HARZA
ENGINEERING COMPANY OF CALIFORNIA *Consulting Engineers*

December 21, 1993
KE1498-1A-2198, 24546

Dr. Ibrahim Hefni
President
Western Microwave
495 Mercury Drive
Sunnyvale, California

RE: WORKPLAN FOR REMEDIAL SYSTEM IMPLEMENTATION
SUNNYVALE, CALIFORNIA

Dear Dr. Hefni:

Enclosed please find a copy of the Workplan for Remedial System Implementation for the ground water beneath the 1271 Reamwood Avenue, Sunnyvale, California site. Figure 4 - Conceptual Design of the Treatment Trench of the workplan will be submitted later.

Please call me if you have any questions.

Very truly yours,

HARZA KALDVEER

Stephen R. Henshaw
Manager, Industrial/Hazardous
Waste Services

SRH:pv
Copies: Addressee (1)

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Tel: (510) 568-4001 Fax: (510) 568-2205

SUPPLEMENT B
WORKPLAN FOR
REMEDIAL SYSTEM IMPLEMENTATION
FORMER WESTERN MICROWAVE FACILITY
1271 REAMWOOD AVENUE
SUNNYVALE, CALIFORNIA

Prepared for
Western Microwave
495 Mercury Drive
Sunnyvale, California

December 21, 1993

Prepared by
Harza Kaldveer
425 Roland Way
Oakland, California 94621

HARZA KALDVEER
Harza Engineering Company of California

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1.0 INTRODUCTION

Harza Kaldveer (Harza) has prepared this workplan on behalf of the Western Microwave, Inc. (WMI), for design, installation, and operation of an interim ground water remediation system at the former WMI facility located at 1271 Reamwood Avenue, Sunnyvale, California. This workplan is prepared as proposed in the November 4, 1993, meeting with the Regional Water Quality Water Quality Control Board (RWQCB) and as specified as Task C in WMI's summary of the meeting dated November 5, 1993.

1.1 Workplan Scope

The scope of this workplan is to describe the tasks that will be performed to further evaluate and optimize an in-situ ground water treatment system; develop design details, drawings, specifications, and bid documents; provide design support and construction oversight services for construction; and provide assistance during the startup of an interim ground water remediation system. This system will be designed to meet or exceed the soil and water cleanup requirements identified in the Site Cleanup Order No. 93-048 and amended Order No. 93-088A.

This workplan also contains background information of the site, the design approach of the interim remedial measures, the proposed scope of work, and a schedule for completing the design and construction oversight of the remediation system. The workplan does not address soil remediation alternatives.

2.0 BACKGROUND

2.1 Site Location and Description

The site is located in the northern portion of the City of Sunnyvale, Santa Clara County, California (Figure 1). It consists of the southern half of a 2.4 acre parcel which is developed with one building (1271 and 1273 Reamwood Avenue). The site is located on the west side of Reamwood Avenue, approximately one and one-quarter miles north of Interstate Highway 101, and approximately one quarter miles south of Highway 237.

The site is bounded on the west by Intersil, on the south by Lockheed Missiles and Space Company (Lockheed), on the east by Reamwood Avenue, and on the north by Micro Lithography, Inc. (MLI).

The land use in the site vicinity generally consists of light industrial and residential with the majority of the development occurring post 1960s. Prior to this period, predominant land use was agricultural. The Sunnyvale-baylands County Park is located approximately 1000 feet north of the site and borders Guadalupe Slough.

The site and the surrounding area are relatively flat, lying at an elevation of between 5 and 8 feet above mean sea level. The area north of Guadalupe Slough is mostly at or below sea level and is used for salt evaporators and the commercial production of salt.

The site is located on the San Jose Plain, near the northern end of the Santa Clara Valley, as defined by the California Department of Water Resource (DWR, 1967). The San Jose Plain is a fluvial outwash plain characterized by low relief, slight topographic gradient, and low elevation. The Plain receives outwash from streams that emerge from coalescing alluvial fans located between the Santa Cruz Mountains to the south and southwest and the Diablo Range to the north and northeast.

The climate of the Sunnyvale area is characterized by warm, dry summers and cool, wet winters. Normal January and July daily average temperatures are 49.5°F and 68.8°F, respectively. Normal annual rainfall is 13.9 inches, most of which falls during November through April.

Surface water bodies in the vicinity of the site consist of San Francisco Bay, tidal creeks and estuarine wetlands that flow from ephemeral freshwater streams from the Santa Cruz mountains to San Francisco Bay. Surface runoff in the site vicinity is controlled by urban stormwater runoff systems that eventually lead to the City of Sunnyvale storm drainage system.

2.2 Site History

The site was occupied by WMI from April 1979 through May 1990. WMI subleased the northern portion of the building to Laselco Pacific and occupied the southern portion of the building for manufacturing microwave components. The northern portion of the building was vacant from May 1990 to April 1991, while the southern portion of the building was vacant from May 1990 to September 1992. Currently the northern portion of the building is occupied by MLI and the southern portion of the building is occupied by De Anza Manufacturing Services.

During the site utilization by WMI, chlorinated and aromatic hydrocarbons and inorganic chemicals were used in the manufacturing process. In 1985, WMI discovered a release of volatile compounds (VOC) in the plating room area which was subsequently closed. Several soil and ground water investigations have been conducted at the site since 1986.

To date five monitoring wells (P-1, P-2, P-3, P-4 and MW-1) have been installed at the site. Monitoring well P-4 was destroyed during the soil removal activities conducted in the plating room area.

Three phases of soil sampling have been conducted at the site since 1986. The Phase I and II investigations were conducted by E_2C, Inc. The Phase I investigation focused on the plating room area and included the collection of soil samples at depths of two and seven feet below land surface for analysis of VOCs. In addition, soil gas samples were collected. Based on these data the plating room was closed and soil excavation activities were implemented.

Phase II soil sampling activities included the collection of 32 soil samples at the WMI site at depths of two and seven feet below land surface for analysis of VOCs. These data indicated the presence of VOCs at concentrations up to 27 and 50 ppm in the two and seven foot deep soil samples, respectively.

Phase III soil sampling activities were employed by ALFA Environmental Remediation Services (ALFA) during 1993. The results of this investigation are presented in ALFA's July 16, 1993 document entitled: Revised Workplan for Remedial Action.

2.3 Site Characteristics

The following discussion of regional and site-specific geology and hydrogeology is based on (1) Harza's knowledge of Santa Clara Valley, obtained from numerous site investigations near the site, (2) a draft report dated January, 1993, prepared by Geomatrix for Intersil entitled: Revised Final Remedial Action Plan, and (3) information presented in ALFA's document entitled: Revised Workplan for Remedial Action, dated July 16, 1993.

2.3.1 Geology

The site is located on the northwest edge of the Santa Clara Valley, a northwest-trending structural basin that is bound by the San Andreas fault zone and the Santa Cruz Coastal Mountains on the southwest, and by the Calaveras fault, Hayward fault, and the Diablo range on the northeast. The basin generally consists of 1,000 to 2,000 feet of alluvial material and deposits of marine environment which unconformably overlie bedrock formations. The alluvial material in the Santa Clara Valley is characterized by weakly consolidated, irregularly-bedded gravels, sands, silts, and clays. These bedded deposits vary from being moderately or highly permeable to relatively low permeable that may act as aquitards.

The soil formation beneath the site consists of silty clay to clay from 0 to 9 feet below ground surface (bgs), silty sand and gravel (A aquifer) from approximately 9 to 18 feet bgs, and clay at a depth of 19 feet bgs, which separates the A aquifer and B aquifer. The B aquifer is reported to be at a depth of approximately 80 feet bgs.

2.3.2 Hydrogeology

Based on previous boring and well logs, the first shallow water bearing zone (A aquifer) at the site was encountered at a depth of approximately 8.5 to 10 feet bgs. The second shallow water bearing zone (B aquifer), was encountered approximately at 75 to 80 bgs. These aquifers are separated from the deeper water bearing zone (C aquifer) by a competent clay aquitard. The proposed interim remedial measures will be installed solely for the remediation of the A aquifer.

The ground water flow direction in the area is inferred to be towards the north. According to the Water Quality Control Plan for the San Francisco Bay Region (Basin Plan), the existing and

potential beneficial uses of the ground water of the site include municipal and domestic water supply, agricultural water supply, and industrial process and service supply.

Based on studies conducted by Intersil, the A aquifer is considered to be non-potable due to high concentrations of total dissolved solids, manganese, chloride, and sulfate.

3.0 DESIGN APPROACH

3.1 Objectives

The proposed interim remedial measures will address two principal concerns posed by the VOCs detected in the A aquifer beneath the site. These concerns are 1) further migration of the VOC impacted ground water, and 2) potential contamination of the drinking water supply.

Installation of the proposed interim remedial measures will serve three purposes, 1) to mitigate the lateral migration of contaminated ground water, 2) to minimize the potential contamination of the drinking water supply, and 3) to evaluate the effectiveness of the installed system and provide design basis for the final remediation system if it is deemed necessary.

3.2 Site Remediation Strategy

The site is located in an industrial area where chlorinated solvents were commonly used for degreasing in the manufacturing processes. Past handling and/or storage and disposal of solvents at the site and adjacent sites may be responsible for the elevated VOCs detected in the A aquifer in the subject area. The remediation strategy is to restore the ground water at the site to a level which meets the requirements set forth by the RWQCB and other regulating agencies.

This document addresses only the ground water remediation activities. The soil remediation activities will be addressed in a separate document, prepared by ALFA Environmental Remediation services, identified as "Supplement A".

The interim ground water remediation system consists of an air sparging and vapor extraction system that will be installed in a trench located approximately perpendicular to the direction of ground water flow. The system will be designed as a passive system thereby treating the ground water under natural velocity as it flows through the aquifer.

3.3 System Description

The proposed interim ground water remediation system consists of an air sparging and vapor extraction system, constructed within a trench which may be supplemented by an experimental iron treatment wall similar to that proposed by Intersil.

The trench will be constructed on the down-gradient side of the former WMI facility to capture contaminated ground water. The approximate location of the treatment trench is presented on

Figure 2. A conceptual schematic of the trench design is presented in Figure 4. Exact dimensions and location of the trench will be finalized in the system design stage.

The trench will be keyed into the shallow aquitard, approximately 20 feet bgs, and will be backfilled with permeable material. The backfill material will enhance air and water flow in and through the trench. Horizontal air sparging piping will be installed at a several different depths within the trench. The horizontal vapor extraction piping will be installed in the vadose zone. Negative pressure maintained by the extraction system will enhance the vertical movement of the air in the trench. A resistant seal will be placed above the vapor extraction system to prevent volatile emissions from the trench to the atmosphere. Liners may also be employed in the sidewalls of trench, within the vadose zone, to minimize the potential for vapor to migrate laterally from the trench into the native subsurface material. The vapor treatment system and the air supplying unit will be located above ground and nearby to the trench. In addition, iron filings, similar to the technology approved by the RWQCB for the neighboring Intersil site, may be placed at the base of the trench to enhance the effectiveness of the remediation system.

The treatment system will consist of the following components: 1) an air supplying source which most likely will be an air compressor; 2) a vacuum pump and its accessories which provide negative pressure for the extraction system; 3) an air/water separator which will remove excess moisture in the vapor; and 4) if necessary, an air abatement unit which will treat the extracted vapor before being emitted to the atmosphere.

Compressed air will be injected through the horizontal air sparging piping network. The horizontal air sparging piping will consist of a series of pipes with air diffusers. The diffused air bubbles discharged from the sparging pipes will migrate through the backfilled material in the trench and will be captured by the horizontal vapor extraction piping. As the introduced clean air bubbles move up through the ground water zone, VOCs will partition into the gas phase. The vaporized VOCs will then be carried by the bubbles to the vadose zone and captured by the vapor extraction system. The captured vapor will be conveyed through underground pipelines to the treatment system before being discharged to the atmosphere.

3.4 Technical Approach

During the initial phase of the remedial design, information from previous investigations and on-going sampling programs for soil and ground water will be reviewed. This will determine whether collecting supplemental data to assist with hydrogeologic characterization is necessary for designing an effective ground water remediation system. In addition, vendor-contact or bench-scale pilot studies may be conducted to evaluate trench backfill materials which are capable of providing high surface area, extensive air/water contact time, and high strength and durability.

A testing program will be conducted on the proposed system for the first 3 to 6 months of system operation. The main purpose of this testing program is to optimize the system operation

and finalize the system equipment. Parameters which will be finalized in this testing period include:

- Pressure rating and volume of the injection air
- Schedule of the air injection
- Effectiveness of the vapor capture
- Impact of the local ground water elevations
- Effectiveness of the treatment system to remove VOC from the ground water
- Finalize the air abatement unit (as necessary)

A system operation plan for this testing program will be submitted to the RWQCB for review and approval. The system operation plan will include a sampling program and a health and safety plan. A report summarizing the findings of the testing program will be submitted to the RWQCB.

Based on data collected from the testing program, the system will be finalized or modified as necessary.

3.5 System Operation

Operation of the proposed interim remedial system will be monitored carefully for the initial 3 months. Additional ground water monitoring wells or piezometers will be installed to monitor the local ground water elevations, ground water quality, and effects of the air injection in the trench.

Because the trench will act as a passive ground water collection system and no pumping is currently planned for the control of ground water flow, maintaining a northern ground water gradient will be essential. Different operating combing scenarios, such as, low pressure/high volume, high pressure/low volume, and pulse verse continuous air injection will be evaluated during the initial operation. These evaluations will assist in locating the most effective operation parameters without disturbing the original ground water gradient.

Both pressure and VOC concentrations of the soil vapor will be monitored regularly during the initial stage of operation to evaluate the effectiveness of the vapor extraction system. The volume of air being extracted always will be significantly higher than the air being injected in order to create negative air pressure. This will control migration of the air emanating from the treatment trench.

Should the air emissions need to be abated, the extracted vapor will be passed through an air/water separator to remove excess moisture entrapped in the vapor. Vapor-phase activated carbon adsorbers will be used as the air abatement unit during the initial operation. Vapor samples will be collected from the treatment system to monitor the effectiveness of the air abatement unit and provide information for selecting a final abatement unit if it is deemed necessary.

4.0 SCOPE OF WORK

The design tasks required to develop plans and specifications for ground water remedial facilities at the former WMI site are discussed below. Tasks which provide services during system construction are also discussed.

4.1 Task 1 - Project Planning

This task includes work efforts required to initiate and manage the design process. The following activities are included in this task.

4.1.1 Site Visit

A site reconnaissance will be conducted to familiarize the Harza design team with details of the site layout and surroundings.

4.1.2 Acquisition and Review of Existing Data

The Harza design team will complete a detailed evaluation of the site characterization data. Based on the review of these data, additional data collection for the system design will be identified. Such data collection is anticipated to include additional geologic characterization of the shallow aquifer and additional treatability testing to evaluate and select media which will be used for backfill in the trench.

4.1.3 Treatability Studies

Harza will conduct treatability testing as needed to select a backfill material which will optimize the air and water flow, provide high contact surface for the air bubbles, and provide sufficient strength to accommodate utilization of the overlying area during remediation.

4.1.4 Project Management

4.1.4.1 Project Organization

The project organization is shown in Figure 3. Harza will serve as a consultant to WMI and provide them with professional engineering services. The roles of key Harza personnel are presented below.

The Project Director (PD), Mr. Stephen Henshaw, is responsible for the quality of all work performed. He monitors the progress of each work assignment to ensure that adequate resources are available and that major problems are minimized and handled expediently. The PD's review concentrates on the technical quality of all work assignments.

The overall Project Manager (PM), Mr. Krishna Mayenkar, will retain responsibility for the design works. The PM is responsible for schedule, budget, and overall project coordination within and outside Harza, and on-site management, if any, for the duration of all actives at the site. The Project Engineer (PE), Mr. Hugo Hsu, has primary responsibility to assist the PM in internal and external coordination, supporting the PM/PE and the lead engineers for the system design. The lead engineers are responsible for preparation of the system design within their respective disciplines (e.g., hydrogeology, civil, mechanical, electrical, and instrumentation and control [I&C] engineering).

4.1.4.2 Project Schedule

The narrative project schedule for deliverables is presented in Section 5.0.

4.2 Task 2 - Data Evaluation

Additional hydrogeological and ground water chemical data obtained through previous and on-going efforts will be thoroughly reviewed to develop and evaluate an optimum remedial system at the WMI site.

Local regulations regarding the siting, design, and construction of the system will be reviewed. In addition, the review will include the discharge limitations and Bay Area Air Quality Management District (BAAQMD) monitoring requirements and emission limitations. The potential off-site treatment, storage, and disposal (TSD) facilities for disposal of any hazardous materials generated by construction or operation of the remedial system will be evaluated. A technical memorandum will be submitted to WMI and the RWQCB documenting results and conclusions of these reviews.

4.3 Task 3 - 30 Percent Design

A site plan will be prepared indicating the location of the proposed trench, conveyance pipelines, power distribution centers, and treatment facility in relation to former WMI facility. The proposed locations of the remediation facilities will be field-verified. Site plans will be provided as part of the 30 percent design review.

The 30 percent design will present a complete conceptual definition of the trenching system, conveyance pipelines, and treatment facility. The following deliverables will be submitted to WMI and the RWQCB for review:

- Preliminary drawings
- Design Basis Memorandum
- Preliminary Construction Specifications

Following the RWQCB review and comment, the major elements of the design will be considered "established" and the remaining details for the project will be developed on that basis in the final design phase.

4.3.1 Drawings

For the 30 percent design phase of this project, drawings illustrating major design components will be prepared. These will include:

- Site Plan
- Illustration of the general arrangement of system components
- Process and instrumentation diagram
- Electrical single line drawings

Following review and comment by the RWQCB, these drawings will be completed so that appurtenances can be designed for the final design.

4.3.2 Specifications

The preliminary design submittal will include a preliminary construction specification package. The specification will qualitatively definite requirements for products, material, and workmanship on which the construction contract will be based. Sections of the specification will be prepared in Construction Specification Institute (CSI) format and organized into 16 major divisions. Based on preliminary review, 6 of these divisions will probably be required for this RD. These include:

Division 1	General Requirements
Division 2	Sitework
Division 3	Concrete
Division 11	Equipment
Division 15	Mechanical
Division 16	Electrical/Controls

Some of the standard divisions will be 90 percent complete at this stage. Specifications will also specify the site safety responsibilities of the contractor during construction.

4.4 Task 4 - Final Design

4.4.1 90 Percent Design

This task includes all efforts necessary to prepare final plans and specifications for the complete extraction and injection systems, conveyance lines, and treatment facilities.

The 90 percent design documents and technical specifications will incorporate WMI and the Board comments on the 30 percent design. The 90 percent design package will be submitted to WMI and the Board for review.

4.4.2 Final Design

The Board comments on the 90 percent design will be incorporated into the final design, which will then be considered to be 100 percent complete. The final design submittal will include completed specifications and drawings. The final design package and the contract bid documents will constitute the bid package from which a general contractor can submit a price to construct the remedial system.

4.4.3 Final Drawings

All project drawings will be 90 percent complete for submittal to WMI and the Board for review and approval and will become final when WMI's and the Board's comments are incorporated. The drawings will provide sufficient details so that the bidders will be able to clearly identify the labor, materials, tools, and equipment necessary for the proper execution of the contract. Approximately 8 drawings may be produced for this project; however, the exact number cannot be firmly established until the preliminary design phase has begun. These drawings will include the following general classes of drawings:

- Site Plan
- Piping and Instrumentation Diagram
- Mechanical Drawings
- Electrical Drawings
- Civil/Structural Drawings

The drawing package, when complete and final, will be signed and sealed by a Professional Engineer registered in the state of California.

4.4.4 Final Specifications

The construction specifications will be 90 percent complete for submittal to the Board for comments, and will become final when the comments are incorporated.

The technical specification, when complete and final, will also be signed and sealed by a Professional Engineer registered in the state of California.

4.4.5 Construction Schedule

An anticipated construction schedule will be prepared during this task and submitted with the other deliverables to the Board.

4.5 Task 5 - Design Support

This task is comprised of design support efforts which will be required during one or all phases of the system design. Support activities include the following:

- Assistance with permits, approvals, and site access agreements
- Preparation of health and safety program
- Resolving problems during all phases of the project
- Attending meetings with the regulatory agencies

4.5.1 Design Basis Memorandum

The Design Basis Memorandum will include all design data and criteria such as flow rates, design concentrations and impacts, electrical power requirements, a process flow diagram, design calculations for major equipment, and relevant design standards to be used for design. Design criteria will be developed based on review of federal, state, and local codes, and fulfilling the objectives of the site clean-up requirements.

4.5.1.1 Process Flow Diagram

The treatment process is the most critical component of the RD. Therefore, a Process Flow Diagram (PFD) will be developed early in the design so that major components of the process will be fixed and remain constant throughout the remainder of the design. The PFD will show all major components of the process equipment.

4.5.2 Permits, Approvals, and Site Access Agreements

The WMI and Harza will obtain and complete necessary permits, approvals, and site access agreements. Permits and access agreements may include, but are not limited to:

- City of Sunnyvale construction permits
- hazardous waste disposal permits
- air emissions and aqueous effluent discharge permits
- permit to construct and operate the treatment facilities

4.6 Task 6 - Preparation of Bid Package and Contract Documents

This task includes efforts required to prepare contract bidding documents, such as printing, advertising, mailing, prebid meetings, addenda, bid opening, tabulation of bids, and award of contract.

Harza will prepare a bid package for use in soliciting bids by general contractors to provide the necessary construction and associated services for implementation of the WMI remedial action.

At a minimum, the bid package will include the following:

- Background information
- Definitions
- Bidding requirements
- Contract forms
- Scope of work
- Technical specifications
- Contract drawings
- Special conditions
- Attachments

As a continuation of the contractor procurement effort, Harza will provide ancillary services required to support the contract procurement process. These services will include, but not be limited to:

- Advertising for invitation to bid
- Mailing bid packages
- Conducting site visits
- Conducting bidder's meeting
- Answering technical questions
- Issuing addenda as required
- Accepting and opening bids
- Evaluating bids and making purchase recommendations

4.7 Task 7 - Contract Negotiation

WMI will negotiate a final contract with the Contractor.

4.8 Task 8 - Provision for Oversight Services during Construction

This task consists of efforts that will be required after the bid package and contract documents are prepared. Typical subtasks include the following:

- Field oversight services
- Design support
- Startup Assistance/Training

4.8.1 Field Oversight Services

Field oversight services include technical oversight of construction. A Harza engineer, which is assigned as the Resident Observer (RO) of the project, will be responsible for processing any design changes or other field requests for overseeing contractor construction daily.

The RO's responsibilities include:

- Advising the contractor on engineering interpretation of plans and specifications
- Interpreting the impact on the final design regarding possible proposed changes and assisting in preparing construction contract modifications
- Documenting design field changes that occur during construction

4.8.2 Design Support During Construction

Field changes during construction can result in design changes. Harza will document design changes, design and supply plans for modifications, and revise drawings, if required.

4.9 Task 9 - System Testing

The system will be monitored closely during the initial 3 to 6 months of operation. Harza will provide a startup engineer to assist the general contractor or WMI with proper startup and shakedown of the facility for 2 weeks. In addition, Harza will prepare the system testing protocol and submit it to the RWQCB for review and approval.

4.10 Task 10 - Additional Work

Harza will perform additional tasks as required. These tasks include, but are not limited to, the following:

- Attendance at meetings, conferences, and site visits as deemed necessary to complete the remedial system.

5.0 IMPLEMENTATION SCHEDULE

The following narrative schedule, including estimated review times for the agencies, is summarized on a bar-chart in Figure 5 to illustrate how the various tasks are integrated into the overall schedule.

The purpose of this narrative schedule is to indicate project flow. All schedules presented are approximate and are presented solely to indicate the interrelationships of project subtasks. Refer to Sections 4.1 through 4.10 of this workplan for detailed discussions of project tasks.

5.1 Task 1 - Project Planning

A site visit and acquisition and review of existing data will be conducted as soon as possible after the approval of the workplan.

- Treatability study for the backfill material, if deemed necessary, will be arranged and completed as quickly as is feasible.

5.2 Task 2 - Data Evaluation

All data obtained in Tasks 1 and 2 will be thoroughly reviewed for the development of an optimum remedial system. The evaluation will include an environmental law compliance review. This overall evaluation process is anticipated to be completed approximately fourteen (14) days.

5.3 Task 3 - Preliminary Design

The draft Preliminary Design (30 percent Design), including drawings, equipment specifications, and a preliminary cost estimate, will be submitted thirty (30) days after the approval of this workplan.

5.4 Task 4 - Final Design

The draft Final Design (90 percent Design) will be submitted thirty (30) days after the Board approval of the Preliminary Design is received. The Final Design (100 percent Design), including final drawings, specifications, and construction schedule, will be submitted seven (7) days after all RWQCB comments on the draft Final Design are received.

5.5 Task 5 - Design Support

Design support activities including development of a process flow diagram and specification of design standards, will occur throughout the design process.

Permits and access agreements for construction, operation and maintenance of the treatment system will be obtained as quickly as possible after RWQCB approves the Final Design. The health and safety plan and the operation plan for the testing program will be submitted to the Board with the Final Design document.

5.6 Task 6 - Bid and Bid Evaluation

Construction Bid Documents will be issued ten (10) days after RWQCB approves the Final Design. Evaluation of the Construction Bid Documents is anticipated to be completed approximately thirty (30) days after RWQCB approves the Final Design.

5.7 Task 7 - Contract Negotiation

Contract Negotiation will be completed as quickly as possible after completion of the Construction Bid Document evaluation, anticipated to be approximately fifteen (15) days.

5.8 Task 8 - Construction and Construction Oversight

On-site construction will begin forty-five (45) days after RWQCB approval of the final design is received (predicated upon receipt of all necessary permits).

5.9 Task 9 - System Testing Program

Treatment system startup will begin thirty (30) days after on-site construction is started or fifteen (15) days after the Board approves the testing program whichever is later. The testing program is anticipated to last for ninety (90) to one hundred eighty (180) days after the system start-up. The treatment system will be put to continuous operation as soon as the system design is finalized. An evaluation report for the testing program will be submitted to the Board thirty (30) days after the system has been in continuous operation.

5.10 Task 10 - Additional Work

Any additional activities deemed necessary to complete the interim remedial facility will be performed as needed throughout the duration of the project.

REFERENCES

California, State of, Department of Water Resources (DWR), August, 1967, Evaluation of Ground Water Resources: South Bay, Geology, DWR Bulletin No. 118-1, Appendix A.

California Regional Water Quality Control Board, San Francisco Bay Region, Site Cleanup Requirements (SCR), May 25, 1993, Order No. 93-048.

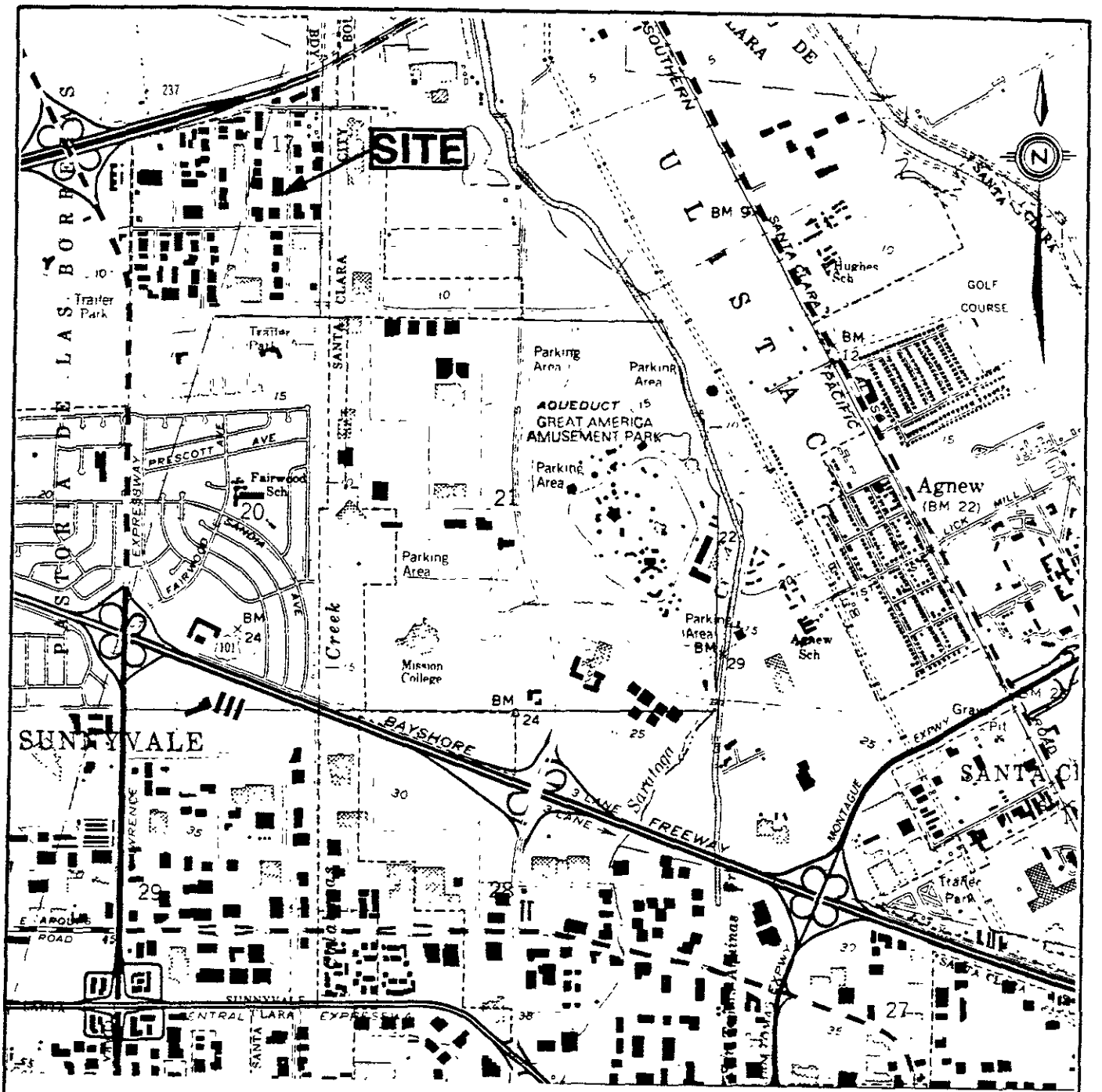
....., San Francisco Bay Region, Amendment to Site Cleanup Requirements Order No. 93-048, August 20, 1993, Order No. 93-088a.

....., San Francisco Bay Region, Proposed Amendment to the Water Quality Control Plan, San Francisco Bay Region, 1991.

State of California, Water Quality Control Plan San Francisco Bay Basic, Region (2), December, 1986.

ALFA Environmental Remediation Services, Revised Workplan for Remedial Action, Former Western Microwave Facility, July 16, 1993.

Geomatrix Consultants, Draft Revised Final Remedial Action Plan, Former Intersil Facility, January, 1993.



APPROXIMATE SCALE IN FEET

0 1000 2000

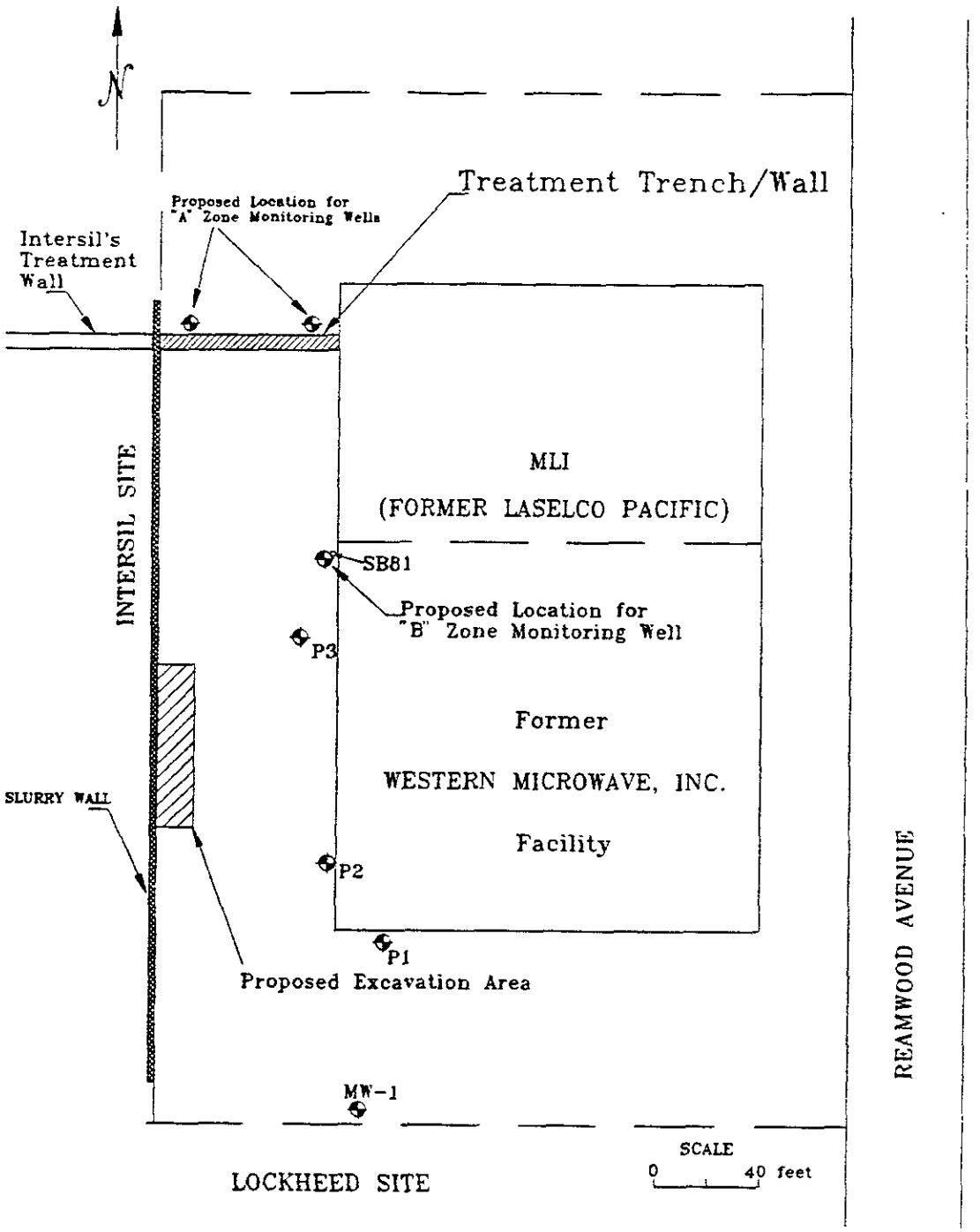
REFERENCE: U.S.GEOLOGICAL SURVEY; 7.5 min. Milpitas TOPOGRAPHICAL SURVEY MAP, PHOTOREVISED 1980

HARZA KALDVEER
Consulting Engineers

SITE LOCATION MAP

WESTERN MICROWAVE, INC.
Sunnyvale, California

PROJECT NO.	DATE	Figure 1
KE1498-1A-2198	November 1993	

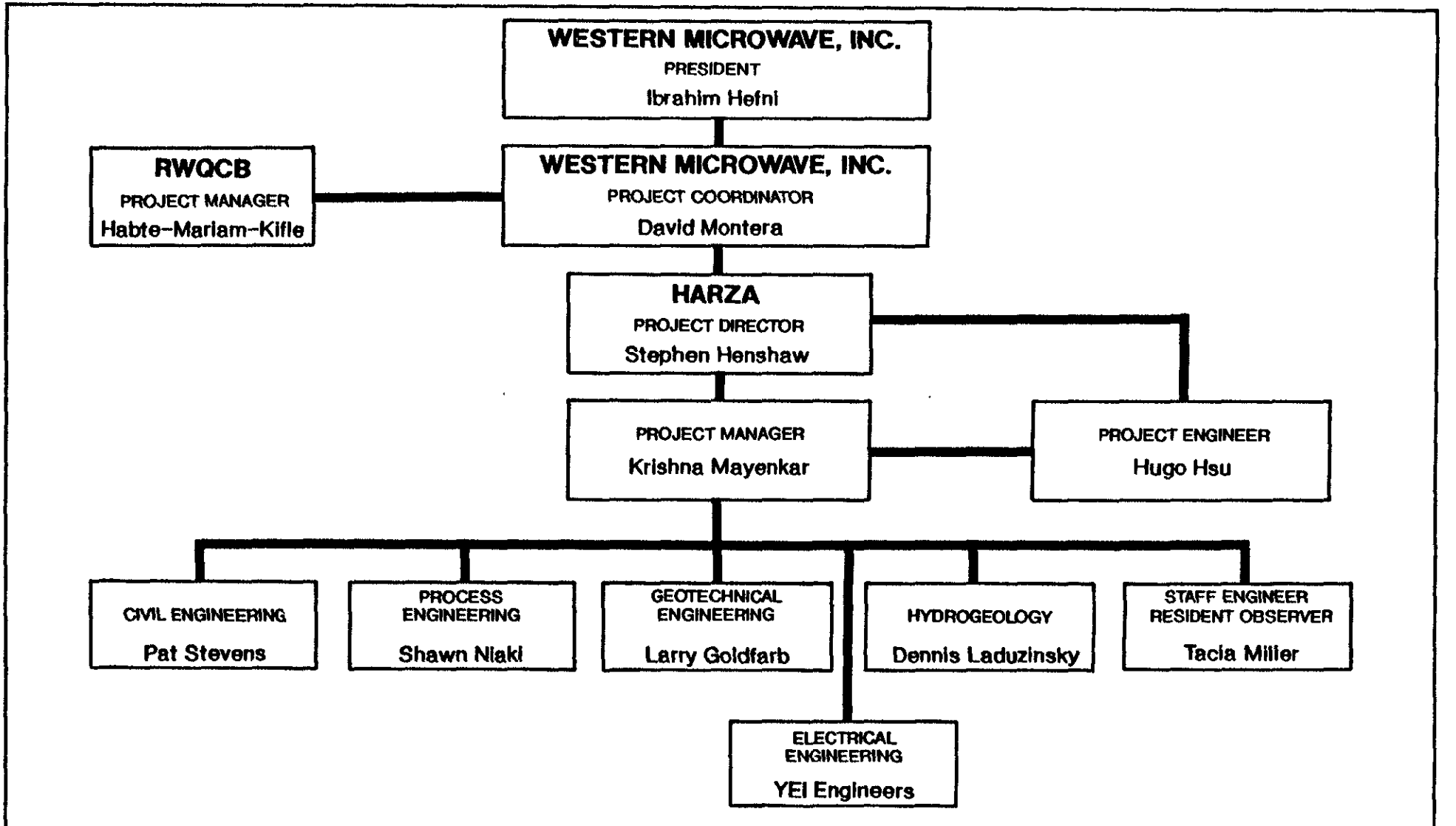


HARZA KALDVEER
Consulting Engineers

SITE PLAN

1271 REAMWOOD AVENUE
Sunnyvale, California

PROJECT NO.	DATE	
KE1498-1A-2158	December 1993	Figure 2



HARZA KALDVEER
Consulting Engineers

PROJECT ORGANIZATION

WESTERN MICROWAVE, INC
Sunnyvale, California

PROJECT NO.	DATE	
KE1498-1A-2198	November 1993	Figure 3

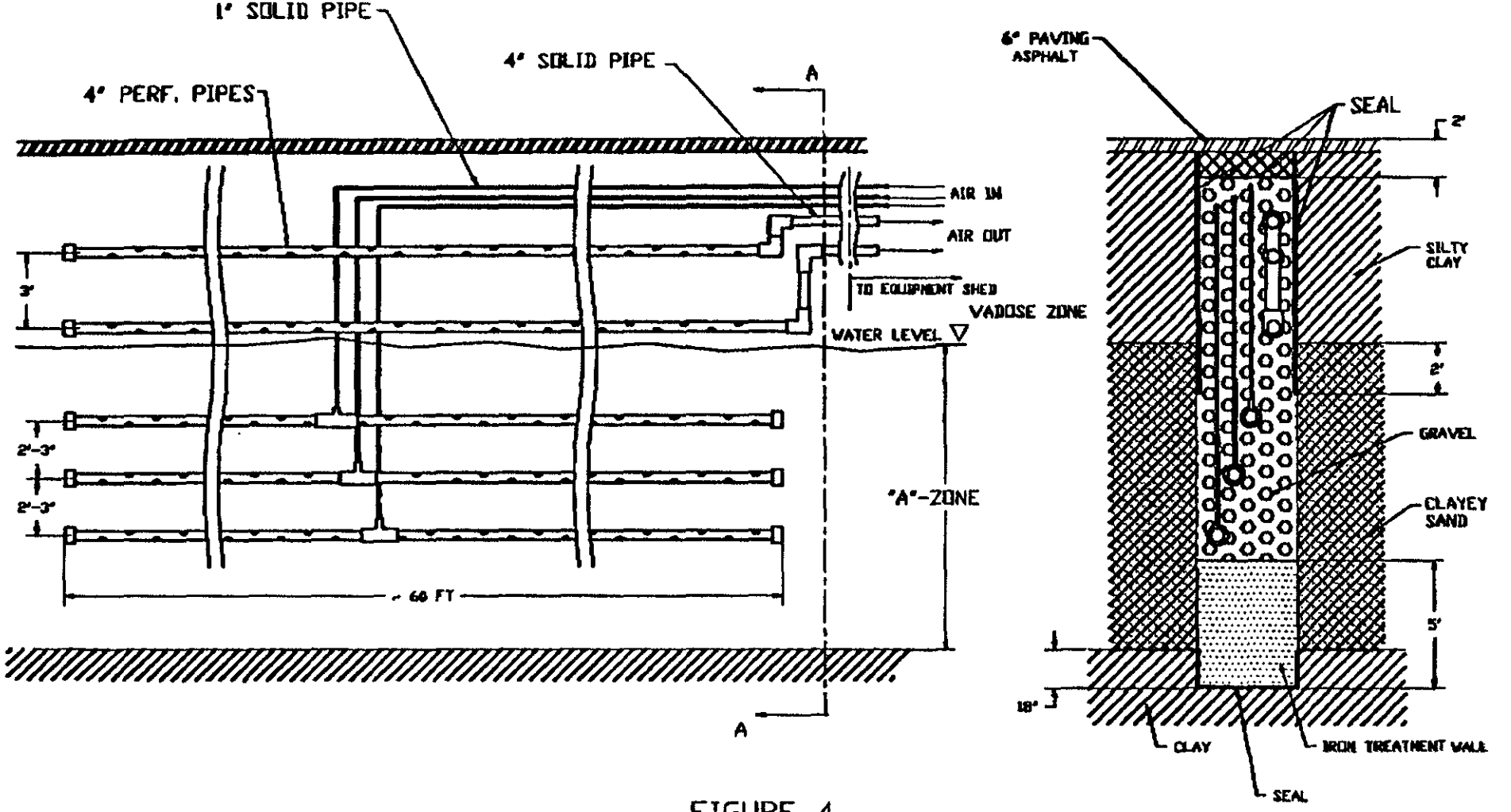


FIGURE 4

			WESTERN MICROWAVE SUNNYVALE CALIFORNIA	
		RM	10-28-93	CONCEPTUAL DESIGN OF THE TREATMENT TRENCH /WALL
			CODE IDENT NO. 16453	SK1051-5