and evaluating information from various government agencies, the individuals or organizations responsible for cleaning up the site, and community members living near the site. Any conclusions about the site are shared with the individuals, groups, and organizations that provided the information. Once an evaluation report has been prepared, MDH seeks feedback from the public. *If you have questions or comments about this report, we encourage you to contact us.*

Please write to: Community Relations Coordinator
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OR call us at: (651) 215-0916 *or* 1-800-657-3908
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I. Summary of Background and History

The Whiteway Cleaners (a.k.a. Despatch Laundry) site is located at the southwest corner of 26th Street East and Stevens Avenue in Minneapolis, Minnesota. The site is located in a mixed commercial and residential neighborhood (the Whittier neighborhood), with both single-family and multi-family homes and apartments. The site currently consists of 0.65-acre gravel surfaced vacant lot used for neighborhood parking. The property was occupied by a large dry cleaning and laundry operation from approximately 1900 until 1986. The property was also occupied by an auto service station in the 1930's and 1940's; a house once stood on the southern end of the site. The buildings on the site were vacated after dry cleaning operations ceased in 1986 and were demolished in 1994. The site is on tax-forfeited land and is currently administered by Hennepin County (Bay West 2003a). The location of the site is shown in Figure 1, and the original site features are shown in Figure 2.

A release at the site was first identified in 1983 when neighbors complained of an oily substance running out from beneath the garage doors of the dry cleaning facility (Bay West 2003a). The initial investigation at the site was conducted by the site owners in 1987 under the direction of the city of Minneapolis Pollution Control Division and contaminated soil and groundwater were found. The site was listed on the federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), a list of potential Superfund sites, in May of 1989. In early 1990, the site entered the Minnesota Pollution Control Agency's (MPCA) Property Transfer Program (now the Voluntary Investigation and Cleanup (VIC) Program). The VIC Program provides technical assistance to site owners and potential developers. In 1993, the site was also entered into the MPCA's Leaking Underground Storage Tank (LUST) Program; six underground storage tanks (USTs) were subsequently removed from the site. The USTs were used variously for gasoline, fuel oil, and dry cleaning solvent storage. The MPCA LUST Program closed the site file in 1996. Because of a lack of activity on the part of the site owners, and the eventual tax-forfeiture of the site, it was listed on the Minnesota Permanent List of Priorities, the state Superfund list, in 1998.

Investigations at the site indicate that soils at the site and groundwater across a wide area in the vicinity of the site are contaminated with high levels of tetrachloroethylene (also known as perchloroethylene, or PCE) and other chlorinated volatile organic compounds (VOCs). Some areas of the site are also contaminated with petroleum products. PCE is a common dry cleaning solvent; petroleum products (specifically Stoddard solvent, a petroleum distillate) were also used for dry cleaning. The sources of the contamination appear to be primarily from spillage or disposal of dry cleaning wastes in the basement of the former facility, and leakage from the former USTs. A "perc room" was identified in the basement of the former dry cleaning facility (see Figure 2).

Given the extent of PCE contamination remaining in soil and groundwater at the site, the MPCA Superfund Program has been overseeing investigation and cleanup activities. Due to recent interest in the redevelopment of the site by Hennepin County, the City of Minneapolis, and area

Figure 4. High levels of some petroleum related VOCs, such as the trimethylbenzene compounds, were also found in some of the 2002 push-probe borings.

The horizontal extent of the PCE and petroleum contamination in soil does not appear to be large, especially at shallow depths and in the fill materials, and is centered beneath and immediately around the former loading dock area and "perc room." It may extend under Stevens Avenue on the east side of the site, and low levels of PCE may be present on the western edge of the site, near the alley. That the highest levels of PCE contamination are found at significant depth (typically 15 to 30 feet below grade) is likely because the contamination was the result of leakage from USTs and from leakage or disposal of PCE wastes through the basement floor of the "perc room." Only low levels of PCE were found in the shallow soils, mainly in the former loading dock area. None of the PCE results in the shallow soils (0-2 feet below grade) exceeded the applicable MPCA Tier I (residential) Soil Reference Value (SRV) for PCE of 72 mg/kg, so exposure to contaminants in shallow soils is unlikely to represent a human health risk. The SRV is a soil evaluation criterion based on the protection of human health from direct contact with contaminated soil through ingestion, skin contact, and inhalation of vapors and/or contaminated dust particles. There are no specific SRVs for the petroleum products.

Groundwater Data

Since investigation activities at the site began, a total of 14 permanent monitoring wells have been installed at and around the site to evaluate groundwater quality. Two groups of nested wells (a shallow aquifer and a bedrock well located in the same location) make up 4 of the 14 monitoring wells. The monitoring well identifications, screen intervals (depth), and general locations are as follows:

Well ID	Screen Interval (feet)	Monitoring Well Location
MW-1	58 – 73	NE corner of site
MW-2	58 – 73	East-central boundary of site
MW-3	58 – 73	West side of site
MW-4	55 – 70	SE corner of site
MW-5	126 – 131	NE corner of site
MW-6	85 – 90	Approx. 200' NE of site
MW-7	82 – 87	NW corner of site
MW-7a	228 – 233	Approx. 200' NE of site
MW-8	82 – 87	NE corner of site
MW-8a	145 – 150	Approx. 500' NE of site
MW-9	82 – 87	SE corner of site
MW-10	78 – 83	Southern boundary of site
MW-11	218 – 223	Approx. 200' east of site
MW-12	60 – 75	Approx. 200' east of site

PCE and TCE, at concentrations well below the odor threshold may be of long-term health concern.

This sampling was conducted using Summa canisters (non-reactive, coated stainless steel canisters placed under a vacuum), which are portable and can be used to collect air samples instantaneously. A low-flow restrictor valve can also be used with a Summa canister to collect air samples over a period of as long as 24 hours. Air samples are then analyzed for VOCs using EPA Method TO-14. Detection limits below one part-per-billion (generally less than 10 micrograms per cubic meter ($\mu g/m^3$) for most compounds) are possible using this method.

Two instantaneous (grab) air samples were collected from bottom of the sanitary sewer and storm sewer on Stevens Avenue, along the east side of the site, in May of 2002. The samples were analyzed for VOCs; PCE was detected at a concentration of 27 $\mu g/m^3$ in the sanitary sewer sample and at a concentration of 6.8 $\mu g/m^3$ in the storm sewer sample. Low levels of toluene and styrene were also detected in these samples. No other VOCs were detected. The results indicate that PCE vapors from the contaminated soil, which lies very close to (and perhaps even beneath) the buried sewer lines, may be penetrating the sewer lines through cracks or joints. It is possible that the PCE vapors could be coming from other sources, such as urban runoff or improper disposal through the sanitary sewer. However, this is unlikely because PCE is highly volatile (it evaporates quickly) and would not travel for any great distance through the sewer, and its use and disposal are now closely regulated.

Twenty-four hour air samples have also been collected using Summa canisters in four off-site buildings adjacent to the site. Three of the four buildings have been sampled on multiple occasions, with samples collected from both the basement and first floor. The results of the sampling are presented in Table 1, and the sample locations and PCE concentrations are shown in Figure 6. Applicable long-term (or chronic) screening air criteria are also shown in Table 1 for comparison.

As can be seen in Table 1, only one common VOC (toluene) was detected in the basement of Building A, so further monitoring was deemed unnecessary. Multiple VOCs were detected in all of the samples collected from the other three buildings, including benzene, ethylbenzene, methylene chloride, toluene, PCE, TCE, trimethylbenzenes, and xylenes. When possible, their concentrations were compared against MDH chronic Health Risk Values (HRVs) for air, EPA reference concentrations (RfCs) for non-carcinogens, or criteria known as Interim Screening Criteria (ISCs) that have been developed by MDH for carcinogenic compounds for which there are no chronic HRVs. Levels of PCE and TCE consistently exceeded their respective ISCs, as did levels of benzene and 1,2,4-trimethylbenzene. The HRVs, RfCs, and ISCs are health-based criteria and represent levels considered by MDH to be safe exposure levels for the general population, including sensitive sub-populations. In the spring of 2003, letters were sent to the building owners and residents informing them of the results of the indoor air sampling and explaining the potential health risks.

each of the four vapor monitoring points, one monitoring point was installed in the sand unit and one in the clay unit.

The SVE pilot study was complicated by the fact that the bottom of the CEP became submerged in a layer of groundwater perched atop the clay unit. Efforts to bail out the CEP proved fruitless, because groundwater refilled the CEP within a short time. One of the four vacuum monitoring points completed in the clay layer was also submerged. Eventually, the SVE pilot test of the clay layer was conducted by testing each of the three dry clay vacuum monitoring points individually, and monitoring system performance using the remaining clay monitoring points and the sand layer monitoring points.

The results of the SVE pilot test showed that SVE is a viable remedial alternative, and would be very effective at removing VOCs from the sand deposits beneath the site. The pilot study also showed that applying a vacuum to the sand deposits results in a vacuum in the clay layer (and vice verse), indicating that VOCs could be removed from the clay as well, albeit more slowly. The study indicated that the likely radius of influence of the soil vapor extraction wells is between 24 and 60 feet.

The successful pilot study demonstrated that SVE is a viable technology to clean up the VOC contamination in the subsurface soils (Bay West 2003c). Emissions from a full-scale SVE system would be high, however, given the high concentrations of PCE in the soil. An exhaust sample collected during the SVE pilot study using a Summa canister and analyzed for VOCs using EPA Method TO-14 contained 11,000 parts per million (or 79,790 $\mu g/m^3$) of PCE, plus low levels of TCE and three other VOCs. Using this measured concentration, an estimated 2,111,372 micrograms of PCE per cubic foot of air ($\mu g/ft^3$) would be emitted from a full-scale SVE system. At this concentration, the allowable emissions rates for VOCs to air established by the MPCA (known as Significant Emission Rates, or SERs) would be exceeded at a system flow rate of only 2.2 cubic feet of air per minute (cfm). At this very low flow rate, cleanup of the site would take many years, if not decades, and the system would likely fail to prevent off-site migration of PCE vapors. To prevent emissions of VOCs above the SERs and achieve cleanup of the site in a relatively short time frame will require the use of emission controls on the SVE system.

The response action approved for the site (in-situ SVE) will be implemented in conjunction with the redevelopment of the site. A response action plan (RAP) for the site has been developed by Bay West, on behalf of the MPCA, Hennepin County, and the proposed developers of the site (Bay West 2003b). The RAP is designed to address soil contamination only, and does not include remediation of groundwater. Over the long-term, however, the SVE system will also have a positive effect on groundwater quality as the contamination source is removed from the soil. The intention of the RAP is to treat soils containing greater than 1 mg/kg of PCE in and above the sandy clay layer, and soils containing greater than 5 mg/kg below the sandy clay layer. These concentrations are well below the SRVs for PCE, and should also eliminate the contaminated soils as a source of sub-surface vapor migration.

Site Visit

On May 12, 2003, MDH staff conducted a site visit to the Whiteway Cleaners Site, located at the intersection of Stevens Avenue South and 26th Street East in Minneapolis. The primary purpose of the site visit was to become familiar with the location and layout of the site, especially the locations of monitoring wells and potential soil gas extraction wells and the locations where indoor air samples have been collected. A technician from Bay West, the consultant conducting the indoor air sampling on behalf of the MPCA, was also present.

The Whiteway Cleaners site itself is a gravel contract parking lot dotted with monitoring and test wells. Several drums of residual investigation wastes remained to be disposed (note: these drums of investigation wastes were properly disposed on June 5, 2003; John Evans, Hennepin County, personal communication, 2004). The site buildings (including one house) were demolished about 10 years ago. The site is currently owned by Hennepin County, which is pursuing a mixed commercial/residential redevelopment of the site as described above.

As a result of soil and groundwater contamination at the site, the MPCA collected indoor air samples in the basements and first floors of four buildings surrounding the site. These four buildings (Buildings A, B, C, and D; see Figure 6) are the closest to the areas of highest contamination. An initial sample collected in the basement of Building A showed no VOCs related to the site. The building to the south of Building C is a multi-unit, split-level apartment building with only a shallow basement, and is not expected to be as susceptible to soil gas intrusion. Multiple VOCs believed related to the PCE contamination at the site have been found in previous air samples collected from Buildings B, C, and D.

The Bay West technician prepared the Summa canisters used for the sampling by attaching the low-flow regulator valves, noting the pressure inside the canister at the start of the sampling, and recording the starting time and location of the sample. The sample time was 24 hours. The Summa canisters were placed in the same locations used for the previous samples. The sampling locations were inspected and the following observations made:

Building A:

This building is used for commercial purposes only. Indoor air monitoring did not indicate the presence of site-related VOCs, so the interior of the building was not inspected.

Building B:

First floor: The building is a two-story side-by-side duplex. The first floors of these units are interconnected and appear to be used as a community meeting/art center or perhaps a youth center. Much of the space appeared to be infrequently used, although there was a slight odor of paint in the air. The Summa canister was set up about 10 feet in from the door.

Basement: The basements of the two units are also interconnected, and appear to be used for music practice, meeting space, and storage. The floor is painted concrete, and the walls painted flat fieldstone. The Summa canister was placed against the west wall of the basement, at the

Based on its volatility and the behavior of PCE in the environment, inhalation is usually the most common exposure pathway (over ingestion or dermal exposure from water and soil) (McKone and Daniels 1991). Once released into the environment, PCE easily volatilizes from soil and water. Factors that can affect the rate of volatilization from soil include soil type, organic matter content of soil, moisture content of soil, and the type of release (e.g., how large of a spill). Volatilization will tend to be higher in sandy soils and lower in denser, more organic soils such as clays where PCE may be adsorbed onto organic carbon particles. PCE also tends to move rapidly through soil, and can easily contaminate shallow groundwater. PCE is denser than water, and, if present in sufficient concentrations in groundwater, it may sink to form a pool at the base of the groundwater aquifer. This pool of dense, non-aqueous phase liquid (or DNAPL) can serve as a continuing source of groundwater contamination.

People are commonly exposed to PCE and other VOCs found at the site through a number of pathways and in a number of situations. They are present in the environment (in ambient air and water), and in our homes and workplaces (in products and building materials). Levels of PCE measured in ambient air have ranged from less than 1 $\mu g/m^3$ to as high as 9.0 $\mu g/m^3$, while levels above 100 $\mu g/m^3$ have been measured in some industrialized areas (ATSDR 1997). Levels of PCE measured in indoor air in homes in Minnesota ranged from non-detect to 120 $\mu g/m^3$ in a recent study conducted in part by MDH (Stroebel et al 1997), indicating it is a contaminant that can be found at high levels in indoor air. The health-based criterion for PCE developed by MDH (the ISC) for screening purposes is 3.33 $\mu g/m^3$. Lifetime estimates of excess cancer risk from exposure to PCE in indoor air have been estimated to be as high as 1.4×10^{-2} based on measured concentrations in homes (Tancrede et al 1987). VOCs in indoor air may also contribute to respiratory hypersensitivity and be capable of triggering asthmatic symptoms, although this relationship is not well established (Becher et al 1996).

Soil Contamination

There are areas of highly contaminated soil at the site. Maximum levels of PCE in soil exceed the MPCA Tier I (residential) Soil Reference Value (SRV) by a factor of several hundred. The SRV is a soil evaluation criterion based on the protection of human health from direct contact with contaminated soil through ingestion, skin contact, and inhalation of vapors and/or contaminated dust particles. Because all of the PCE detections which exceed the SRV of 72 mg/kg are found at significant depth (more than 2 feet below ground), there is little possibility of regular direct contact with the soil by local residents or those who park their cars at the site. The same is true for the high levels of residual petroleum contamination found in soils at the site. There is the potential for exposure when the contaminated soil is excavated for redevelopment. Such activities should only be conducted under an approved site safety and health plan, as has been proposed by Hennepin County. The contaminated soil also serves as a continuing source of groundwater contamination, and is the likely source of vapors in indoor air in adjacent structures.

The MPCA's consultant has evaluated various options for further remediation of the contaminated soil, and has concluded that the installation of an in-situ SVE system will be the most effective long-term remedy (Bay West 2003a). The predominantly sandy soils at the site,

trimethylbenzenes. Concentrations of the petroleum-related VOCs are within typical reported background ranges, however, and their concentrations were generally higher in samples collected from the main level than they were in the basements in all three homes. This suggests a background source within the main living spaces (or outdoors) as opposed to a below-ground environmental source outside of the structure. Many of these VOCs are common household contaminants, found in fuel oil, cigarette smoke, cleaners, etc., and in vehicle emissions. The opposite is true for TCE and PCE, which were found at levels well above typical background ranges in all three buildings, and were generally at higher concentrations in basement spaces than in main floor samples. This does suggest a below ground environmental source, such as the heavily contaminated soil located very near the three buildings in which PCE and TCE were detected in indoor air. Potential sources of TCE or PCE were also not observed in the three buildings during a site visit. The basement construction of the three buildings (fieldstone walls, with two having partial dirt floors) would also contribute to vapor intrusion.

The ISCs used for comparison to levels of PCE and TCE found inside the nearby structures were developed using the most recently available toxicological information, and are consistent with HRV methodology. The ISCs were developed using common risk assessment parameters. The excess lifetime cancer risk level used was 1×10^{-5}, or 1 in 100,000, which is the default limit used in Minnesota. Estimated excess lifetime cancer risks below this level are considered to be negligible. The ISCs are intended for simple screening for the identification of potential problem situations and not as actual, long-term health standards. The derivation of the ISCs is shown in Appendix 1.

The fact that concentrations of PCE and TCE in indoor air have consistently exceeded their respective health-based ISCs indicates that an excess lifetime incremental cancer risk exists for residents or others who essentially spend all or a majority of their time at the three buildings, in the sampled areas, over a lifetime. To put it another way, if a person spent all day, every day at Building B, based on the average concentrations of PCE and TCE detected their estimated excess lifetime cancer risk from exposure to the PCE and TCE at these concentrations would be approximately 38 in 100,000. Note that as an incremental risk, this estimate is in addition to the reported lifetime cancer incidence rate of Minnesota citizens, which is approximately 40% (or 40,000 in 100,000).

The ISCs and associated risk estimates were developed using conservative exposure assumptions. The assumptions used may not reflect the actual exposures that may occur at the buildings, and in fact likely overestimate them. The true health risks are probably lower. Exposures to PCE and TCE vapors in Building B are likely limited, because the basement and first floor uses are non-residential. Exposures in Building C may be higher, because part of the first floor appears to be a residence. The other part of the first floor is used as a woodworking shop, and is frequently occupied. The consistent detection of methylene chloride (a common ingredient in paint stripper and some other commercial products) in air in Building C at levels in excess of the HRV is probably related to the woodworking operation. The basement of Building D is not currently usable for living space, and the first floor residence is no longer being rented out and is now occupied by the building owner (B. Lundeen, personal communication, 2003).

special concern to communities faced with contamination of their water, soil, air, or food. Children are at greater risk than adults from certain kinds of exposures to hazardous substances at waste disposal sites. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are smaller than adults, which means they breathe dust, soil, and heavy vapors close to the ground. Children also weigh less, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

Children may have been exposed to VOC vapors from the infiltration of soil gas into buildings near the site, and exposures may be ongoing. Since the highest levels of PCE and TCE have been found in the basements of the nearby buildings where it does not appear children spend a large amount of time, such exposures may not represent a long-term health concern for children. The proposed SVE system should reduce or eliminate the potential for exposure in the near future.

III. Conclusions

The Whiteway Cleaners site in the City of Minneapolis was the location of a dry cleaning operation for much of the 20th century, and also a service station. Significant spillage or outright disposal of petroleum products and dry cleaning wastes occurred at the site. Levels of VOCs in soil significantly exceed the MPCA's soil evaluation criteria for direct human contact. However, the contaminated soil is at a depth where the likelihood of human contact is minimal given the sites current use as a parking lot. The uppermost groundwater and the bedrock groundwater aquifers beneath the site are grossly contaminated with PCE and TCE, at levels significantly in excess of the HRLs. A well survey in the area has not shown any drinking water wells to be impacted, however. The full extent of the groundwater plume has not been identified.

Indoor air samples collected on multiple occasions using Summa canisters in three buildings adjacent to the site show detectable levels of PCE and TCE. The levels detected consistently exceed health-based screening criteria developed by MDH, and indicate that people in or using the buildings may be exposed at levels associated with an excess lifetime incremental cancer risk that exceeds the criteria used in Minnesota of 1 in 100,000. Exposure to these levels of PCE and TCE may not be occurring on a constant basis, and the risk may be overestimated. For this reason, the site currently is classified as posing no apparent public health hazard at this time. However, if not remediated, this site could pose a health hazard in the future, especially if the exposure becomes more frequent and/or the contaminant levels rise.

The proposed in-situ SVE system should be effective in cleaning up the site and preventing exposure to PCE and TCE in indoor air in the surrounding buildings. The conceptual design of the proposed development on the site incorporates several safeguards that also should prevent

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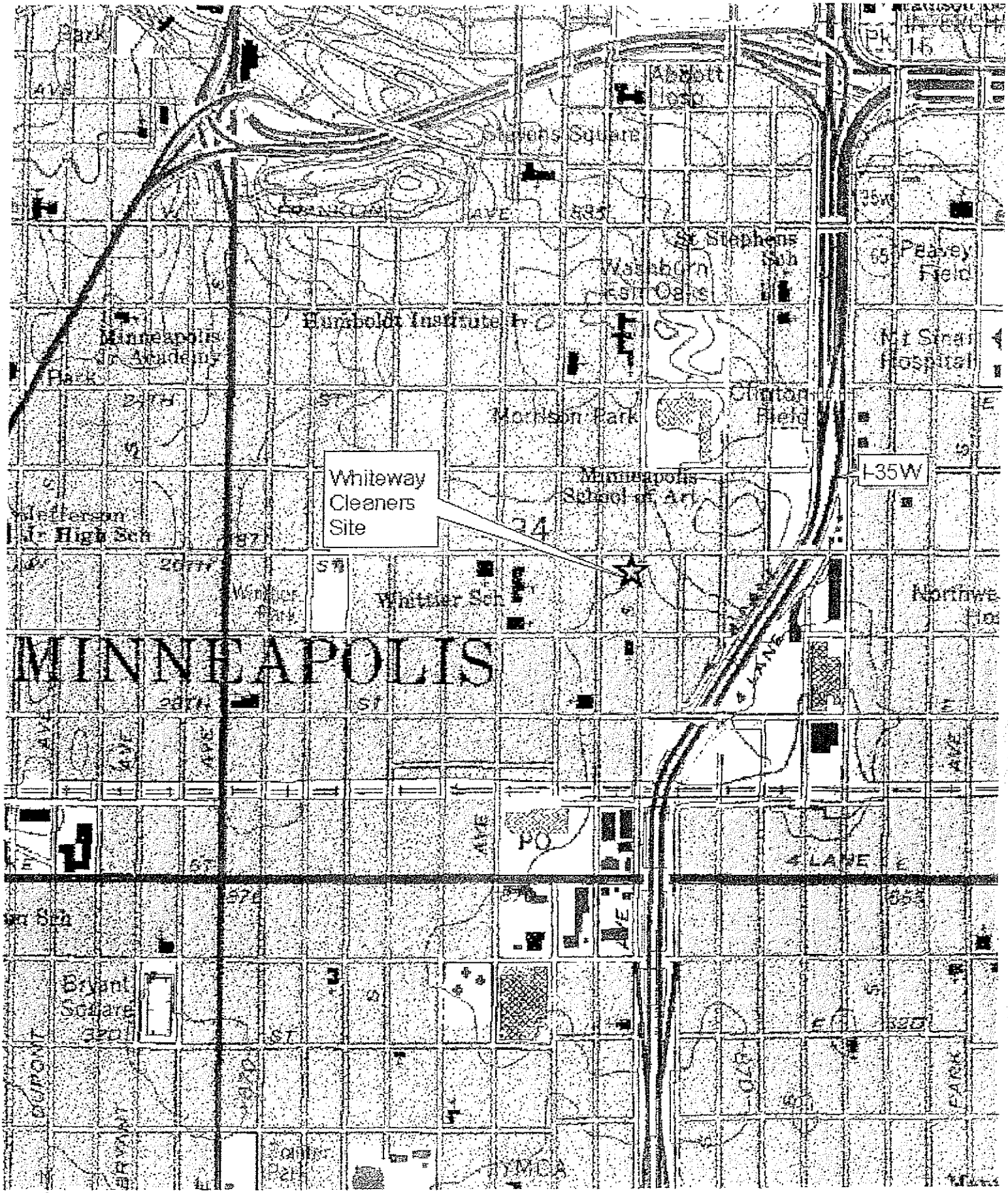
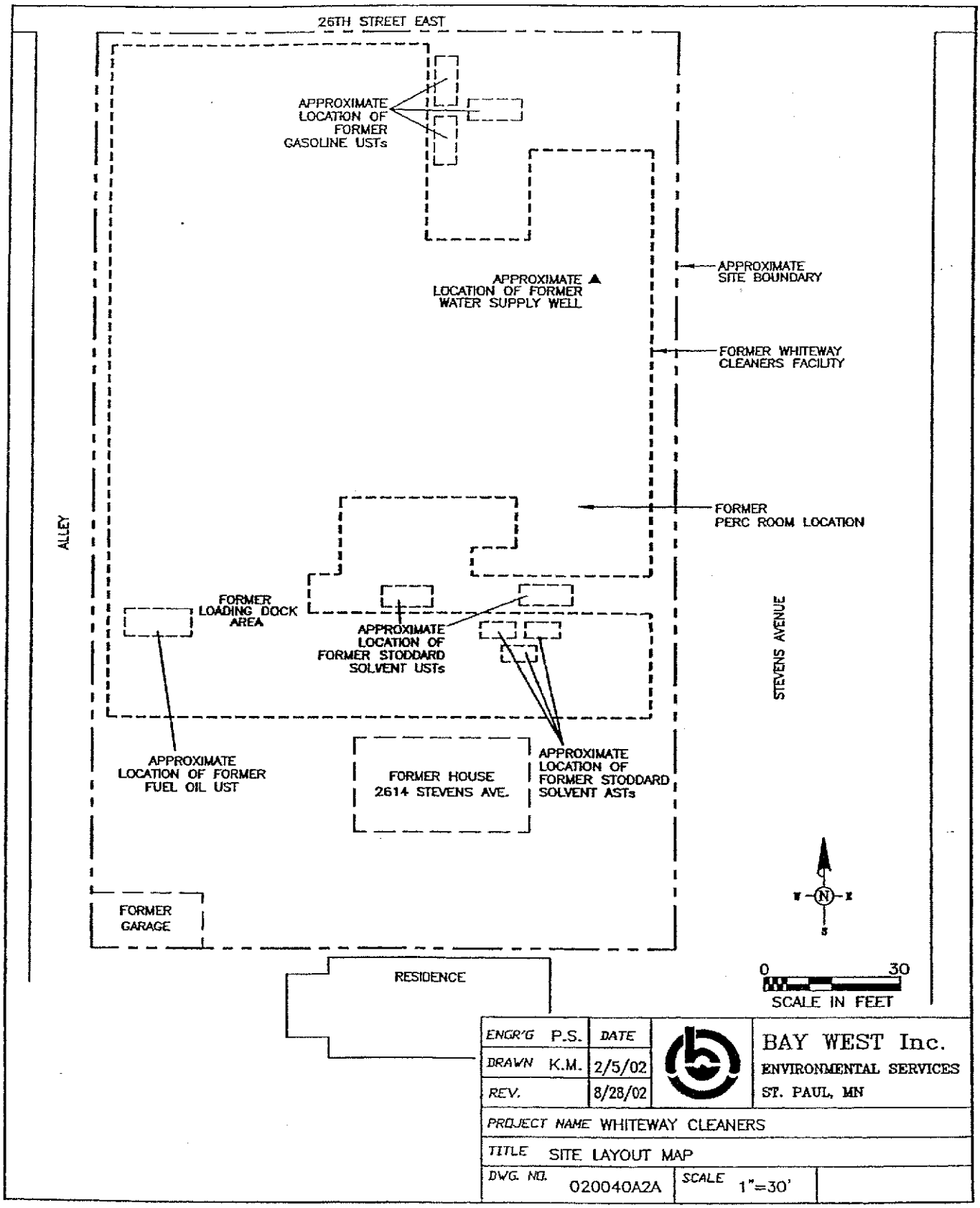


Figure 1: Site Location

Figure 2: Site Features



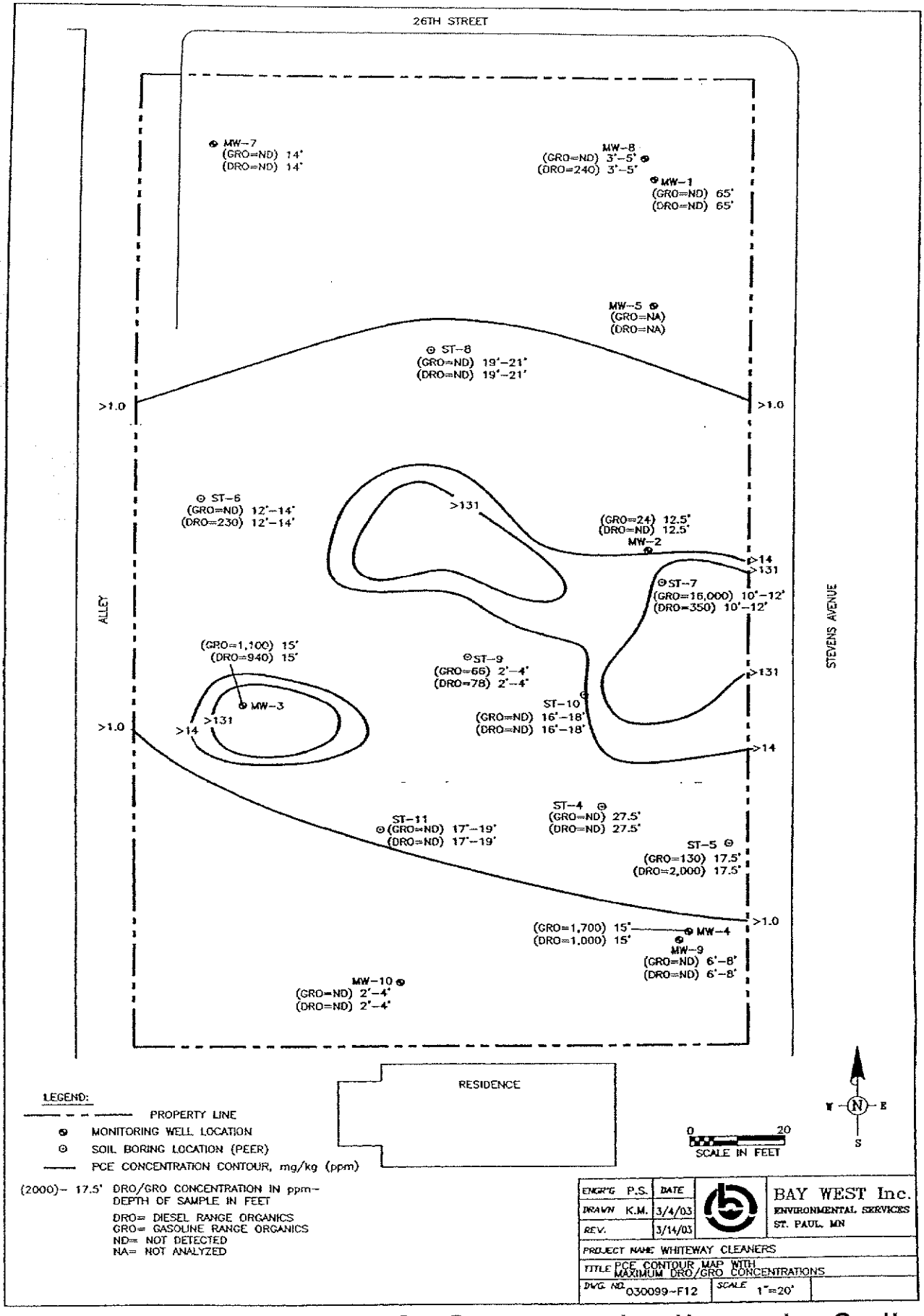


Figure 4: DRO/GRO Concentrations in Soil

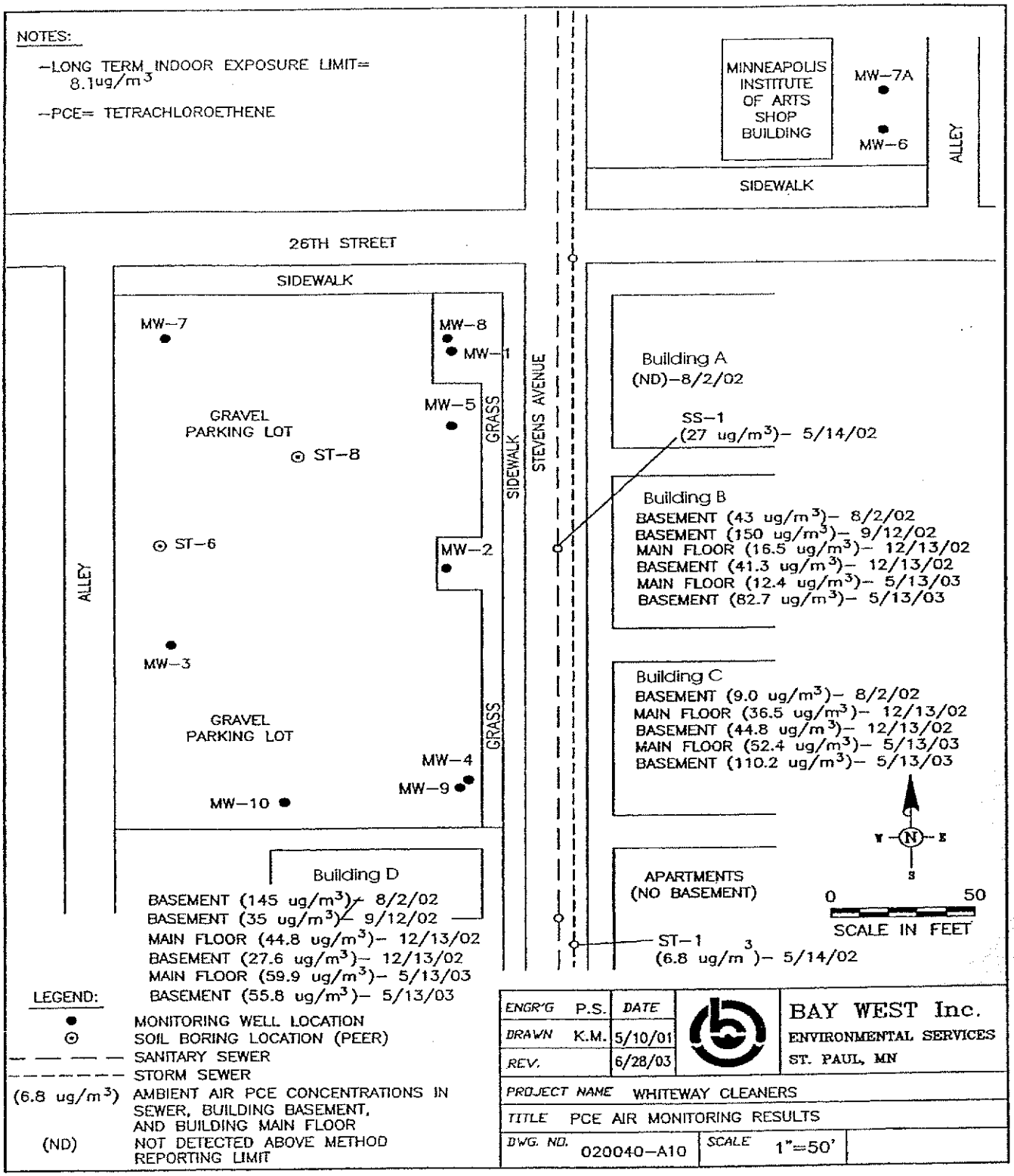


Figure 6: PCE Air Monitoring Results

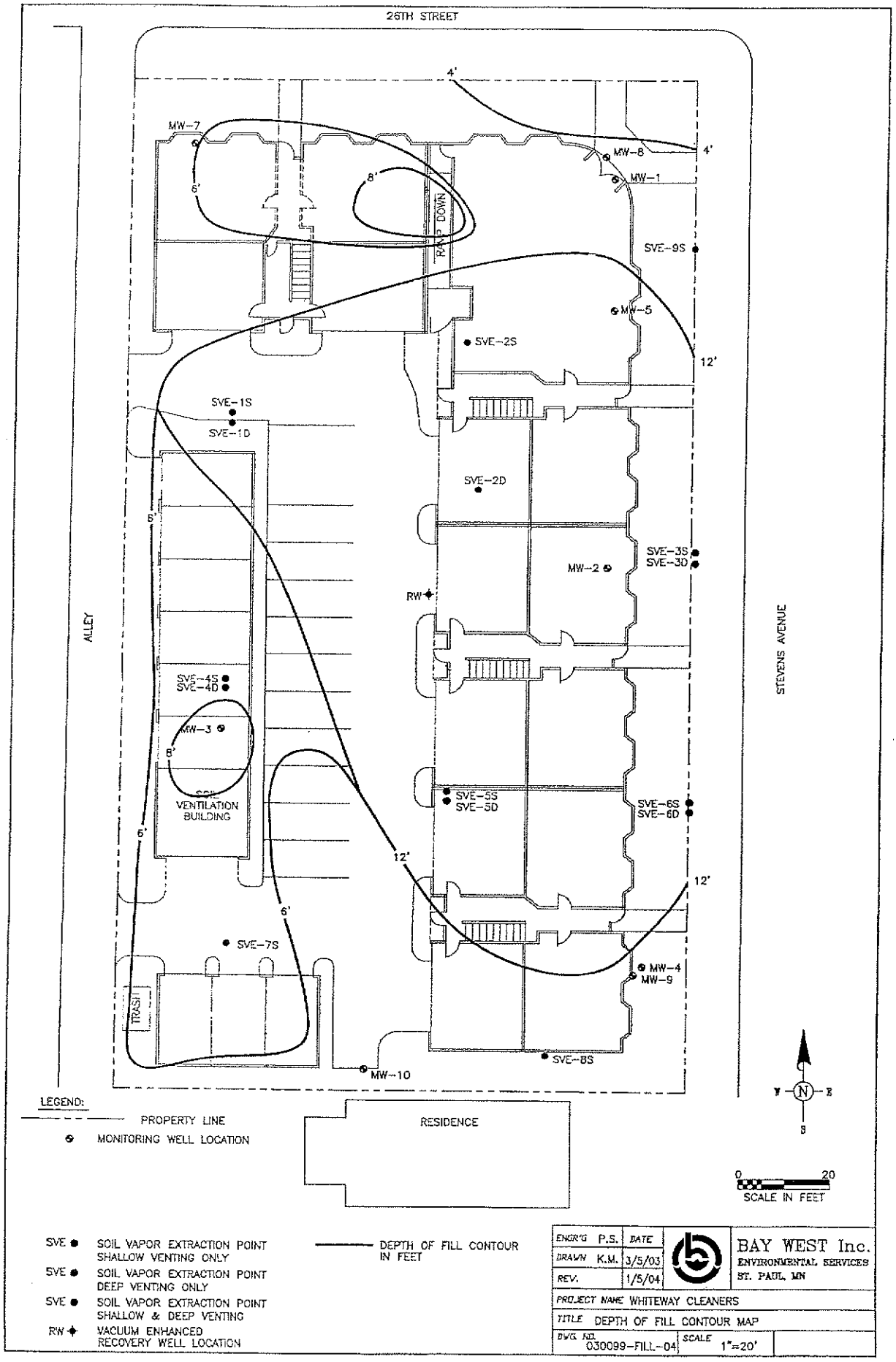


Figure 8: Proposed Development & Fill Depth

Table 1

Indoor Air Sample Analytical Results

Whiteway Cleaners Site

Results in ug/m^3

Compound	Building A Basement	Building B Basement					Building B 1st Floor			Chronic Screening	Source
	8/2/2002	8/2/2002	9/12/2002	12/13/2002	4/3/2003	5/13/2003	12/13/2002	4/3/2003	5/13/2003	Criteria	
Dichlorodifluoromethane	5								4.0	800	RfC
Chloromethane										90	RfC
Bromomethane										5	HRV
Trichlorofluoromethane		42								700	RfC
Methylene chloride		**590**	6.9	6.7		3.5	4.2		5.3	20	HRV
1,1,1-Trichloroethane		390								2200	RfC
1,2-Dichloroethane			**2.8**							0.38	ISC
Benzene			2.7	**4.8**		3.5	**8.3**		**6.4**	1.3-4.5	HRV
Trichloroethene (TCE)		**7.5**	**26**	**10.4**	**5.0**	**7.6**	**6**		**5.4**	0.4	ISC
Toluene	7.2	140	57	71.6	82.9	135.7	79.1	94.3	192.3	400	HRV
Tetrachloroethene (PCE)		**43**	**150**	**40.7**	**27.8**	**81.4**	**16.3**	**6.4**	**12.2**	3.33	ISC
Ethylbenzene		6.1	4.8	3.2		16.9	4.8		11.7	1000	RfC
m&p Xylenes		24	18	7.8	9.1	56.4	14.8	10.4	38.2	700	RfC
o-Xylene		6.5	7.8	3.7		14.3	5.6		10.0	700	RfC
Styrene			11							1000	HRV
1,3,5-Trimethylbenzene		4.9	5.9			4.5				6	RfC
1,2,4-Trimethylbenzene		**17**	**13**	**6.9**		**13.3**	**12.3**	4.9	**9.8**	6	RfC
1,4-Dichlorobenzene		18	7.2							110	RfC

Bold indicates exceedence of chronic screening criteria

CERTIFICATION

This Whiteway Cleaners Site Health Consultation was prepared by the Minnesota Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

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