

Augeas Corporation

ENVIRONMENTAL MANAGEMENT AND ENGINEERING SERVICES

November 16, 1990

Gill Wistar
Alameda County Environmental Health Department
80 Swan Way, Ste. 200
Oakland, CA 94621

Dear Mr. Wistar:

**Re: Groundwater and Soil Contamination Assessment Workplan - Veterans Affairs
Medical Center - Livermore, California**

Augeas Corporation is forwarding for your review and consideration the following proposal to conduct a groundwater and soil contamination assessment at the VA Medical Center, 4951 Arroyo Road, California. The contamination assessment proposed herein will accommodate all regulatory concerns. A completed permit application for the construction of the proposed groundwater monitoring wells has been previously submitted. The purpose of the assessment is to determine the lateral and vertical extent of groundwater and soil contamination in the proximity of the facility's two former 12,000 gallon bunker oil tanks. Approximately 300 cubic yards of contaminated soil has been excavated and stockpiled for subsequent treatment or off-site disposal. A tank excavation report which briefly summarizes the analytical results of soil samples collected from the base of the excavation has been prepared and forwarded to your office.

Since inspection of the tank excavation shortly following tank removal revealed areas of discoloration and the odor of petroleum products, an investigation was immediately initiated to determine the areal and vertical extent of soil contamination. Four soil borings were drilled around the perimeter of the excavation using a backhoe mounted hollow stem auger. Although the borings were unable to penetrate a gravel zone located at a depth of 13 feet below the surface, they were able to confirm that most of the observed soil contamination is restricted to the perimeter of the excavation. Additional soil borings however, will be drilled to a depth of 20 to 25 feet below the surface to verify these conclusions.

Kent Murray
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GROUNDWATER CONTAMINATION ASSESSMENT

Because groundwater contamination has resulted from the seepage of the bunker oil through the vadose zone soils, Augeas Corporation proposes to convert three of the deep soil borings described above into groundwater monitoring wells. The borings locations are shown on Figure 3. Detail lithologic logs will be kept on each boring and soil samples will be collected by driven sampler at 5 foot intervals. Each soil sample will be screened in the field on the basis of odor and discoloration and appropriate samples will be submitted for analysis to a certified analytical laboratory. Soil samples collected in brass tubes which will be submitted for analysis will be appropriately sealed and packed on ice for transport to the laboratory.

Shallow groundwater at the site was encountered at a depth of 13.5 feet below the surface. Based on data obtained from existing groundwater monitoring wells installed at the medical facility to monitor discharges from the facility's waste water treatment plant, regional groundwater flow direction is generally to the north. As shown in figure 3, Augeas will locate one of the monitoring wells up-gradient of the excavation with the remaining two wells located north and northeast of the excavation.

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WELL INSTALLATION

Augeas Corporation proposes to install all three groundwater monitoring wells down to a depth of 25 feet. The wells will be installed using a 10-inch diameter hollow-stem auger drilling rig. The wells will be constructed with 15-feet of factory slotted well screen located at the 10 to 25-foot depth interval. This will result in the screened intervals being placed so that 10 feet of screen will be below and 5 feet of screen will be above the water table. All three wells will use 2-inch diameter Schedule 40 PVC blank casing and slotted screen. Filter pack material and slot size will be engineered based on soil samples collected from the soil/water interface at the base of the tank excavation.

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Each well will be constructed by installing flush-threaded casing and slotted screen down through the hollow stem of the auger. Filter pack material will be placed by backfilling the annulus between the borehole wall and the well screen as the auger is retracted. Filter pack material will be placed to extend 2 feet over the top of the well screen. A 2-foot layer of bentonite pellets will be installed above the filter pack in the same manner as the filter pack material was placed. The bentonite seal will then be allowed to hydrate for approximately 30 minutes. Following hydration of the seal, a cement/bentonite grout will be pumped into place and will extend from the top of the seal to the surface. The well will then be completed below grade with the installation of a traffic rated. Figure 4 provides an example of the typical well to be installed during this phase of the investigation.

Surveying

Upon completion of all three wells, the areal location and casing elevation of each well will be surveyed and added to the existing site plan. Casing elevations will be used to obtain accurate groundwater elevations, and thus, flow direction. A total station surveying unit will be used to obtain the location and elevation data.

Well Development

Well development for the two new wells will be accomplished by swabbing the inside of each well with a surge block in a plunger-like fashion and then pumping the wells with a submersible pump until the discharge water clears. This procedure will be repeated twice for each well. Surging of the wells will also take place during the pumping phase of development by turning off the submersible pump (with the foot valve removed) intermittently during pumping. Each well will be swabbed approximately 30 to 40 times at a slow speed over the entire length of the well screen followed by pumping of the well until the discharge water clears. This step will then be repeated with the swabbing speed increased. Following clearing of the pump discharge water in the final pumping, the well will be pumped at the submersible pump's maximum pump rate of 30 minutes.

All discharge water will be pumped into 55-gallon drums and contained on-site until an analysis of the groundwater has been completed. If the water is free of contaminants the water will be discharged to the storm sewer. If contamination is present, the water will be contained on-site until a decision has been made to treat or dispose of the water.

Groundwater Sampling

Groundwater samples will be collected from both wells immediately following development. One groundwater sample will be collected from each of the wells in two 40 ml VOA vials. Samples will be obtained at a depth equal to the screening interval of the well using a point source bailer. Following collection, each sample will be labeled, logged on a Sample Management/Chain of Custody form and stored on ice.

Prior to development and sampling of each well, all development and sampling equipment will be cleaned in a solution of liquinox organic cleaner and rinsed in deionized water, and allowed to air dry.

Gill Wistar
November 16, 1990
Page 4

Laboratory Analysis

All samples will be delivered within 24 hours to Superior Analytical laboratory (State Certification #319) in Martinez, California. Samples collected during this round of sampling will be analyzed for total petroleum hydrocarbons and BTXE (EPA Method 602). *unclear*

Along with normal laboratory quality control measures, at least 10 percent spike and 10 percent duplicate samples will be run with each analysis set for quality assurance and quality control. A sample blank obtained by passing deionized water through a cleaned bailer will also be analyzed to verify on-site decontamination procedures.

Water Level Measurements

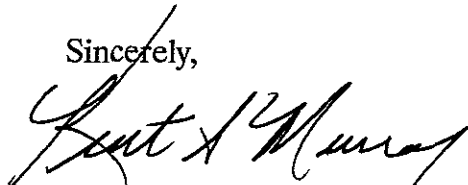
Water level measurements will be taken from all three monitoring wells. A Solonist Model 101 electric water level sounder will be used to measure water depths. Groundwater elevations and gradients will be calculated based on these depth measurements.

PROBLEM ASSESSMENT REPORT

A Problem Assessment Report summarizing the results of this investigation will be forwarded to the Alameda County Health Department upon completion of the study. At a minimum, the report will include site plans showing the surveyed locations of borings, and wells, logs of all borings, summaries and details of laboratory chemical analysis, results of field screening for organic chemicals, chain of custody record for the handling of all samples and recommendations for further groundwater monitoring or alternative remedial activities. *RW&CB*

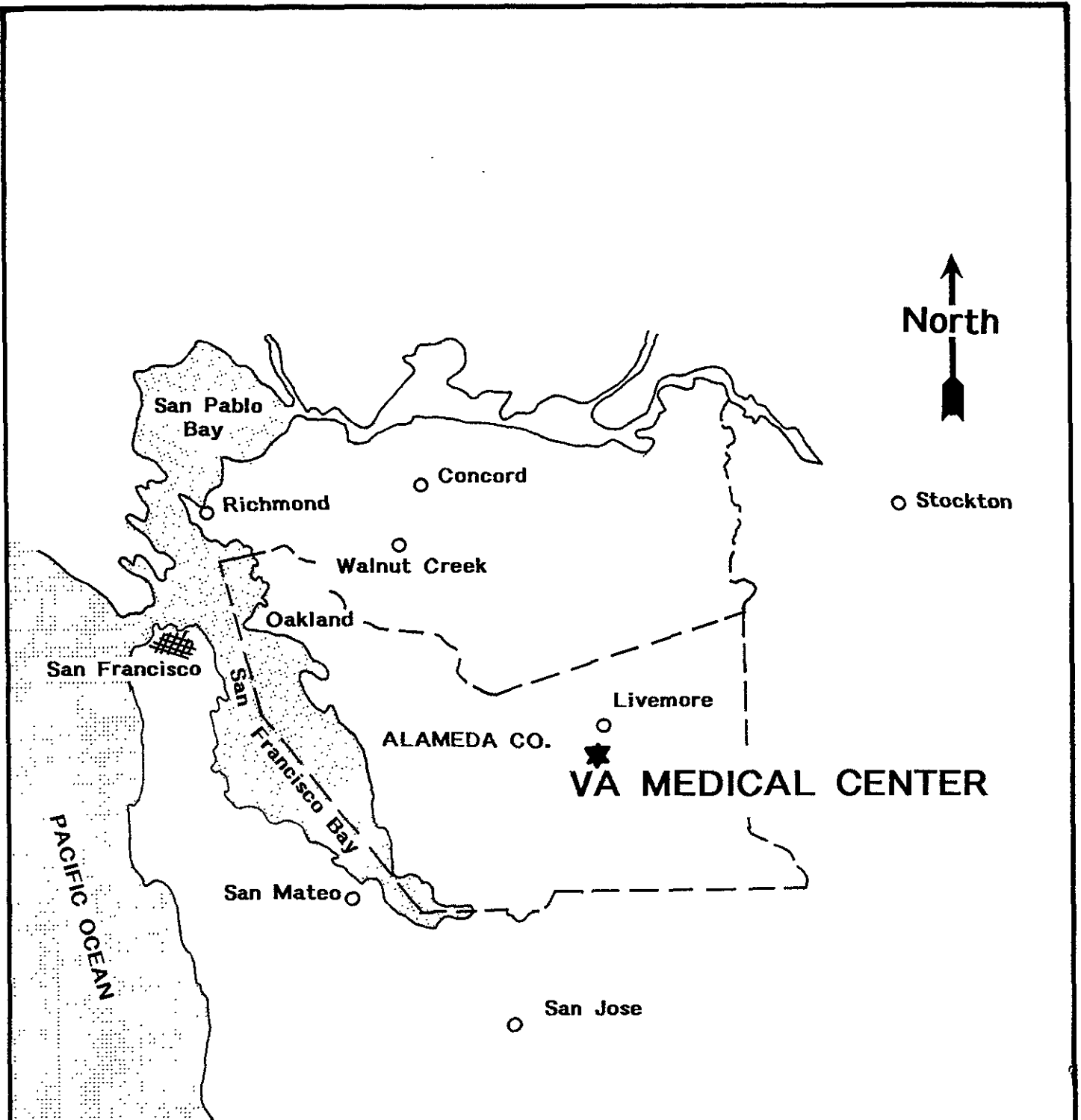
If you have any questions concerning this proposal, or would like additional information, please call me at your earliest convenience. We plan to schedule the drilling activities for November 20 and 21, 1990. Thank you.

Sincerely,

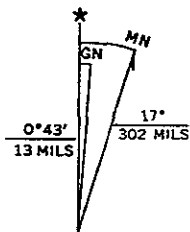
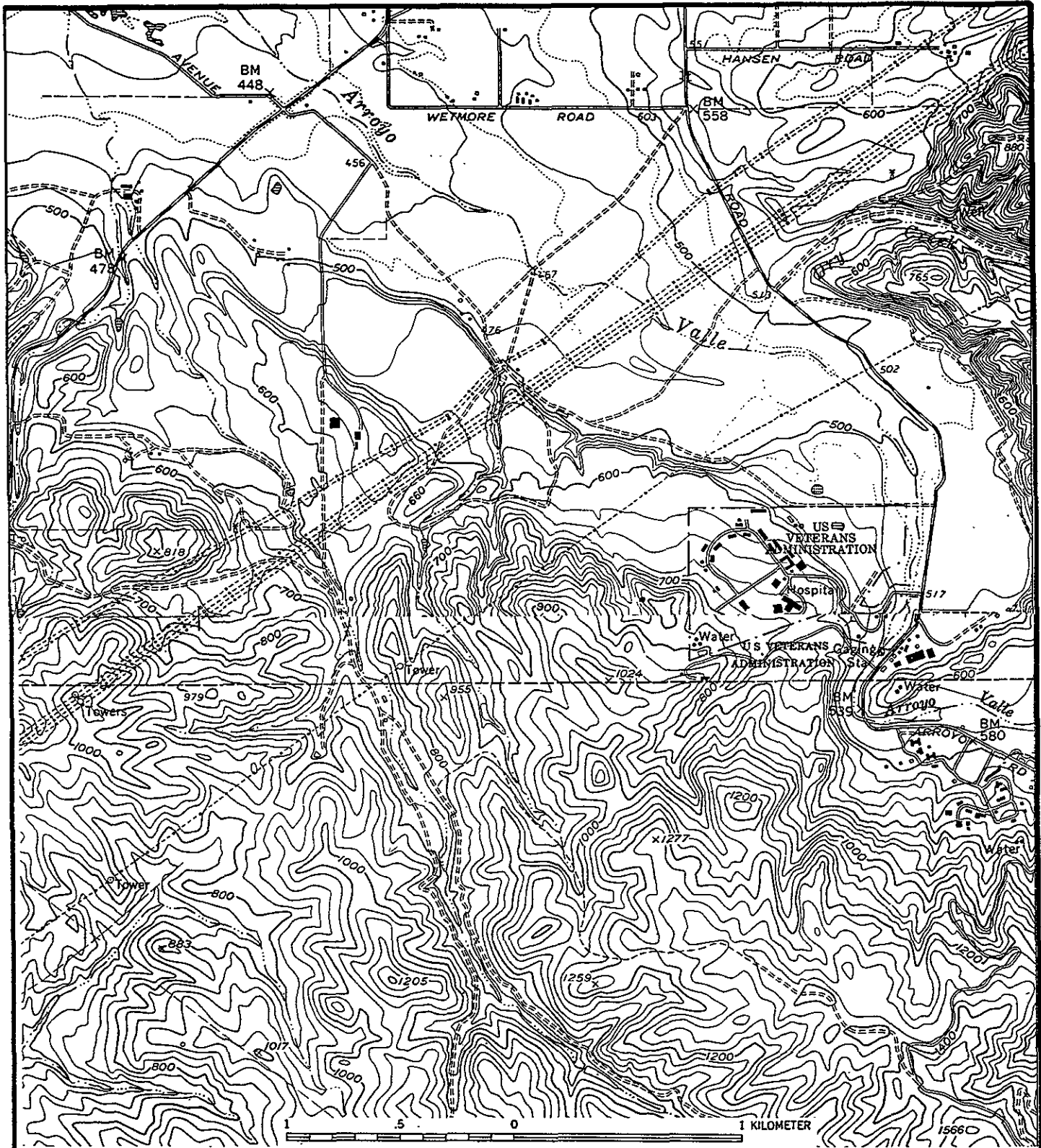


Kent S. Murray, Ph.D.
President

KSM:cal
Attachment



AUGEAS CORPORATION		
FIGURE 1		
LOCATION MAP		
DRAWN BY:	DATE:	PROJECT NO.



UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

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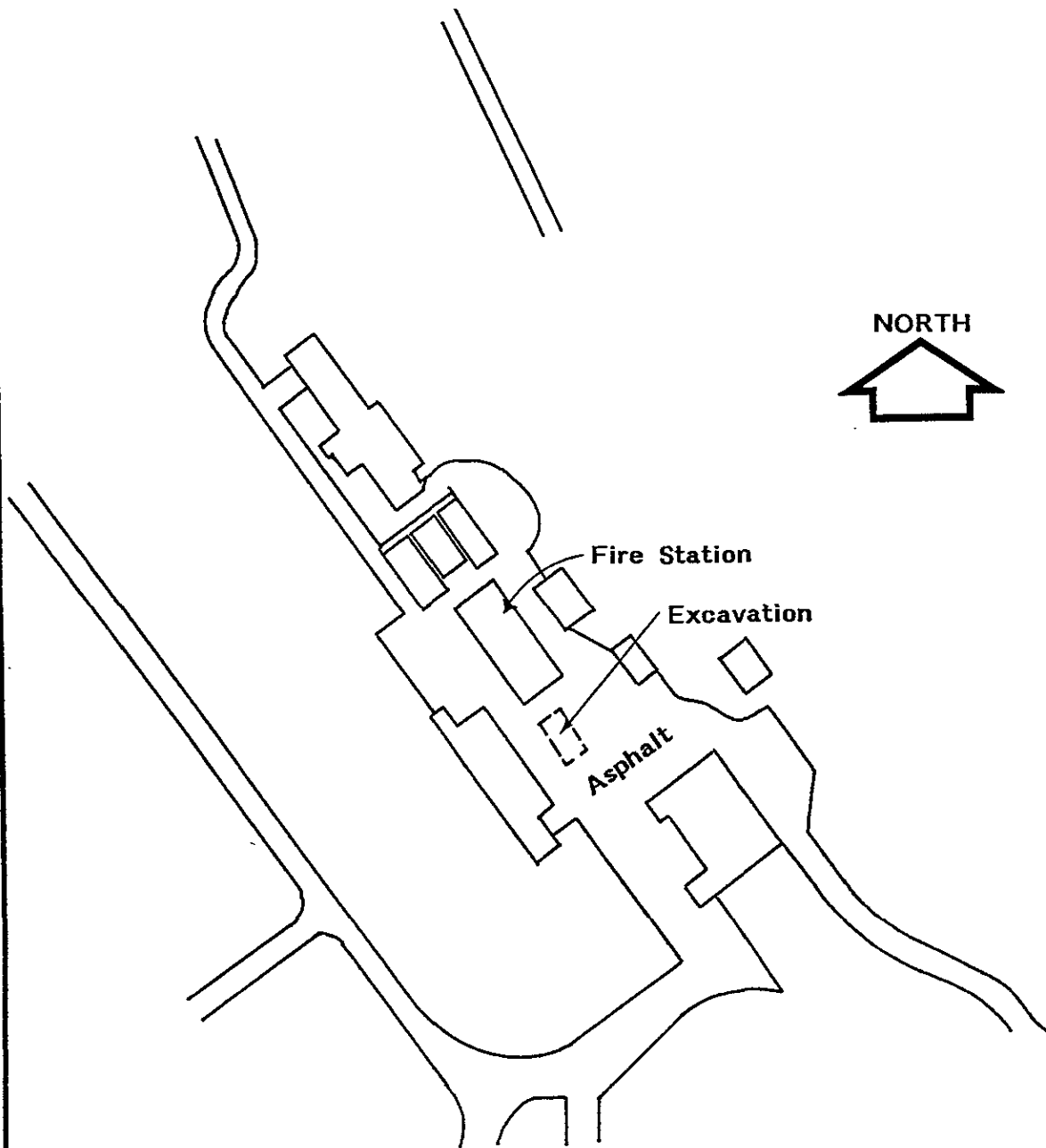
FIGURE 2
SITE VICINITY MAP

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VA MEDICAL CENTER SUPPORT BUILDINGS



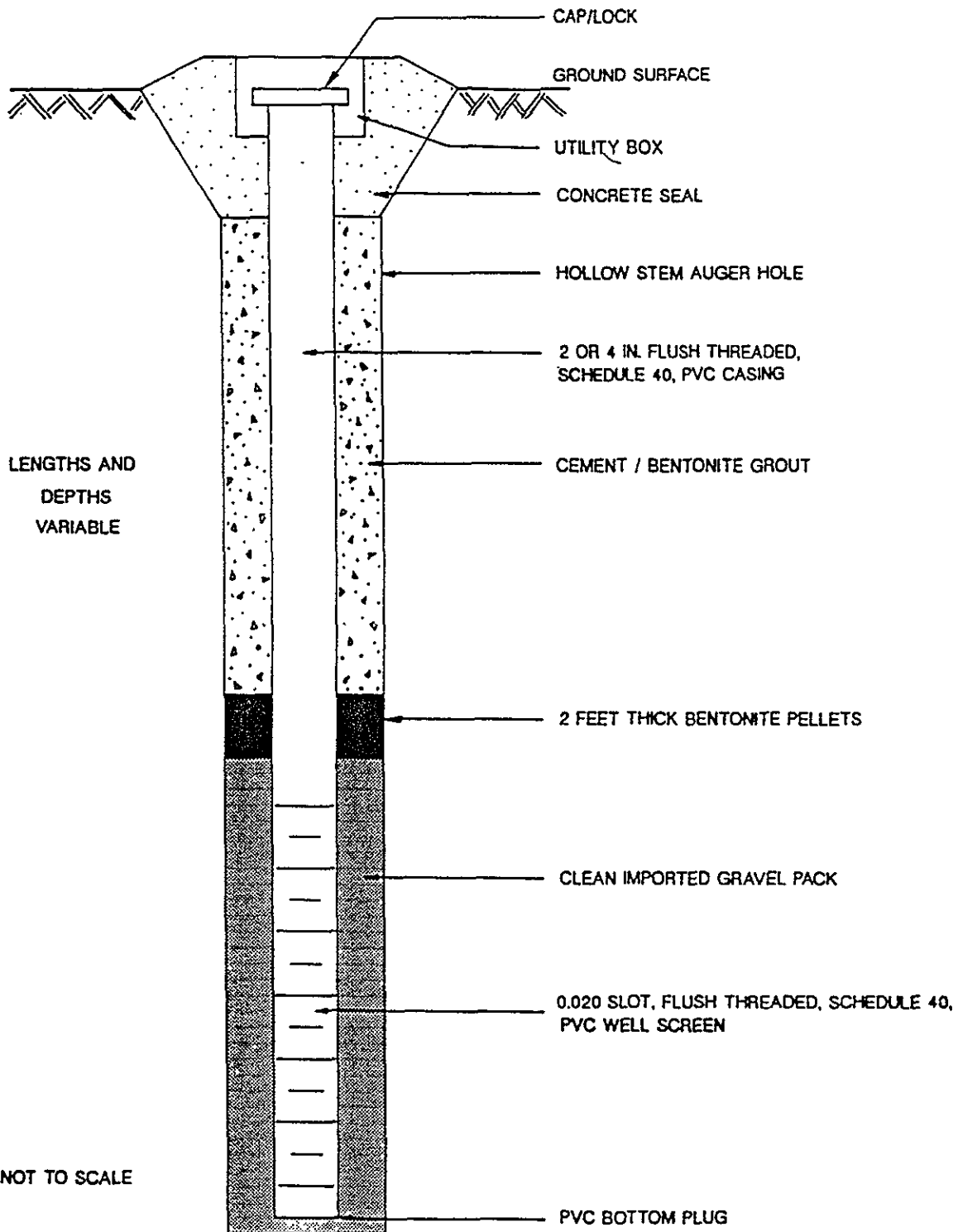
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FIGURE 3
SITE PLAN-

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FIGURE 4

WELL COMPLETION DETAIL

DRAWN BY:

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