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PROPOSED PLAN
FOR
REMEDIATION OF THE
ARMONK PRIVATE WELLS SITE
I.D. 360005

Prepared by

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

INTRODUCTION

The Armonk Private Wells Site (AWS) is located in the hamlet of Armonk, Town of North Castle, Westchester County. The site is approximately 34 acres in size and bounded by the Wampus River to the east, Bedford Road to the south, Route 128 (Main Street) to the west and the northern end of the A&P Shopping Center to the north.

This plan describes the remedial alternatives considered for this site, identifies the New York State Department of Environmental Conservation's (NYSDEC) preferred remedy and presents the basis for this preference.

SITE HISTORY

In 1978, the Westchester County Health Department (WCHD) initiated a study in Westchester County to evaluate groundwater quality in the vicinity of past and present dry cleaning establishments. Water from thirty-six water supply wells at the AWS was sampled and analyzed by WCHD in March 1979. Samples from nine of these wells contained contaminants (halogenated solvents) above New York State Department of Health (NYSDOH) standards. The primary contaminants found were tetrachloroethene (PCE), trichloroethene (TCE) and 1,2-dichloroethene.

Since the initial WCHD sampling, approximately 68 separate, private and commercial supply wells have been sampled and tested by the WCHD and the United States Environmental Protection Agency Region II Technical Assistance Team (USEPA-TAT). From March 1979 through April 1987 over 350 samples were taken and analyzed. In samples from 37 of the 68 supply wells TCE and PCE were detected with combined concentrations less than 100 parts per billion (ppb) while samples from 13 supply wells indicated combined concentrations of TCE and PCE in excess of 100 ppb, for a specific sampling event. Contaminants were not detected in samples collected from the remaining 18 supply wells.

The majority of the property owners whose supply wells have been affected by the halogenated solvents have been put on "boil water" orders by WCHD or are receiving bottled water from the USEPA-TAT. The USEPA-TAT conducted a study which provides justification for a public water supply system for Armonk. The USEPA-TAT study is separate from this NYS Superfund Study, although information collected by the USEPA-TAT and NYS has been exchanged freely.

In addition to the WCHD/USEPA-TAT study, two additional studies were completed prior to 1989. Wehran Engineering, P.C. (Wehran) completed a NYSDEC Phase I Investigation in June 1983 and a NYSDEC Phase II Investigation in June 1985. The Phase I study identified several supply wells as being contaminated with halogenated compounds, and concluded that the situation posed a potential health threat to the population. The Phase II study developed a hazardous ranking system score (HRS) for the AWS of S_m equals 37.9. This HRS score reflects a potential for harm to humans and the environment from groundwater and surface water migration. However, these studies were not of sufficient scope to evaluate the source(s), nature, extent and potential for spread of the contaminants at the AWS. Thus, the NYSDEC retained TAMS Consultants, Inc. (TAMS) and its subconsultant, Goldberg-Zoino Associates of New York, P.C. (GZA) to complete a Remedial Investigation/Feasibility Study (RI/FS).

THE RI/FS PROCESS

The purpose of the Remedial Investigation was to determine the nature, extent and source of contamination and to assess the associated health risks to the public and the environment. To accomplish this for AWS, 18 monitoring wells were installed, and soil and bedrock test borings were completed. Samples of groundwater, surface water, soil and sediments were analyzed and an extensive soil gas survey was conducted.

Based on the findings of the RI, a Feasibility Study is done to develop and evaluate a number of potential remedial actions. Each alternative remedy is evaluated for:

- Short Term Effectiveness
- Long Term Effectiveness
- Reduction of toxicity, mobility or volume
- Ability to implement
- Costs
- Compliance with standards
- Overall Protection

MAJOR FINDINGS OF THE REMEDIAL INVESTIGATION

- The geology at the AWS generally consists of a gneissic bedrock overlain by glacial sands. The bedrock, encountered at depths from approximately 10 feet to greater than 125 feet, slopes from the north-northwest to south-southeast. The bedrock is overlain by varying thicknesses of sand containing varying amounts of silt and gravel. The nature of and depth to bedrock near the Wampus River is unknown but is greater than 125 feet.

- Local groundwater flow in the overburden and bedrock is generally northwest to southeast with an estimated groundwater velocity ranging from $5x10^{-4}$ to 2 feet per day in the sand overburden to $9x10^{-3}$ to 2 feet per day in the bedrock. The Wampus River appears to act as a localized groundwater discharge area for the overburden water bearing zone. However, groundwater in the lower overburden and bedrock appears to flow under the Wampus River.

- Surface water flow at the AWS is generally towards the Wampus River and travels by overland flow and/or the storm sewer system.

- Volatile organic compounds (VOCs), particularly PCE, TCE and total 1,2-dichlorothene (DCE), were the primary contaminants found in samples collected at the AWS. However, some groundwater samples tested contained various concentrations of phenols, carbon tetrachloride, priority pollutant metals and other VOCs that exceed established water quality standards. The distribution of the contaminants at the AWS and the uses of these contaminants suggests there are three sources: 1) the former 396 Limited dry cleaner, currently the Nails Etc. facility located at 400 Main Street; 2) the Country Cleaners dry cleaner on Maple Avenue; and 3) Cleaning by Fredericks dry cleaners, in the A&P Shopping Center. The source(s) of the other contaminants (i.e. priority pollutant metals, phenols, carbon tetrachloride, and other VOCs) detected in samples during some of the sampling rounds was not determined during this RI study. These contaminants were not detected consistently during the period of study, however, they will be investigated further during the design support testing.

The VOC contamination likely originated as a surface or near-surface release (i.e., the septic systems of the three noted sources). The present distribution of the contaminants is likely the result of a series of hydrogeologic events, including percolation with rainwater, water table fluctuations and groundwater flow through the overburden and fractured bedrock. See Figures 1 and 2 for the approximate extent of the groundwater contamination.

- VOC contamination has reached the Wampus River, through overland flow, groundwater and/or the storm sewer system.

- Due to the short-term of the RI, the persistence and migration of the contaminants could not be fully evaluated. However, data collected by the WCHD/USEPA-TAT suggest that the contaminants are decreasing in concentration in the supply wells with time. This decrease is likely a result of dispersion and dilution of the contaminants.

- The two primary exposure routes of concern for the contaminants at the AWS are ingestion and inhalation. Ingestion of contaminants occurs through the use of supply well water for drinking. Inhalation of VOCs occurs by breathing of vapors entering the residences through the bathrooms (e.g. taps and showers) and basements (i.e. VOC vapors entering through basement walls from surrounding soils).

- The estimated increase in carcinogenic risks from the long term ingestion of TCE and PCE at concentrations measured in samples of groundwater from unfiltered supply wells corresponds to an additional 20 to 39 cancers in the assumed exposed population. (The population within a three mile radius of AWS is 5,900).

- Total estimated carcinogenic risks from inhalation of vapors released in the home from unfiltered supply wells correspond to an additional one cancer in the assumed exposed population.

FEASIBILITY STUDY

The primary contaminants detected at the AWS are tetrachloroethene (perchloroethene or PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE). The sources of contamination were determined to be one former and two existing dry cleaning establishments. Contamination is present in two media requiring remedial action. These have been identified as:

1. Vadose Zone (soil above the water table)
   - Sources (the septic tank (or tanks) and the leachfields).
   - Source Vicinities (contaminated areas immediately adjacent to sources).
2. Groundwater
   - Shallow Saturated Overburden.
   - Bedrock/Deep Saturated Overburden.

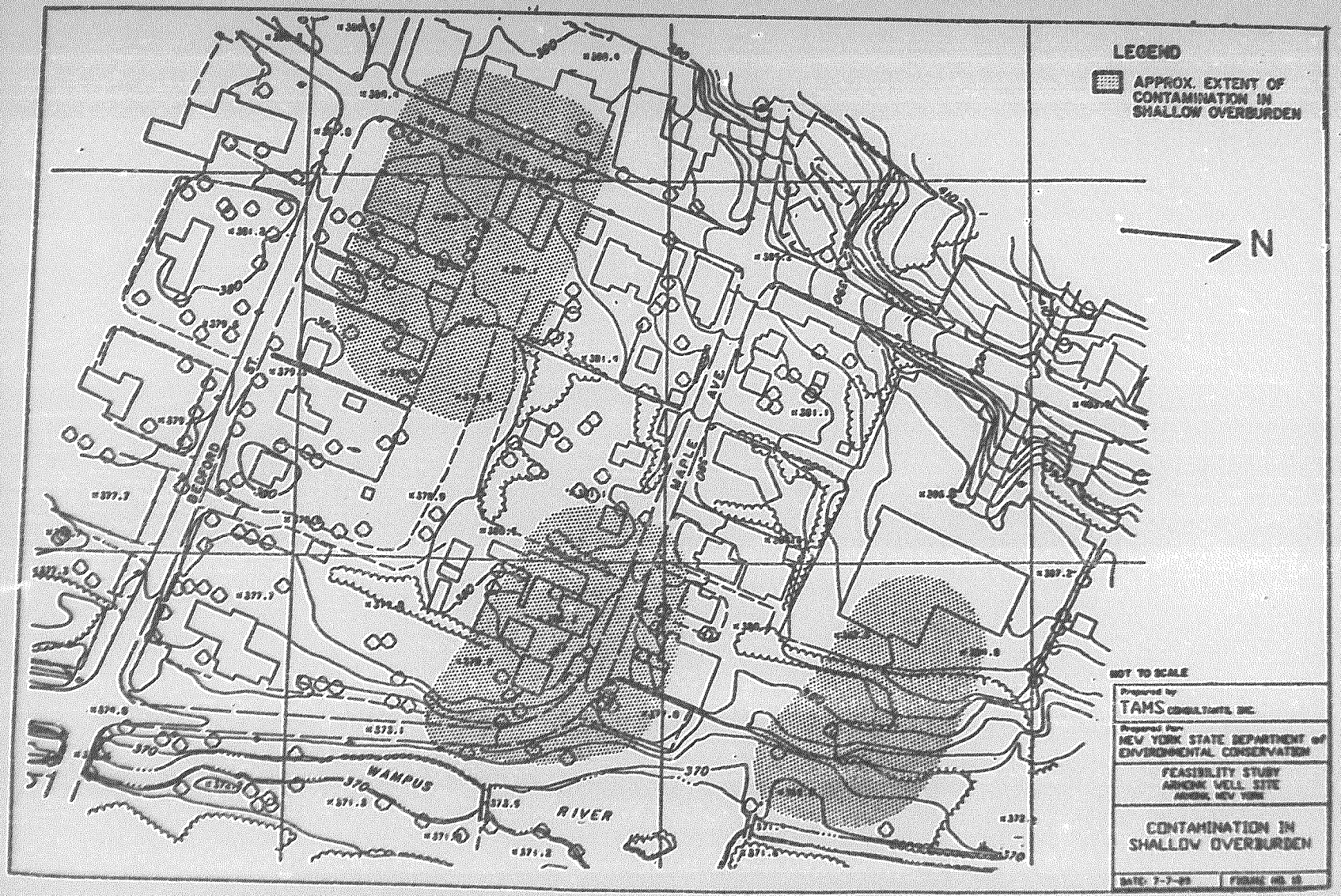


FIGURE 1 - APPROXIMATE EXTENT OF SHALLOW OVERBURDEN CONTAMINATION

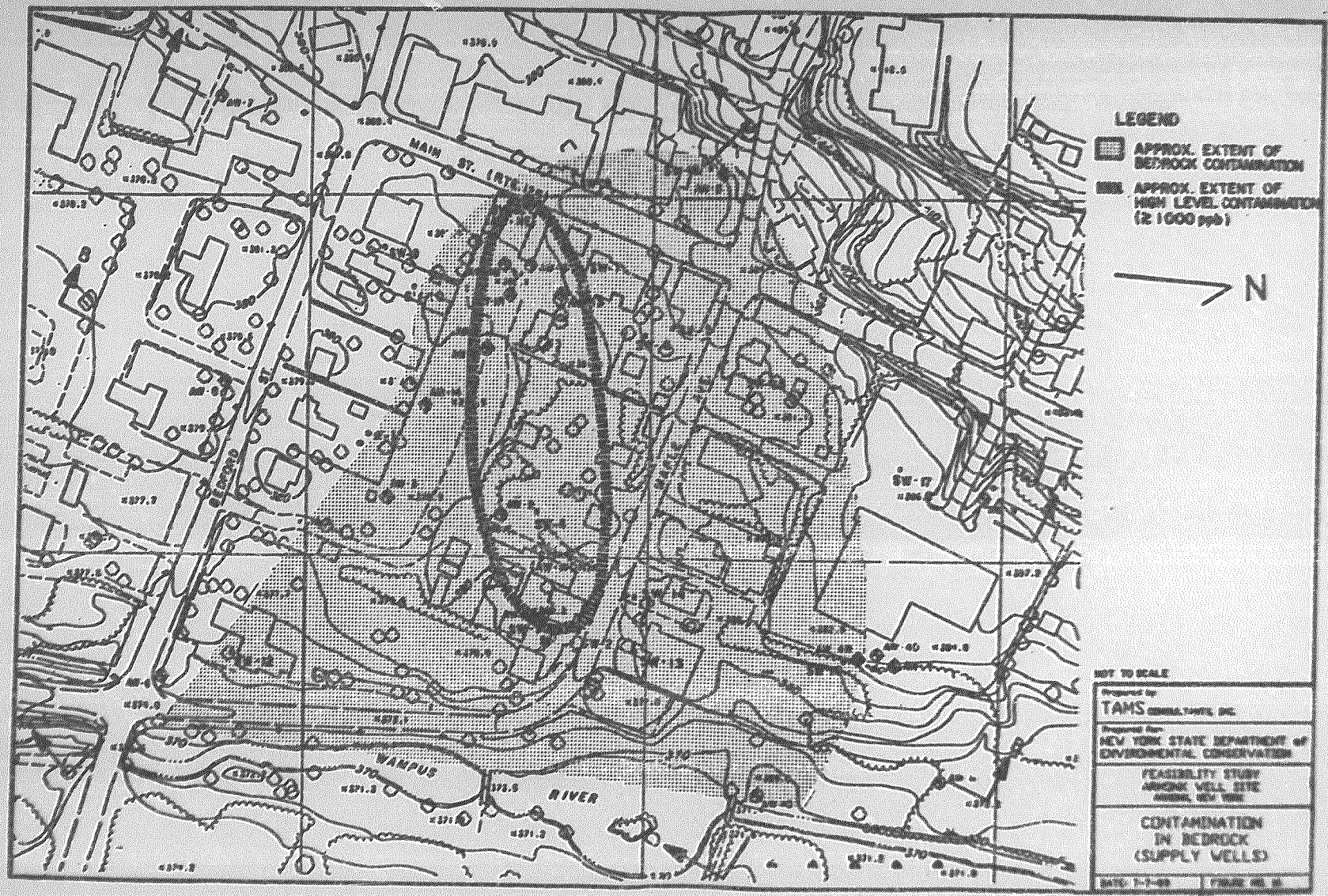


FIGURE 2 - APPROXIMATE EXTENT OF BEDROCK CONTAMINATION

DISCUSSION OF VADOSE ZONE ALTERNATIVES

Eight alternatives (V.1 through V.8) were developed for remediation of the vadose zone. See Figure 3 for a schematic of active gas extraction, and Figure 4 for an estimate of the area requiring treatment.

V.1 - No Action - Consists of periodic monitoring of soil gas and land use restrictions such as prevention of excavation of soil near sources or removal of asphalt surfaces behind Cleaning by Frederick's. It also includes placement of cautionary signs near the sources.

V.2 - Partial source removal/off-site disposal - All of the components of V.1 plus removal of the septic tank(s) and all of its contents and off-site disposal.

V.3 - Partial source removal/off-site disposal/passive gas venting - Similar to V.2 plus passive gas venting, which consists of placing vents in the ground to facilitate volatilization of the contaminants.

V.4 - Partial source removal/off-site disposal/active gas extraction and treatment - Similar to V.2 plus active gas extraction and treatment, which consists of vacuuming the VOC vapors from the soil and treatment of the gases.

V.5 - Full source removal/off-site disposal - Consist of periodic gas monitoring and temporary land use restriction. Removal of the septic tank(s), its contents, contaminated soil immediately surrounding and below the tank, and removal of the pipes and soils from the leachfields.

V.6 - Full source removal/off-site disposal/passive gas venting - Similar to V.5 plus passive gas venting.

V.7 - Full source removal/off-site disposal/active gas collection and treatment Similar to V.5 plus active gas collection and treatment.

V.8 - Full source and source vicinities removal/off-site disposal - Removal of sources and source vicinities (meaning the septic tank and the leachfields, and any contaminated areas immediately adjacent to the sources) with off-site disposal.

Initial screening of these alternatives was based on assessment of effectiveness and the ability to implement the remedy.

While passive gas venting (alternatives V.3 and V.6) is applicable to this site, they would have little effect on contaminants beneath buildings or other features, also the rate of removal would be very slow and may harm local air quality. Alternatives V.3 and V.6 were eliminated from further consideration due to their ineffectiveness.

Although alternative V.8 would be effective in removing contamination from the Armonk site, it involves the excavation of large quantities of soil and disposal at a landfill. This would be in conflict with NYSDEC's objectives of long-term effectiveness and permanence. Also, land burial of the contaminated soils may be banned by new federal regulations which go into effect November 8, 1990. Alternative V.8 was eliminated from further consideration.

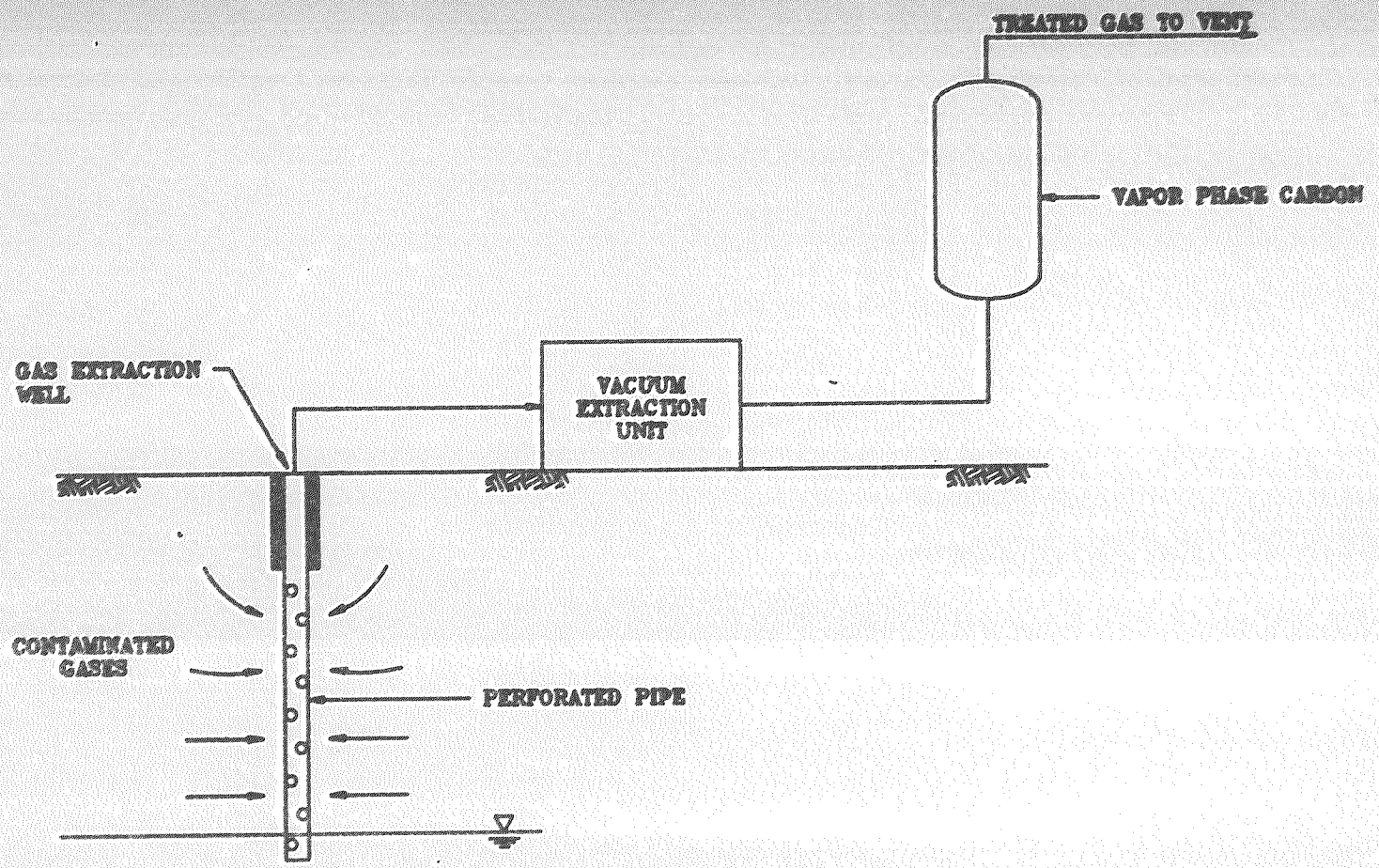


FIGURE 3

SCHEMATIC DIAGRAM OF VACUUM EXTRACTION AND TREATMENT

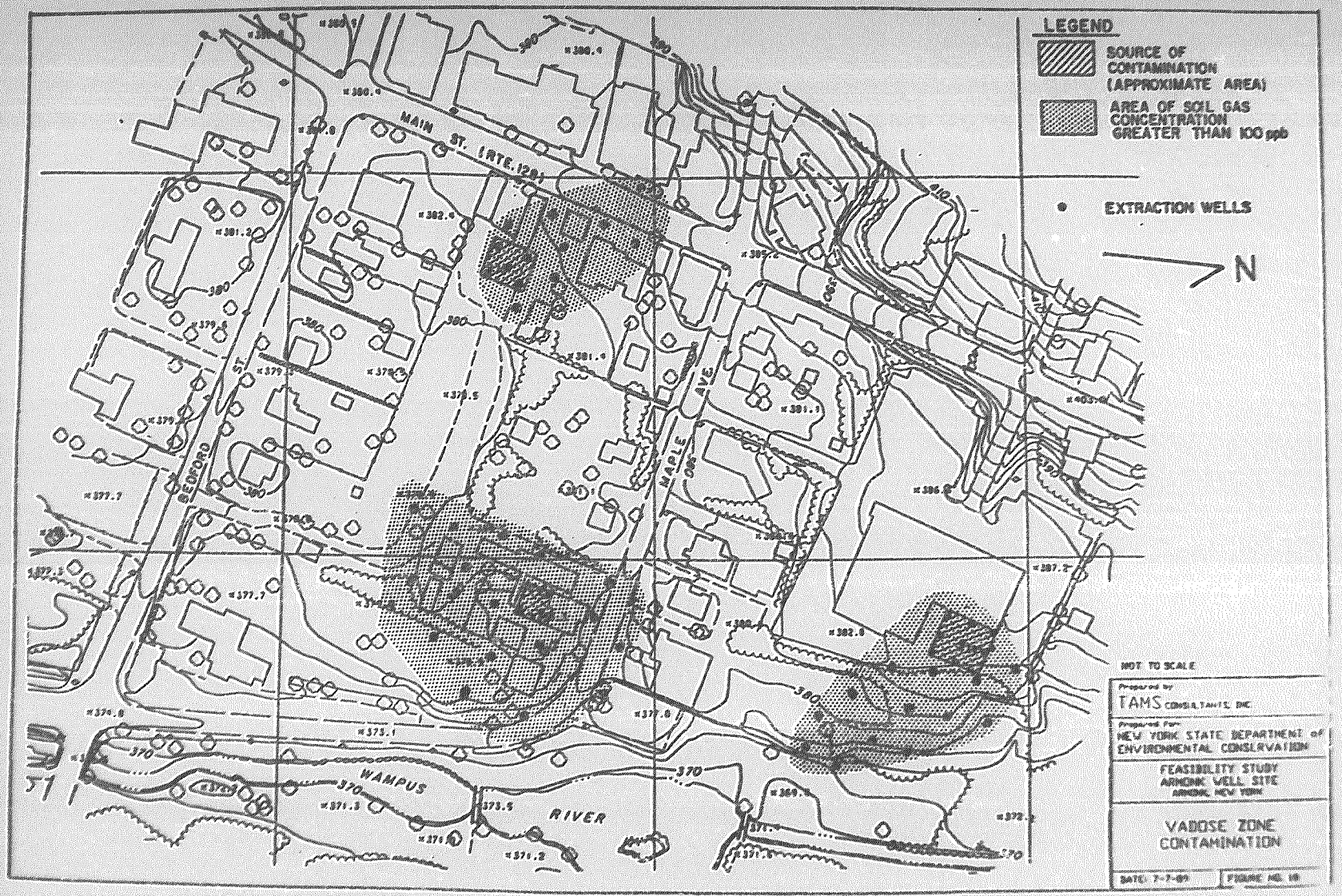


FIGURE 4 - ASSUMED AIR EXTRACITON REMEDIATION SCHEME

DISCUSSION OF GROUNDWATER ALTERNATIVES

Seven alternatives (G.1 through G.7) were developed for remediation of the groundwater. With the exception of the No-Action Alternative all remedial activities consist of pumping of groundwater using extraction wells and treatment of water, provision for municipal water supply and prohibition of use of private supply wells. The only difference between the alternatives is how and where water treatment takes place and the disposition the treated groundwater. See Figure 5 for a schematic of the pump and treat system and Figure 6 for assumed well locations.

G.1 - No Action - Periodic sampling and testing of monitoring wells and selected supply wells; sealing or prohibiting the use of private supply wells in downtown Armonk and prohibiting or requiring a special permit for drilling new wells and provisions for a municipal water supply.

G.2 - On-site treatment of extracted groundwater using air stripping in combination with carbon adsorption, discharge of treated water into the Wampus River.

G.3 - Similar to G.2 except treated water would be reinjected into the aquifer.

G.4 - Off-site treatment with air-stripping and a carbon adsorption system at the local sewage treatment plant (STP) and discharge with the STP's effluent.

G.5 - On-site treatment with a carbon adsorption system and discharge to Wampus River.

G.6 - Similar to G.5 except treated water would be reinjected into the aquifer.

G.7 - Off-site treatment using carbon adsorption at a local STP and discharge with STP outfall.

All groundwater remedial actions are equally effective and can be implemented, therefore, all were retained for the detailed analysis.

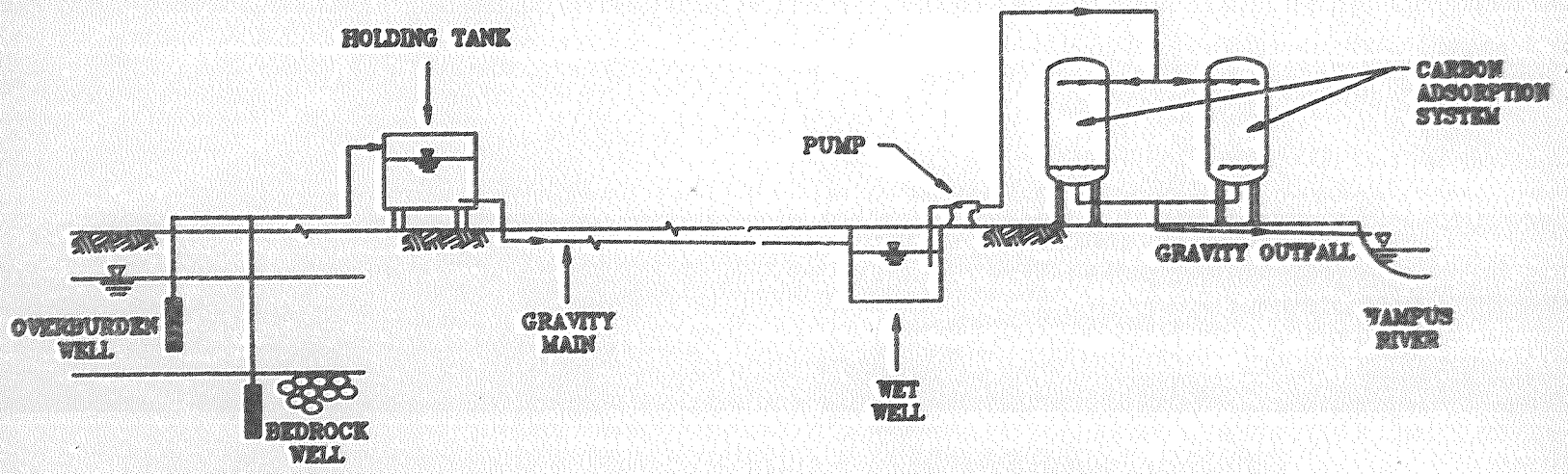


FIGURE 5

SCHEMATIC DIAGRAM OF GROUNDWATER REMEDIATION

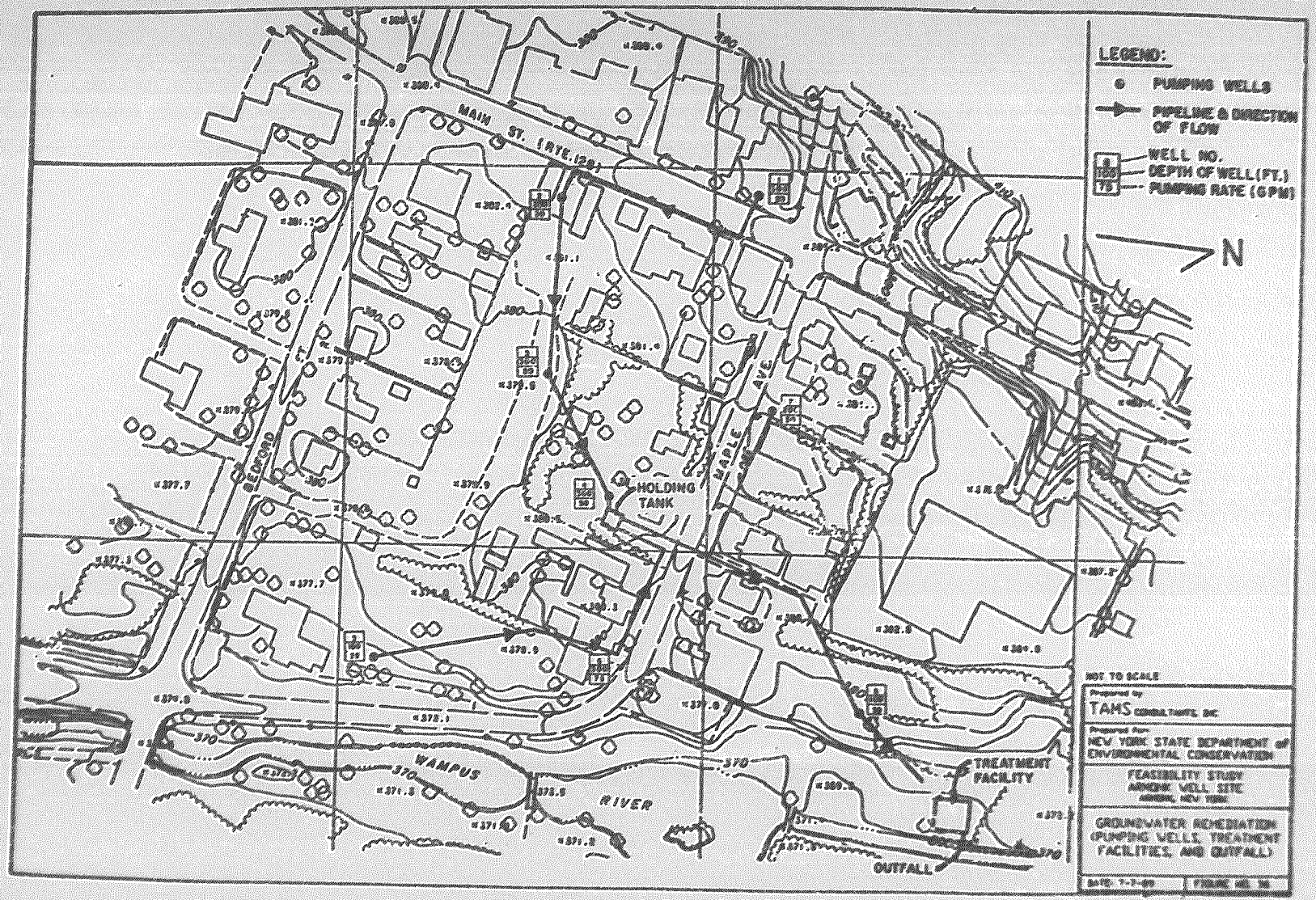


FIGURE 6 - ASSUMED GROUNDWATER REMEDIATON PUMPING SCHEME

PREFERRED REMEDY

After careful consideration of all reasonable alternatives, NYSDEC and TAMS Consultants, Inc. propose Remedial Alternatives V.4 and G.5.

V.4 Vadose Zone

- Removal of Liquid Wastes and Sludge from the Septic Tank
- Off-Site Treatment of Liquid Wastes and Sludge
- Removal of the Septic Tank
- Off-Site Disposal of Septic Tank Materials
- Soil Gas Collection by Vacuum Extraction
- On-Site Treatment of Extracted Gases Using Carbon Adsorption
- Soil Gas Monitoring
- Land Use Restrictions Pending Completion of Remediation

G.5 Groundwater

- Pumping
- On-Site Treatment Using Carbon Adsorption
- Discharge of Treated Water to the Wampus River
- Municipal Water Supply
- Groundwater Monitoring
- Well Use and Drilling Restrictions Pending Completion of Remediation

RATIONALE FOR SELECTION

During the detailed evaluation of remedial alternatives, each alternative was assessed against seven evaluation criteria;

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with standards addresses whether or not the remedy will meet NYSDEC cleanup standards or provides grounds for invoking a waiver.

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

4. Reduction of toxicity, mobility or volume is the anticipated performance of the treatment technologies a remedy may employ.

5. Short-term effectiveness addresses the period of time needed to achieve protection, and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. Ability to implement is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. Cost includes estimated capital and operation and maintenance cost, and net present worth costs.

COMPARISON OF VADOSE ZONE REMEDIAL ALTERNATIVES

Overall protection of human health and the environment: Alternative V.1 would not provide adequate overall protection. Alternatives V.2 and V.5 would reduce potential health and environmental risk significantly. However, they do not provide overall protection because of contaminants remaining in the vadose zone. Alternatives V.4, V.7 would provide adequate overall protection.

Compliance with standards: V.1 would not comply with standards. V.2 and V.5 may not comply with standards if removal (V.5) [or partial removal (V.2)] of sources does not reduce contamination in the surrounding vadose zone. Alternatives V.4, V.7 comply with State and local criteria and Federal advisories.

Long-term effectiveness and permanence: V.1 does not alter the risk of public health and the environment by relying solely on institutional land use restrictions to prevent exposure. For V.2 and V.5, if contamination levels in the source vicinities are high, there will be significant residual risks. They also rely solely on institutional restriction to prevent any excavation in these areas. For Alternatives V.4 and V.7, vacuum extraction efficiently removes contamination and carbon adsorption removes contamination from the gas. There are slight risks involved from trapped untreated residuals and monitoring will be required to verify the performance of the extraction system.

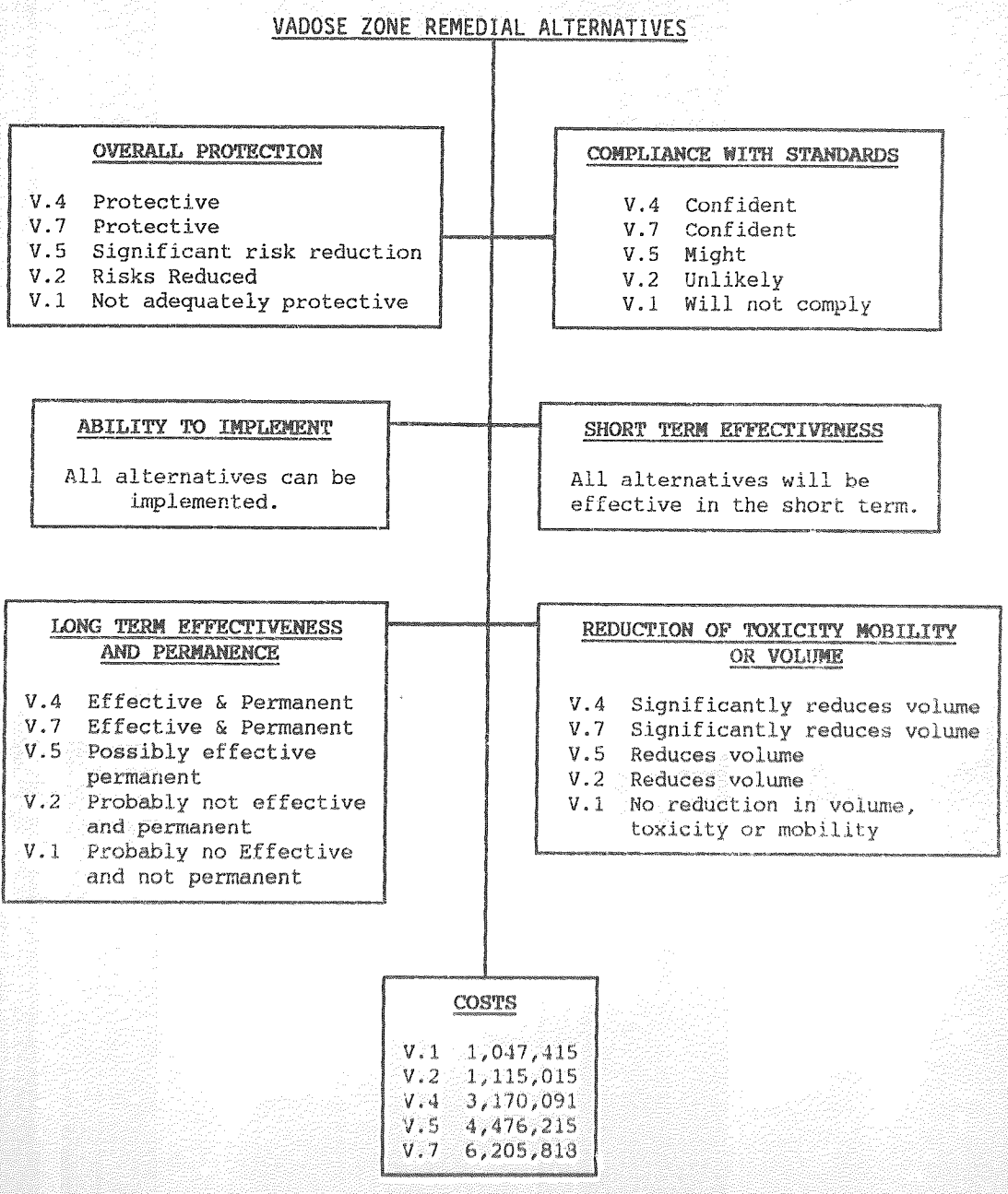
Reduction of toxicity, mobility or volume: V.1 does not reduce toxicity, mobility or volume. V.2 and V.5 significantly reduce the volume of contaminants (V.5 more so than V.2). Toxicity and mobility may continue to be of concern for both. V.4 and V.7 will significantly reduce volume, and toxicity and mobility are no longer of concern.

Short-term effectiveness: There will be adequate protection of the community and workers during remedial action for all the alternatives. Source removal will be completed in one month and for V.4 and V.7, vacuum extraction and treatment will be completed in one year. Natural clean up may occur due to volatilization and flushing of contaminants during percolation of rainwater. However, no estimates have been made for how long this will take. For all of the alternatives, there will be slight adverse impacts due to fugitive dusts and volatiles emissions during construction.

Ability to implement: There are no technical difficulties with any of the alternatives and materials and services are also available for each. V.1 will require coordination between agencies to effect land use restrictions. For all of the remedial activities there are permit requirements for construction and landfilling. In addition V.4 and V.7 would require permits for off-gas emission.

Costs:

	Vadose Zone Alternatives	Present Worth Costs
V.1	No Action/Limited Action	1,047,415
V.2	Partial Source Removal/Off-Site Disposal	1,115,015
*V.4	V.2 plus Gas Collection/On-Site Treatment	3,170,091
V.5	Full Source Removal/Off-Site Disposal	4,476,215
V.7	V.5 plus Gas Collection On-Site Treatment	6,205,818


VADOSE ZONE REMEDIAL ALTERNATIVES
OVERALL PROTECTION
V.4 Protective
V.7 Protective
V.5 Significant risk reduction
V.2 Risks Reduced
V.1 Not adequately protective
COMPLIANCE WITH STANDARDS
V.4 Confident
V.7 Confident
V.5 Might
V.2 Unlikely
V.1 Will not comply
ABILITY TO IMPLEMENT
All alternatives can be implemented.
SHORT TERM EFFECTIVENESS
All alternatives will be effective in the short term.
LONG TERM EFFECTIVENESS AND PERMANENCE
V.4 Effective & Permanent
V.7 Effective & Permanent
V.5 Possibly effective permanent
V.2 Probably not effective and permanent
V.1 Probably no Effective and not permanent
REDUCTION OF TOXICITY MOBILITY OR VOLUME
V.4 Significantly reduces volume
V.7 Significantly reduces volume
V.5 Reduces volume
V.2 Reduces volume
V.1 No reduction in volume, toxicity or mobility
COSTS
V.1 1,047,415
V.2 1,115,015
V.4 3,170,091
V.5 4,476,215
V.7 6,205,813

COMPARISON OF GROUNDWATER REMEDIAL ALTERNATIVES

Overall protection of human health and the environment: With the exception of G.1, all of the alternatives significantly reduce the risks associates with groundwater contamination by removal and treatment of the contamination.

Compliance with standards: Alternative G.1 would not comply with Federal and State standards, all others will.

Long-term effectiveness and permanence: G.1 only slightly lowers the risk to public health and the environment, relying solely on well closure and drilling restrictions to prevent exposure. For the remaining alternatives there is a slight risk that untreated residuals remain trapped due to the heterogeneous nature of the aquifer. Periodic monitoring will be required to assess the performance of any of these alternatives. For alternatives G.3 and G.6 there is also a slight risk of failure due to difficulties with reinjection of the treated water.

Reduction of toxicity, mobility or volume: G.1 does not provide any reduction of toxicity, mobility or volume. For all other stated alternatives, toxicity, mobility and volume are no longer of concern.

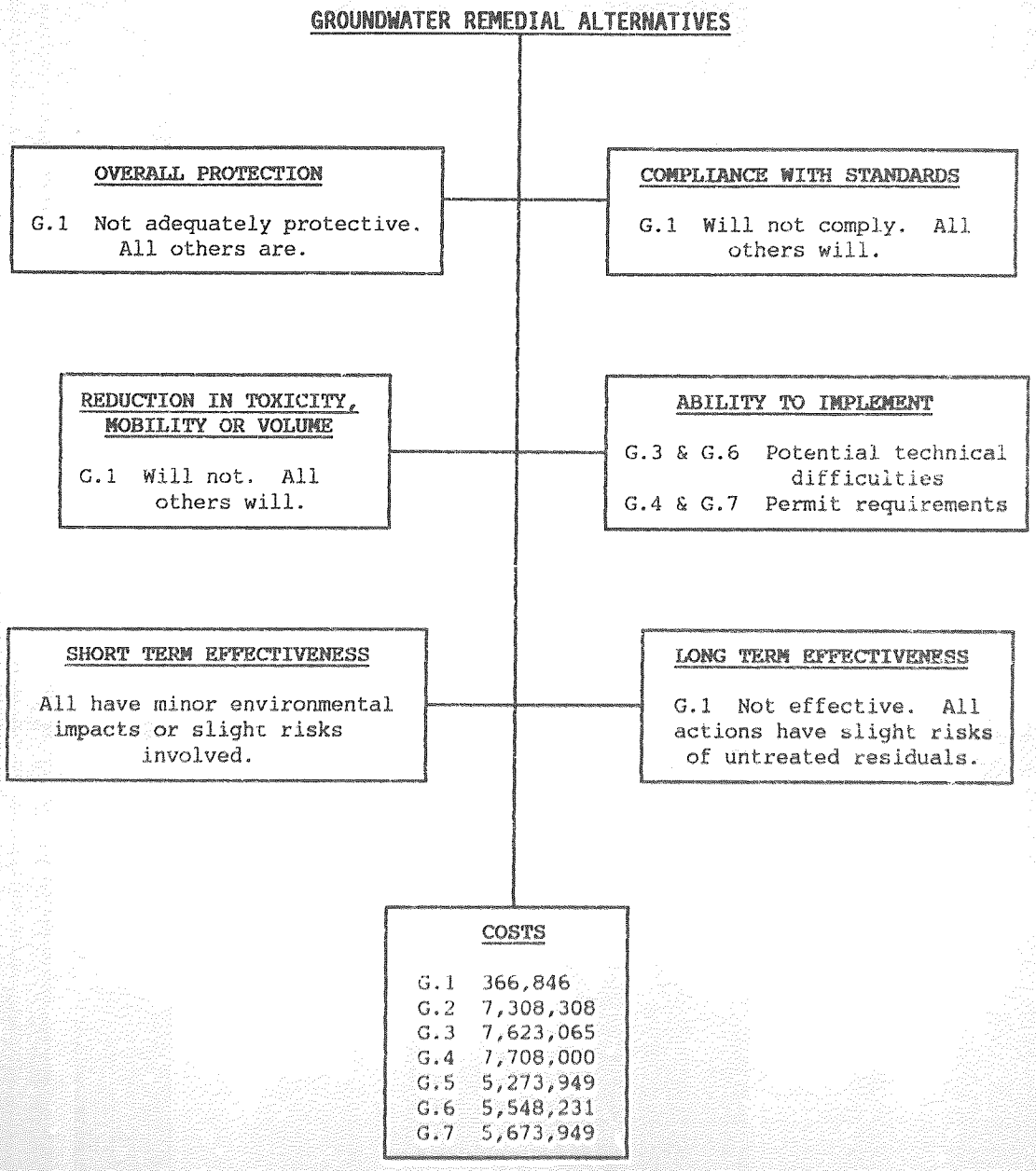
Short-term effectiveness: For all of the alternatives there will be adequate protection of the community and workers. Natural cleanup may occur for alternative G.1 due to dilution and volatilization at downgradient discharge locations. Although no estimate has been made of how long this natural cleanup would take, for costing purposes, monitoring was assumed to continued for 15 years. For alternatives G.2, G.3 and G.4 there may be minor air impacts from the air stripping towers. For alternatives G.3, G.4, G.6 and G.7 there are slight risks of contaminating uncontaminated areas, and for G.2, G.5 and G.7 a slight risk of surface water contamination. For all of the pump and treat alternatives, there will be an aquifer draw down during groundwater extraction and minor air impacts due to fugitive dusts and volatile emissions during construction.

Ability to implement: The materials and services required for all of the alternative are readily available, also there are no technical difficulties with the exception of G.3 and G.6 which have a slight risk of problems during reinjection. All of the alternatives will require a number of permits, none appreciably greater than another, except for alternatives G.4 and G.7 which would be subject to obtaining a Part B RCRA permit to operate the treatment facility at the STP.

Costs:

	Groundwater Alternatives	Present Worth Costs
G.1	No Action/Limited Action	366,846
G.2	Air Stripping, Carbon Adsorption Surface Water Discharge	7,308,308
G.3	G.2 except Groundwater Reinjection	7,623,065
G.4	G.2 at Local STP	7,708,000
*G.5	Carbon Adsorption, Surface Water Discharge	5,273,949
G.6	Carbon Adsorption, Groundwater Reinjection	5,548,231
G.7	C.5 at Local STP	5,673,949

Note: Cost Estimates for Alternatives G.2 through G.7 include $2,000,000 for the municipal water supply.



Note: Estimated Costs for Alternatives G.2 through G.7 include $2,000,000 for a municipal water supply.

CAPITAL COSTS - VADOSE ZONE REMEDIATION

Item	Total Costs (1990 $)
Individual Technology	
Pumping Liquid Waste & Sludge	5,600
Septic Tank Excavation	11,000
Transportation, Off-Site Treatment of Liquid Waists and Sludge	17,000
Transportation of Septic Tank Materials to Landfill	1,200
Off-Site Landfill Disposal	2,000
Gas Monitoring Well Installation	25,000
Soil Vapor Extraction	880,000
Vapor Phase Carbon	340,000
Soil Gas Monitoring	3,200
Site Access Restrictions	59,000
Site Costs	
Site Preparation	8,000
Site Administration	170,000
General Conditions	
Startup Costs	61,000
Bid Contingencies	340,000
Scope Contingencies	300,000
Permitting and Legal Costs	65,000
Service (during construction)	91,000
Total Capital Cost	$2,379,000

O & M COSTS - VADOSE ZONE REMEDIATION

Item	Total Costs (1990 $)
Individual Technology	
Soil Vapor Extraction	290,000
Vapor Phase Carbon	160,000
Soil Gas Monitoring	130,000
Site Access Restrictions	3,200
General Conditions	
Insurance and Permit Renewal	97,000
Indirect Costs	
Administrative	100,000
Contingencies	100,000
Total Annual O & M Cost	$870,200

CAPITAL COSTS - GROUNDWATER REMEDIATION

Item	Total Costs (1990 $)
Individual Technology	
Groundwater Extraction	200,000
Granular Activated Carbon	740,000
Discharge to Surface Water	143,000
Municipal Water Supply	2,000,000
Site Access Restrictions	130,000
Site Costs	
Site Preparation	8,000
Site Administration	16,000
General Conditions	
Startup Costs	47,000
Bid Contingencies	240,000
Scope Contingencies	220,000
Permitting and Legal Costs	61,000
Services (during construction)	86,000
Total Capital Cost	$3,891,000

O & M COSTS - GROUNDWATER REMEDIATION

Item	Total Costs (1990 $)
Individual Technology	
Groundwater Extraction	72,000
Granular Activated Carbon	150,000
Discharge to Surface Water	280
Site Access Restrictions	70,000
General Conditions	
Insurance and Permit Renewal	44,000
Indirect Costs	
Administrative	50,000
Contingencies	50,000
Total Annual O&M Cost	$436,280

Remedial Cost Summary

Capital Costs (1990 $)

Vadose Zone Remediation	:	$ 2,379,000
Groundwater Remediation	:	3,891,000

O&M Costs (1990 $)

Vadose Zone Remediation	:	870,200
Groundwater Remediation	:	436,280 [1]

Annual Expenditures Projection [2]

Remedial Components	Year 1 (1990)	2 (1991)	3 (1992)	4 (1993)	5 (1994)
Vadose Zone	$2,379,000	$ 913,710	--	--	--
Groundwater	3,891,000[3]	458,094	480,999	505,049	530,301
Total	$6,270,000[3]	$1,371,804	$480,999	$505,049	$530,301

Notes

(1) Does not include O&M costs for municipal water supply system.

(2) Assumptions:

- All capital outlays will occur in Year 1 (i.e., 1990).
- O&M outlays will occur in Years 2 through 5.
- Vadose zone remediation will require one year.
- Groundwater remediation will require four years.
- Inflation of O&M costs will remain steady at 5 percent for Years 2 through 5 (i.e., 1991 through 1994).

(3) Includes $2,000,000 capital outlay for the water supply system being funded separately.

OBJECTIVE OF REMEDIATION

The main objective of this remedial program is to restore groundwater at the Armonk Well Site to drinking water quality. To accomplish this, any concentrated contaminants found in septic tank(s) must be removed to prevent potential future discharges. Second, the contaminated soils sources above the groundwater must be cleaned to prevent contamination from percolating to the groundwater as precipitation infiltrates the soil, leaching contaminants from it. And thirdly, the contaminated groundwater must be removed, and the residual contaminants flushed from the pore spaces of the soil and fractures in the rock.

The clean-up objectives for the groundwater are the most stringent among Federal and State Standards (5 ug/l for the principal contaminants found). The contaminated soils above the groundwater will be cleaned up so to such low residual concentrations that there would be no sources of pollution left. This soil cleanup criteria also depends on the amount of organic carbon in the soil, which will be determined during design support testing and actual remediation.

As hazardous constituents migrate further from the sources, they become less concentrated, and in general it becomes more difficult to recover them; therefore, remediation will focus on the sources. Removing the septic tank(s) and contents eliminates the chance of future concentrated discharges to the environment. Active gas extraction, a proven technique will reduce the level of contamination in the soil considerably and prevent further contamination of groundwater. Removing contamination from the groundwater, especially from the bedrock water zones, will be the most difficult task.

The proposed pump and treat process for groundwater is currently the only available technology for remediation of a contaminated aquifer. Although such systems reduce contaminant levels significantly, at very low contaminant concentrations such systems become inefficient. The RI/FS estimated that the groundwater clean-up objective would be reached in four years. Although this is a reasonable estimate, at the end of four years the need for additional or continued remedial action will be re-evaluated.

Public Participation In The Selection Process

NYSDEC relies on public input to ensure that community concerns are considered in selecting an effective remedy for each State Superfund site. The RI/FS reports have been distributed to the public for a comment period which concludes on February 19, 1990. The Proposed Plan is provided as a supplement to this report and to inform the public of the States preferred remedy.

It is important to note that the remedy described above is the proposed remedy. The final remedy selection will be documented in a Record of Decision (ROD) only after consideration of all comments on the remedial alternatives addressed in this Proposed Plan and the RI/FS.

A public meeting will be held during the comment period to allow NYSDEC to present the conclusions of the RI/FS, to elaborate on the reasons for recommending the preferred alternatives, and to gain public input. Written and verbal comments will be documented in the Responsiveness Summary section of the subsequent ROD, which formalizes the selection of the remedy.

All written comments should be addressed to:

John L. Henkes, P.E.
Bureau of Eastern Remedial Action
Division of Hazardous Waste Remediation
Department of Environmental Conservation
50 Wolf Road, Albany, NY 12233-7010