

ELDERLEE, INC.

CONSENT ORDER NUMBER B8-0428-93-04

**OPERATIONS AND MAINTENANCE PLAN
REMEDIAL SYSTEMS INSTALLATION
CERTIFICATION REPORT**

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Prepared for:

Elderlee, Inc.
729 Cross Road
Oaks Corners, New York 14518

December 21, 1999



Prepared by:

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1 Statement of Qualifications

This Operations and Maintenance Plan ("O&M Plan") has been prepared by TriTech Environmental Health and Safety, Inc. ("TriTech") in conjunction with Matrix Biotechnologies ("Matrix"). Statements of Qualifications for TriTech and Matrix are attached in Appendix A. The roles and responsibilities of TriTech and Matrix are set forth in Section 3.

TriTech Environmental Health
and Safety, Inc.

Matrix Biotechnologies

By: Thomas Ruggieri
Thomas Ruggieri, PE

By: _____
Sean Carter

2 Introduction

This Operations and Maintenance Plan ("O&M Plan") has been prepared as required by Consent Order Number B800428-93-04 for the Elderlee, Inc. Site located Oaks Corners, New York ("Elderlee or the Site"). This Plan provides detailed instruction for monitoring, operating and maintaining remedial activities in Area A and Area B at the Site (see Figure 1). The Plan has been developed for ease of use by Elderlee personnel and contractors in administration of their roles and responsibilities under the Plan.

3 Quality Assurance and Control ("QA/QC") Team

The roles and responsibilities of the QA/QC Team are outlined below.

3.1 Site Owner—Elderlee, Inc.

Elderlee, Inc. the Site owner, is responsible for the remediation of the Site and over-all implementation of the O&M Plan. Elderlee is responsible for the following tasks:

- Coordinating and providing Site access
- Contracting with environmental consultants and contractors
- Reviewing and providing comments on project reports and documents
- Reviewing and approving all deliverables prior to submission to regulatory authorities
- Performing and documenting O&M activities associated with Area A (eg, annual inspections of asphalt paving cover)
- Performing and documenting tri-weekly inspections of the remediation system in Area B
- Recordkeeping.

3.2 Environmental Consultant and Contractors

3.2.1 TriTech Environmental Health and Safety, Inc.

TriTech Environmental Health and Safety, Inc's ("TriTech") responsibilities consist of the following:

- Preparation of the O&M Plan
- Preparation of Remedial Systems Installation Certification Report
- Scheduling, coordination and completion of groundwater and soil sampling activities
- Contracting and coordination of laboratory and drilling services
- Preparation of quarterly progress reports
- Preparation of correspondence and deliverables to regulatory authorities
- Implementation of post-closure activities
- Preparation of Closure Report

- Project management (eg, coordination of activities in O&M Plan)
- Regulatory compliance and recordkeeping associated with services performed.

3.2.2 Matrix Biotechnologies

Matrix Biotechnologies will be responsible for the operations, maintenance and monitoring of the oxygen injection system installed in Area B. Responsibilities will include the following:

- Operation of the system
- Monthly system inspections
- Preventive and as-needed system maintenance
- Monitoring of subsurface conditions (eg, DO measurements at wells)
- Regulatory compliance and recordkeeping associated with services provided.

3.2.3 Columbia Analytical, Inc. and Paradigm Environmental Services, Inc.

Soil and groundwater analyses described in this O&M Plan will be completed by either Columbia Analytical, Inc of Rochester, New York or Paradigm Environmental Services, Inc. of Rochester, New York. Lab responsibilities will include the following:

- Completion of requested analyses
- Adherence to quality control measured described in this Work Plan
- Adherence to laboratory in-house quality control program
- Regulatory compliance and recordkeeping associated with services provided.

4 Construction and Design

4.1 Description of Asphalt Paving---Area A

The asphalt paving cover in Area A consists of 2-1/2 inches of asphalt binder and topcoat installed North of the Galvanizing Plant. It has been installed to reduce surface water infiltration in the area of the former neutralization lagoons. Specifications and as-built drawings of the paving are attached as Appendix B.

4.2 Description of Oxygen Injection System---Area B

The oxygen injection system installed in Area B is a patented remediation process (US Patent No. 5,874,000) developed by Matrix Biotechnologies ("Matrix"). The system is designed to inject pure oxygen into groundwater by the use of an oxygen generator, associated piping and injection wells. Oxygen injection creates aerobic conditions within the groundwater and enhances the biodegradation of hydrocarbons (eg, Xylene and Ethylbenzene). The process takes advantage of oxygen transport via diffusion and advection. For shallow groundwater systems, a fraction of the oxygen will migrate into the unsaturated zone soils and result in treatment of soils.

System specifications and as-built drawings are attached in Appendix C. The system operates in the following manner:

- a. An Atlas Copco air compressor and associated air tank supplies air to an Air-Sep oxygen generator. The compressor also provides the necessary pressure to operate the system.
- b. The AirSep oxygen generator draws air from the compressor, as needed, and separates nitrogen from the air stream. The oxygen generated is stored in a 60 gallon oxygen receiver tank. The oxygen is generated by the "pressure swing absorption" method. By this method the media in the unit selectively absorbs nitrogen from the air, leaving oxygen (90-95%) and other atmospheric gases.
- c. Oxygen is supplied from the receiver tank to the injection wells through the solenoid valve on the outlet of the tank.
- d. The amount of oxygen delivered to the injection points is intermittent and controlled by a timer. Normal setting is a cycle of \pm 10 minutes on and \pm 30 minutes off.
- e. Oxygen enters the groundwater system through a 1-foot screen located at the bottom of each injection well.
- f. Flow rates to the individual injection wells is regulated by 6 individual flow regulators. These regulators are normally set at 30 standard cubic feet per hour (SCFH) for each well.
- g. Oxygen dissolves into the groundwater and is available for uptake by microorganisms.

5 Groundwater Monitoring

Groundwater will be sampled by TriTech according to the groundwater sampling schedules, list of analytes for each well and sampling procedures presented below.

5.1 Groundwater Sampling Schedule

Groundwater samples will be collected in accordance with the schedule in Tables 1 and 2. Well locations are attached as Appendix D.

Table 1. Long-Term Groundwater Monitoring Well Sampling Schedule

Area	Wells	Dates:
A	MW4A, MW5A, MW8, MW9, MW10, MW11	Semi-annual in June and December; 1998-2002 Annual in June; 2003-date to be determined
B	MW1, MW2, MW6	Semi-annual in June and December; 1998-2002 Annual in June; 2003-date to be determined

Table 2. Short-Term Groundwater Monitoring Well Sampling Schedule

Area	Wells	Dates
B	MW1, O/W7	November 1999 and April 2000

5.2 Groundwater Sample Analysis

Groundwater samples will be analyzed by the methods indicated in Tables 3 and 4.

Table 3. Long-Term Groundwater Monitoring Analyses Schedule

Area	Wells	Analyses
A	MW4A, MW5A, MW8, MW9, MW10, MW11	Method 6010B/7470 Target Analyte List (metals)
B	MW1, MW2, MW6	Method 8260B (BTEX—Benzene, Toluene, Ethylbenzene, Xylene)

Table 4. Short-Term Groundwater Monitoring Analyses Schedule

Area	Well	Analyses
B	MW1	Method 8260B (BTEX—Benzene, Toluene, Ethylbenzene, Xylene)
B	MW1 *	Ammonia nitrogen, nitrate, nitrite, pH, ortho-phosphate, dissolved organic carbon, iron, chemical oxygen demand, sulfate
B	O/W7	Method 8260B (BTEX—Benzene, Toluene, Ethylbenzene, Xylene)

* Analyses to be completed during November 1999 only.
All samples to be field filtered with 0.45 micron filter.

5.3 Groundwater Sampling Procedures

Groundwater wells will be sampled in conformance with the following procedures:

- a. Water levels will be measured to within 0.01 foot prior to purging and sampling.
- b. Wells sampled for metals (MW4A, MW5, MW8, MW9, MW10, MW11) will be purged with a peristaltic pump using the "low flow technique" according to the following procedures:
 - New tygon tubing will be used for each well
 - Tubing will be lowered into the well to a depth of approximately 3 feet above the well bottom and within the well's screened interval
 - Procedures will be utilized to minimize turbidity (eg, care will be taken not to stir up sediment in the well)
 - The pump will be set on a flow rate which minimizes the drawdown of the well's water level (ie, less than 1 foot)
 - Purged groundwater will be tested for pH, temperature, conductivity and turbidity approximately every 1 liter
 - Samples will be collected when turbidity measurements stabilize

- c. Wells sampled for volatile organic compounds (MW1, MW2, MW6 and O/W7) will be purged using dedicated PVC bailers according to the following procedures:
- Procedures will be utilized to minimize turbidity (eg, care will be taken not to stir up sediment in the well, aggressive purging will be avoided to minimize turbidity and volatilization, etc.)
 - Purged groundwater will be tested for pH, temperature, conductivity and turbidity every 1 to 2 gallons
 - Wells will be purged until the pH, conductivity, temperature and turbidity of the water being purged from the well has stabilized. A minimum of 3 well volumes will be purged
 - When transferring water from the bailer to sample containers, care will be taken to avoid agitating the samples, since agitation promotes the loss of volatile constituents
- d. A 0.45 micron filter will be used for samples requiring filtering. These samples will be filtered at the time of collection
- e. The following information will be measured and recorded for each well on the groundwater sampling log (see Appendix E)
- Depth to groundwater prior to sampling
 - Depth to well bottom (MW1, MW2, MW6 and O/W7 only)
 - Specific conductance, pH, temperature and turbidity measurements
 - Quantity of water purged prior to sampling the well
 - Observable physical characteristics of the groundwater (eg, color, sheen, odor, etc.)
 - Weather conditions (eg, air temperature, sky condition, recent heavy rainfall, drought conditions, etc.)

Groundwater sampling and field activities will be in conformance with the Quality Assurance /Quality Control Plan (see Section 4).

5.4 Post Closure Groundwater Monitoring

Groundwater sampling in Area A represents post-closure monitoring. The frequency of monitoring will be reviewed and re-evaluated periodically with the NYSDEC (ie, next in 2002). Upon the completion of remediation of soil and groundwater in Area B, a post-closure groundwater monitoring schedule will be developed for the area and reviewed and approved by the NYSDEC.

6 Soil Sampling and Analyses—Oxygen Injection System Area B

6.1 Sample Locations

A grid-based soil boring program will be completed in Area B to determine soil BTEX concentrations and evaluate oxygen injection system performance. Soil boring locations are shown in Appendix F.

6.2 Sampling Schedule

Soil sampling and analyses will be completed according to the following schedule:

- November 1999
- April 2000
- October 2000 (if necessary)

6.3 Sample Collection

Drilling of soil borings will be performed using a Terra-Probe direct push drill rig. The Terra-Probe uses hydraulic force to advance drilling and soil sampling equipment through soils.

Soil sampling equipment consists of 2-foot long stainless steel sampling tubes (1-inch diameter) with polyethylene sample sleeve. The polyethylene sample sleeve will be cut open with a utility knife to obtain soil samples. Soil samples will be classified in accordance with Unified Soil Classification System (USCS) specifications and logged. Samples will be stored in glass jars with sealable Teflon lids, and placed in a cooler with ice for storage before delivery to the laboratory.

Samples will be collected at the following depths/intervals:

- 1 foot to 3 foot
- 3 foot to 5 foot
- 5 foot to 7 foot.

All sampling equipment will be decontaminated and cleaned between borings by scrubbing and washing equipment in a soap solution (Alconox), and rinsing in it water.

Drilling logs will be prepared by a geologist or engineer. Information provided in the logs shall include, but not be limited to, the following:

- Date, test boring and project identification numbers
- Name of individual developing the log
- Name of driller and assistant(s)
- Drill make, model and size
- Identification and documentation of modifications to procedures (eg, alternative drilling methods used)
- Depth of each change of stratum or soil layer type (eg, sands, silts, etc.)

- Identification and documentation of the material (eg, sands and silts) of which each stratum or soil layer is composed of, according to the USCS system
- Depth from which each sample was taken
- Depth at which groundwater was encountered
- Total depth of completed boring
- Documentation of any modifications to the work plan

6.4 PID Field Screening and Headspace Analyses

Soil samples will be screened in the field using REA MiniRae 2000 model photoionization detector (PID) or equivalent. Upon opening the polyethylene sample sleeve, readings will be taken to identify the range of PID concentrations across the sample core identifying portions of the sample with high organic vapor concentrations.

A headspace analysis will be run on soil samples using the following procedures:

- Zip-lock polyethylene bags will be labeled with the sample identification
- Samples will be placed in the zip-lock bags
- The zip-lock bags will be opened approximately 1/8th inch and the tip of the PID will be inserted into the bag
- The PID meter reading will be read and the value recorded

6.5 Soil Sample Analysis

Soil samples will be analyzed for Benzene, Toluene, Ethylbenzene and Xylene using USEPA Method 8260B.

6.6 Post-Closure Soil Sampling and Analyses

Post closure soil sampling will be evaluated by the NYSDEC at the time of closure.

7 Quality Assurance/Quality Control Plan

7.1 Data Usability Summary Reports

The use of Data Usability Summary Reports to evaluate data will be determined by the NYSDEC.

7.2 Equipment Management

All instruments and equipment used during sampling and analyses will be operated, calibrated and maintained according to the manufacturer's guidelines and recommendations. Calibration and maintenance will be performed by Response Rentals, Inc. and will be by personnel properly qualified and trained in these procedures. Documentation of all routine, special maintenance and calibration procedures will be maintained by Response Rental, and will be available upon request.

7.3 Decontamination Procedures

Sampling methods and equipment chosen will address minimizing decontamination procedures and the prevention of potential of cross-contamination. A new pair of

disposable latex gloves will be used each time a sample of soil or groundwater is collected. Dedicated PVC bailers will be used for individual monitoring wells to eliminate the potential for cross contamination between wells. For wells sampled with peristaltic pumps, new tygon tubing will be used for each sample event. All samples that have the potential to be analyzed will be collected in new laboratory containers.

Decontamination of equipment will be performed between discrete sampling locations. Equipment used to collect composite samples do not require decontamination between collection of samples. All drilling equipment will be decontaminated by cleaning and scrubbing with soap (Alconox) and rinsing with water. Clean equipment is to be kept off the ground on sawhorses or racks.

Soil sampling and other non-disposable equipment will be decontaminated between each sampling event. The sampler will be cleaned prior to each use including:

- Initial cleaning of all foreign matter
- Scrubbing with brushes in trisodium phosphate or Alconox solution
- Rinsing with water

7.4 Sample Chain of Custody

Required chain of custody procedures and documentation will be utilized to ensure that the quality of all samples is maintained during their collection, transportation and storage until analyzed.

The following field custody procedures shall be followed at all times:

- As few persons as possible will handle samples.
- Clean sample bottles will be used. Coolers or boxes containing clean bottles will be sealed with a "custody tape" seal during transport to the field or while in storage prior to use.
- The sample collector will be personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under chain-of-custody rules.
- The sample collector will record sample data in the field notes and the chain of custody report.
- All samples will be delivered to the laboratory with 24 to 48 hours from the day of collection, or sooner if required by sample holding times

7.4.1 Sample Labels

Sample labels attached to or affixed around the sample container will be used to properly identify all samples collected in the field. Labels will be placed on the bottles so that QA/QC lot numbers are visible. Sample information will be printed in a legible manner using waterproof ink. The sample label will contain the following information:

- Sample number/identification
- Location of collection

- Date and time of collection
- Preservation method.

7.4.2 Sample Packaging

Samples will be packaged to avoid breakage or contamination and will be shipped to the laboratory at proper temperatures. The following sample packaging requirements will be followed:

- Sample bottle lids will never be mixed. All sample lids will stay with the original containers.
- Coolers will be partially filled with packing materials and ice when required, to prevent the bottles from moving during shipment.
- Sample bottles will be placed in the cooler in such a way as to ensure that they do not touch one another.
- Samples will to be cooled. The use of "blue ice" or some other artificial icing material is preferred. Ice can be used, provided that it is placed in plastic bags. Ice will not to be used as a substitute for packing materials.

7.4.3 Chain-of-Custody Record

A chain-of-custody record will accompany sample coolers. When transferring samples, the individuals relinquishing and receiving them will sign and date the chain-of-custody record. The chain-of-custody record will be completed in duplicate, using black carbon paper where possible, by the Field Technician who has been designated as responsible for sample shipment to the laboratory for analyses. Constraints or concerns will be documented in the "Remarks" or "Turnaround Time" section of the chain of custody record (eg, extraction time or sample retention period limitations, etc.).

7.5 Laboratory Quality Control

Laboratory quality control/quality assurance procedures will be conducted in accordance with applicable regulatory requirements and guidance.

7.6 Documentation

7.6.1 Field Notes

All field notes will be kept on file at respective contractor offices. All entries will be made in pen, dated and signed. The field notes will be the responsibility of the Field Technician and will include a complete summary of the day's activity at the Site, including:

- Name of person preparing log (signature)
- Date
- Weather conditions, wind direction, etc.
- Names of team members on-site
- Contractor activities

- Levels of personnel protection
- Level of protection originally used
- Changes in protection, if required
- Reasons for changes
- Time spent collecting samples
- Documentation on samples taken, including:
 - Sampling location and depth
 - Sampling date and time
 - Type of sample (grab, composite, etc.)
 - Sample matrix
 - On-site measurement data
 - Field observations and remarks
 - Unusual circumstances or difficulties

7.6.2 Photographs

Photographs will be taken as necessary by TriTech and/or Matrix to document field activities. The following information will be noted in the field notes (as necessary) concerning photographs:

- Date, time, location photograph was taken
- Photographer
- Description of photograph taken.

After the photographs have been developed, the information recorded in the field notes will be transferred to the back of the photographs.

7.7 Quality Control Checks

Field-based QC will consist of the use of trip blanks. Trip blanks will be prepared by the laboratory prior to field activities where volatile organics are analyzed and will consist of sample jars filled with distilled water. The jars will be sealed and carried to the job site. They will be handled like a sample and shipped to the laboratory for analysis. The trip blanks will be analyzed by the laboratory as samples, and will not necessarily be identified to the laboratory as blanks. One trip blank will be run per sampling event.

Matrix spikes and duplicate analyses will be run on groundwater samples during each long-term sampling round, as indicated in Table 5 below. Additional sample will be collected for one well in Area A and one well in Area B in order to run these analyses.

Table 5. Groundwater Sampling Laboratory Quality Control

Area	No. of Samples	Activity	Purpose
A	1	Matrix duplicate (metals analysis)	Determine precision of laboratory analysis when compared with results of sample
A	1	Matrix spike (metals analysis)	Determine matrix effects from recovery of spiked analysis
B	1	Matrix spike (organics analysis)	Determine matrix effects from recovery of spiked analysis
B	1	Matrix spike duplicate (organics analysis)	Determine precision of analysis when compared with matrix spike, and matrix effects from recovery of spiked analysis

All QC data will be documented in the field notes. QC records will be retained and results reported with sample data.

7.8 Field Modifications and Deviations

Any modifications to planned field activities or system operations will be noted in the field notes and/or inspection logs and communicated to TriTech. If a modification requires long term changes to the O&M Plan, it will be documented in writing to the NYSDEC, Elderlee and affected contractors. Other modifications and deviations will be documented in field notes and inspection reports.

8 Operation and Maintenance of Area A---Asphalt Paving Cover

The asphalt paving cover in Area A has been installed as the closure remedy for the area. Post-closure maintenance activities include the following:

- a. The joints between the new asphalt pavement and existing pavement will be resealed with hot poured asphalt cement-20 (AC-20) every 5 years or as required based on observations of its integrity by the Elderlee Safety Supervisor.
- b. The pavement will be inspected annually by the Elderlee Safety Supervisor for signs of damage, puncture or significant wear. The inspection will be documented and records will be maintained by Elderlee. If damage is observed, a qualified paving Contractor will be contracted to repair the damage.
- c. The pavement will be evaluated in 2005 to determine the need to re-pave Area A, in whole or in part. The evaluation will be conducted by a qualified paving contractor designated by the Elderlee Safety Supervisor.
- d. The Elderlee Safety Supervisor will contact the NYSDEC Region 8 office at least 10 days prior to any work being performed to seal, repair or re-pave Area A.

9 Operation and Maintenance of Area B---Oxygen Injection System

9.1 Operation

An *Oxygen Injection System Operations Manual* has been prepared by Matrix. The manual includes manufacturer's instructions for the following system equipment:

- a. AirSep oxygen generator
- b. Atlas Copco air compressor
- c. Add-A-Phase power converter
- d. Broan roof-mount powered ventilator
- e. Dayton Electric utility heater

The manual has been distributed to the following organizations:

- a. NYSDEC Region 8
- b. Elderlee, Inc.
- c. TriTech Environmental Health and Safety, Inc.

Matrix operates the system on behalf of Elderlee. The system was initially installed with the following operational control settings:

- a. Oxygen injection flow rate per injection point: 30 standard cubic feet per hour
- b. Oxygen injection frequency: inject for 10 minutes, system off for 30 minutes
- c. System operating pressure: 3 to 5 pounds per square inch

Operational controls on the system are adjusted by Matrix based on measured groundwater dissolved oxygen (DO) levels in the injection wells. Oxygen is supplied to the groundwater in an amount sufficient to maintain a DO of at least 20 mg/l in the injection wells. If the system is not able to maintain DO levels, additional oxygen is supplied by one or both, of the following operational changes:

- a. Oxygen injection flow rate per injection well is increased
- b. Oxygen injection frequency is increased

System operating pressure is adjusted during initial system startup. The amount of system pressure necessary is a function of the tightness of the geologic formation in which the injection wells are set. This operational parameter will not require significant adjustment upon startup of the system. The need for future adjustment will be based on operating conditions.

9.2 Routine Maintenance

Maintenance of the system is performed by Matrix, in accordance with the schedule indicated in Table 6.

Table 6. Oxygen Injection System Maintenance Schedule

Equipment	Activity	Frequency
AirSep Oxygen Generator	Change particulate filter	Twice per year
	Change coalescing filter	Twice per year
Atlas Copco Air Compressor	Change oil filter	Every 2,000 hours of operation
	Change oil	Every 4,000 hours of operation
	Check air filter	Every 2,000 hour
	Change air filter	As necessary
	Change oil element separator	Twice per year
	Clean air intake valves	As needed and minimum twice per year
	Adjust belt tension	As needed and per computer readout
Oxygen injection wells	Clean well by bailing or air lifting	As needed at 2 times normal pressure or 10 PSI
All equipment	Repairs	As needed

9.3 System Inspections

9.3.1 Tri-Weekly Inspections

The system is inspected on a routine basis (ie, 3 times per week; Monday, Wednesday and Friday) by the Elderlee Safety Coordinator, who has been trained by Matrix personnel on the general operation of the system. If the Safety Coordinator is not going to be present at the Facility during inspection days, personnel will be designated to conduct the inspections on those days. Inspections will be documented on a log sheet (see Appendix G) and must include the following:

- a. System operating condition (on/off)
- b. Hour meter readings for air compressor
- c. Alarm status
- d. Unusual conditions.

In the event the system is down, Elderlee personnel will note the event on the inspection log and take the following steps:

- a. Re-start the system if possible
- b. Contact Matrix at (716-662-0745) if the system cannot be re-started

9.3.2 Monthly Inspections

Matrix checks the system on a monthly basis and records key information on a log sheet (see Appendix G). Inspections include the following:

- a. Recording of flow and pressure to each oxygen injection point

- b. Recording of pressures and hour meter readings for the AirSep oxygen generator
- c. Recording of pressures and hour meter readings for the Atlas Copco Compressor
- d. Collection and recording of dissolved oxygen, temperature and oxidation/reduction potential measurements from injection wells O/W1 through O/W6 and groundwater monitoring wells MW1 and O/W7. Samples are collected with a bailer and readings taken with portable meters.
- e. Recording of maintenance activities (ie, oil or air filter changes) and special system conditions
- f. Measurement and recording of water level in monitoring well MW1

9.4 System Alarms

A flashing alarm light will be installed on the oxygen injection trailer in December 1999. The light will turn on when the compressor pressure drops to less than 40 pounds per square inch gauge (PSIG). Normal pressure is 90 PSIG. A counter clock will be connected to the alarm light so that the total length of time the system is down can be recorded.

9.5 Post-Closure Activities

Upon the completion of remediation of soil and groundwater in Area B the oxygen injection system will be removed. Post closure activities will include the following:

- a. Shutdown of the system/disconnecting of power to the oxygen injection trailer
- b. Removal of injection well protective steel risers
- c. Saw cutting of oxygen injection well points below ground level
- d. Filling of the oxygen injection wells with cement grout
- e. Capping of oxygen injection wells with PVC caps
- f. Grading of the area
- g. Post-closure sampling and analyses (to be determined by NYSDEC)

10 Employee and Contractor Safety and Training

Elderlee employees will follow applicable health and safety regulations during the completion of all operations and maintenance activities, as described in the Elderlee Health and Safety Compliance Plan. Contractors will follow applicable health and safety regulations, as well as Elderlee's contractor safety requirements. All workers will have received required and approved training and will be able to demonstrate knowledge of the regulatory requirements and competency when performing O&M activities.

11 Emergency Action Plan

In the event of an emergency, contractors will immediately notify the Elderlee Safety Supervisor by contacting the main office switchboard. Outside emergency contact phone numbers are listed below.

- a. Oaks Corners Fire Department (315) 789-8876
- b. New York State Police (315) 789-7763
- c. Geneva Hospital (315) 787-4000
- d. TriTech Environmental Health and Safety, Inc. (716) 256-6211
- e. Matrix Biotechnologies (716) 662-0745

12 Site Access

Elderlee is responsible for controlling access to the Facility. The Site is controlled by fencing and natural barriers.

13 Equipment Shelters

Equipment shelters or designated storage areas have not been established as contractors transport their equipment and materials to the Site.

14 Recordkeeping

All records will be kept by Elderlee and contractors for 7 years.

15 Reports

15.1 Quarterly Reports

Progress reports on the operation and maintenance of the system will be prepared by TriTech and submitted to the NYSDEC on a quarterly basis. Reports will be submitted by the following day of each quarter:

- a. First quarter---March 10
- b. Second quarter---June 10
- c. Third quarter---September 10
- d. Fourth quarter---December 10

The report will include the following:

- a. Description of actions taken towards achieving compliance with the Consent Order during the previous quarter
- b. Results of sampling, tests and all other data received or generated during the last quarter including quality assurance/quality control information, whether conducted pursuant to the Consent Order or independently by Elderlee
- c. Identification of all work plans, report and other deliverables required by the Consent Order that were completed and submitted during the previous quarter

- d. Description of all actions, including, but not limited to data collection and implementation of work plans that are scheduled for the next quarter
- e. Information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Consent Order, and efforts to mitigate any delays
- f. Description of any modifications to work plans that Elderlee has proposed to the Department or that the Department has approved
- g. Description of activities undertaken in support of the Citizens Participation Plan during the previous quarter and those to be undertaken in the next quarter.

Reports will be submitted to the following:

2 copies

Mary Jane Peachy, Region 8
New York State Department of Environmental Conservation
6274 East Avon Lima Road
Avon, New York 14414

2 copies

Director, Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

1 copy

Director, Bureau of Environmental Exposure Investigation
New York State Department of Health
2 University Place
Albany, New York 12203

1 copy

New York State Department of Environmental Conservation
Division of Environmental Enforcement
270 Michigan Avenue
Buffalo, New York 14203

1 copy

Mr. Patrick Dempsey
Elderlee, Inc.
PO Box 269
150 South Sumner Street
York, PA 17405

1 copy
Ms. Eileen Lutz
Elderlee, Inc.
729 Cross Road
Oaks Corners, New York 14518

1 copy
Mr. Scott Gould
McNees, Wallace & Nurick
PO Box 1166
100 Pine Street
Harrisburg, PA 17108-1166

15.2 Closure Report

Upon closure of the oxygen injection system in Area B, and the discontinuing of a on-going groundwater monitoring in Area A and Area B, a closure report will be prepared and submitted to the NYSDEC by TriTech. The report will describe the history of the Site, and information substantiating the final closure determination.

15.3 Remedial Systems Installation Certification Report

15.3.1 Introduction

This Remedial Systems Installation Report ("Report") has been prepared as required by Consent Order Number B800428-93-04 for Elderlee. This Report, in conjunction with supporting documents, provides information on the installation of the following:

- a. Asphalt paving cover in Area A
- b. Oxygen injection system in Area B

Attached as Appendices B and C are companion documents including specifications, as-built drawings and field notes. The installation of each system is described in the following sections.

15.3.2 Installation of Asphalt Paving Cover—Area A

The asphalt paving cover was installed in Area A during the week of October 2, 1998 by Ruston Paving, Inc. of Farmington, New York. The asphalt cover was installed North of the Galvanizing Plant in unpaved areas located over, and in the area of, the former neutralization lagoons (see Figure 1). The total area paved as a part of the project was 32,100 square feet. Installation was spot checked by personnel from TriTech.

The asphalt cover was installed as follows:

- a. Existing areas of crushed stone/clay were graded to achieve a fine grade. Grading included adding crushed stone in areas where needed.
- b. A 2.5 inch layer of Type #3 asphalt dense binder was placed, graded and compacted to 2 inches.

- c. A 1 inch layer of Type #7 asphalt top was placed and compacted (addition to specification, not originally specified).
- d. Joints between new and existing asphalt pavement were sealed with hot poured asphalt concrete-20 (AC-20).

15.3.3 Installation of Oxygen Injection System—Area B

The oxygen injection system was installed in Area B from January 5 through 6, 1998 by Matrix Biotechnologies ("Matrix"). The system installation was observed by personnel from TriTech. Installation included the following:

- a. Boring and placement of six (6) ¾ inch oxygen injection wells
- b. Boring and placement of one (1) ¾ inch groundwater monitoring well
- c. Trenching, installation and backfilling of ¾ inch polyethylene oxygen delivery piping
- d. Hookup of oxygen piping to injection wells and oxygen injection system
- e. Hookup of power to oxygen injection trailer
- f. System startup

The location of the oxygen injection well O/W 3 (a/k/a AW3) was modified by moving it North 5 feet to facilitate installation under the building overhang. Injection well O/W6 was added, since the Matrix system is set up to run with 6 points. Correspondence from Matrix of December 23, 1997 describing the modification is attached in Appendix C.

15.3.4 Certification Statement

I herein provide the REMEDIATION SYSTEMS INSTALLATION AND CERTIFICATION REPORT for Elderlee, Inc., Consent Order No. B8-0428-93-04.

I certify that to the best of my knowledge and belief that the asphalt paving cover in Area A and the oxygen injection system in Area B have been installed in substantial compliance with Consent Order Number B8-0428-93-04 and in accordance with contract documents that Elderlee, Inc. has established with Ruston Paving, Inc. and Matrix Biotechnologies.

Thomas Ruggieri 12/21/99

Thomas Ruggieri, PE
New York State Professional Engineer No. 065073



Appendix A
Qualifications Statements

Qualifications

TriTech Environmental Health and Safety, Inc. was established in 1995, in Rochester, New York, to provide the private and public sectors with technical assistance and expertise in meeting their environmental health and safety (EHS) needs. We service clients in Upstate New York and throughout the United States.

Our environmental services encompass air and water pollution control, hazardous and solid waste management, Superfund matters, environmental impact reviews, permitting of industrial facilities, environmental auditing, litigation support and site assessments. We have also established a comprehensive EHS program to assist our clients with: identifying applicable standards and regulations; developing policies, plans and performance standards; and implementing the program to achieve compliance through training, inspections and auditing. Our services focus on helping clients by providing long-term solutions, based on a management systems approach.

TriTech's staff has a comprehensive background in all aspects of EHS compliance. This includes personnel who have worked for engineering firms, law firms and laboratories. We have the experience to conduct environmental field investigations, perform employee exposure monitoring, audit multi-facility organizations for EHS compliance, conduct certified training classes and provide support during regulatory inspections.

TriTech's environmental site investigation and Superfund work has included work at fill sites, tanneries, gas stations, dry cleaners, metal shops, galvanizing plants and paint shops. Our remedial investigations focus on a site's history, and use of hazardous substances and petroleum products, so that the most appropriate sampling locations and analyses can be selected. We have prepared feasibility studies to select the most appropriate remediation technologies, based on comprehensive evaluations of alternatives.

After the selection of remedial options, we have assisted clients in implementing cleanup by preparing remediation work plans, operations and maintenance plans, and designing cleanup systems. Upon installation of the systems TriTech has monitored and maintained systems to verify performance and determine when cleanup standards have been met. Throughout the entire process TriTech maintains close communication with regulatory personnel to negotiate consent orders and corrective action plans, provide required submissions and keep them informed of project progress.



MATRIX ENVIRONMENTAL TECHNOLOGIES, INC.

MATRIX ENVIRONMENTAL TECHNOLOGIES INC. (MATRIX) was established to provide economical, quality environmental consulting and project management services to private and public sectors affected by environmental regulation. **MATRIX** has offices in Charlotte, North Carolina; Buffalo, New York; Alton (Syracuse), New York; and Albany, New York. The **MATRIX** staff consists of approximately 50 professionals including scientists, hydrogeologists, registered geologists, engineers and trained technicians who have performed thousands of environmental projects.

MATRIX has substantial expertise in planning and executing all phases of environmental investigations from Phase I and Phase II Real Estate Transaction Assessments to Hazardous Waste Site Characterization Studies concerning RCRA permitting or closures. In addition, **MATRIX** professionals develop corrective and remedial action plans and health and safety plans, perform underground storage tank (UST) projects, design treatment storage and disposal (TSD) facilities and processes, furnish remediation equipment systems, and perform complex remedial programs.

MATRIX staff experiences include government, public and military agencies, utilities, educational institutions, real estate, insurance, transportation, chemical, manufacturing, retail services, financial, mining and petroleum companies.

All **MATRIX** professional, exploration and remediation personnel participate in a yearly baseline medical monitoring program. Additionally, Matrix personnel are trained in the use and maintenance of Level A, B, C and D personal protection and safety equipment and have received Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER), as required by OSHA 29 CFR 1910.120 for work at hazardous waste sites. Site specific decontamination and health and safety programs are developed, implemented and administered by **MATRIX** personnel using the firm's safety equipment and supplies.



SUMMARY OF CAPABILITIES

- Subsurface Contaminant Investigations
- All phases of Pre-Purchase/Divestment Assessments
- Remedial Investigations/Feasibility Studies
- Remedial Equipment System Design and Installations
- Remedial System Monitoring and Maintenance
- Risk Assessment
- **MATRIX BIOFILTER** for Vapor Phase Treatment
- Compliance Permitting and Reporting
- Groundwater Modeling
- Health and Safety Planning
- Monitoring and Recovery Well Installation
- Regulatory Support
- SARA Title III Compliance
- Site Monitoring
- Soil and Groundwater Remedial Action Plans
- Soil, Groundwater and Air Sampling and Analysis
- TSD Facility and Process Design
- Underground Storage Tank (UST) Removals and Closure Assessments
- Waste Minimization Studies and Reporting
- Waste Treatment Process Design



RUSTON PAVING CO., INC.

6229 Collett Road • Farmington, NY 14425

Tel. (716) 742-3080

Fax (716) 742-3634

www.rustonpaving.com

November 5, 1997

Mr. Stan Turon
Elderlee, Inc.
729 Cross Road
Oaks Corners, NY 14518

Dear Mr. Turon:

Ruston Paving Co., Inc. would like to take this opportunity to introduce our company and request consideration for the upcoming paving project at your plant.

Our company is one of the largest commercial/industrial paving and site development contractors in Central and Western New York. With over 55 years of experience in providing personalized service, the firm prides itself on satisfying customers with a quality product, in a timely fashion, at competitive prices.

Through our two Syracuse and Rochester offices, we are able to serve the majority of upstate and western New York. In addition, we are now serving North Carolina through our Durham, NC office. We would be happy to review and bid any other projects that you feel may be suitable for our expertise.

Attached please find a company brochure. Please feel free to call me anytime at (716) 742-3080 if I can answer any questions or be of further assistance.

Very Truly Yours,

A handwritten signature in black ink, appearing to read "S G D", is written over a horizontal line.

Sean G. Donohoe, P.E.
Project Manager

Visit us at www.rustonpaving.com

Appendix B

Asphalt Paving Cover Construction Information

Elderlee, Inc.

729 Cross Road
Oaks Corners, NY 14518
(315) 789-6670 tel
(315) 789-4262 fax

Paving Project Specifications

- > Regrade crushed stone / clay areas, adding crushed stone where necessary to achieve a "fine grade".
- > Remove excess materials as required and dispose of on site.
- > Seal joints between new and existing pavement with hot-pour AC-20.

- > **Materials:**
 - 2.5" of Type #3 Dense Binder, graded & compacted to 2"

- > **Coverage Area(s):**
 - > Former Lagoon Area: approx. = 32,100 sq.ft.

Site Contact:

Karl Schlifke
Manager, Environmental Operations



RUSTON PAVING CO., INC.

6228 Collett Road Farmington, NY 14425 Phone: (716) 742-3080 Fax: (716) 742-3634

PROPOSAL AND CONTRACT

REVISED

id To: **Elderlee, Inc.**
729 Cross Road
Oaks Corners, NY 14518-0010

Date: **August 17, 1998**
Attn: **Karl Schlifke**
Phone: **315-789-6670**

Ruston Paving Co., Inc. hereinafter called the Company, offers to furnish all labor, materials and equipment for the performance of the following described work in connection with the construction or improvements at:

Elderlee Steel/Galvanizing Plant - Oaks Corners, NY

which property is owned by:

Elderlee, Inc.

Item	Scope of Work:	Quantity	Unit	Unit \$	Item \$
ASPHALT PAVEMENT:					
Galvanizing Plant:					
	- Fine grade existing stone and gravel base in preparation for pavement.				
	- Remove excess crushed stone as required and dispose of on-site.				
	- Place and compact 2" Type 3 Dense Binder and 1" Type 7 Top.				
	- Seal joints between new and existing pavement with hot poured AC-20.	32,100	SF	\$0.72	\$23,112.00
TOTAL ASPHALT PAVEMENT:					\$23,112.00



NOTES:

- One mobilization.
- Existing movable materials to be removed by Owner prior to the start of work.

Unless a lump sum price is to be paid for the foregoing work and is clearly so stated it is understood and agreed that the quantities referred to above are estimates only and that payment shall be made at the stated unit prices on the actual quantities of work performed by the Company as determined upon completion of the work.

This proposal expires thirty (30) days from the date hereof, but may be accepted at any later date at the sole option of the Company.

If the foregoing meets with your acceptance, kindly sign and return the attached copy of our proposal. Upon its receipt it is understood the foregoing, including the terms and conditions set forth on the reverse side hereof, will constitute the full and complete agreement between us unless incorporated as a part of another contract, and in such event the terms and conditions of this proposal shall control over conflicting terms and conditions found in the contract into which this contract is incorporated.

ACCEPTED BY:

Print Name: Tatiana Dempsey
Signature: [Signature]
Title: KIP
Date: Sept. 23, 1998

Very Truly Yours,

RUSTON PAVING CO., INC.

By: [Signature]
Sean Donohoe

TERMS AND CONDITIONS

Payment shall be made as follows:

Interim payment in full for all work performed or materials furnished hereunder shall be made not later than the tenth day of the month next following each month in which the work was performed or materials furnished. Upon substantial completion of the work to be performed by us, you will make final payment to the Company.

A finance charge at the periodic rate of 1-1/2% per month (being an annual percentage rate of 18% per annum) shall be charged to you and paid by you on all unpaid balances from the due date to the date of receipt of payment by the company, and in the event this matter is turned over to an attorney for collection, you shall pay all reasonable attorneys' fees. Furthermore, for work not paid the Company may have a claim against the customer's property under the Lien Law.

The Company shall not become obligated to perform the work called for under this contract until your credit has been checked and approved by our Credit Department. If in the opinion of the Company credit conditions become unsatisfactory at any time prior to our completion of the work hereunder, we shall be furnished adequate security upon our request, or the Company shall have the right to discontinue work, treat the contract as having been breached by you, and bring suit for the completed work and for its damages by reason of your having breached this contract.

Any deviations from the specifications or modification of the terms of this contract and any extra or incidental work, or reductions in work, shall be set forth in writing and signed by both parties prior to the making of such change or doing said extra or incidental work. Any increase or decrease in the contract price resulting from such change shall be included in such writing.

The Company will provide and pay for Workmen's Compensation Insurance covering our employees and Public Liability and Property Damage Insurance protecting themselves. The company also assumes responsibility for the collection and payment of Social Security and Federal and State Unemployment taxes as applicable.

The Company shall be provided with suitable access to the work area. If the Company's work is dependent upon or must be undertaken in conjunction with the work of others, such work shall be so performed and completed as to permit the company to perform its work hereunder in a normal uninterrupted single-shift operation.

Unless a time for the performance of the Company's work is specified, the Company shall undertake it in the course of its normal operating schedule. The Company shall not be liable for any failure to undertake or complete the work for causes beyond its control, including but not limited to fire, flood, inclement weather or other casualty; labor disputes or other disagreements and accidents or other mishaps, whether affecting this work or other operations in which the Company is involved, directly or indirectly.

If for causes beyond the Company's control its work is not completed within twelve (12) months after the date of your acceptance of this proposal, the Company may cancel this agreement at any time thereafter on then (10) days notice. In such event (i) the Company shall be relieved of any further obligation with respect to the balance of the work, and (ii) all sums due under the contract shall become immediately due and payable.

The Company shall not be responsible for, and you agree to hold it harmless from any liability resulting from, damages to utilities or other facilities or objects buried beneath, or to sidewalks, driveways or other improvements located within its work area or designated areas of access. It is further understood that the Company shall not be responsible for any damage to or deterioration of any of our work, whether completed or in process, resulting from any cause or causes beyond our control, including but not limited to failure of subgrade or failure or inadequacy of any labor or materials not furnished and installed by it, whether or not such failure or inadequacy was or could have been known at the time its work was undertaken.

RUSTON PAVING CO., INC.

FOREMAN'S REPORT

Job Name: ELDERLEE
 Job Location: CROSS RD
 Weather: am: _____ pm: _____

Date: 10-7-98
 Project Manager: SEAN
 Job Number: 98-2084

labor Codes: Foreman (1) Operator (2) Driver (3) Laborer (4)

Name	Labor	Equipment	Clocked In	Time On Site	Time Off Site	# Hrs On Job	Clocked Out	Lunch Y/N
M. Pizaino	1		600	630	345			N
R. CARVER	4							
R. KOTLA	2							
D. Bekford	2							
D. Geelan	4							
S. Seymore	4							
S. ORSHART	4							

Equipment Codes: (Circle Equip Used - List Misc Other Below)

PAVING (E200)

- #214 96 BK 172B
- #216 95 BK 161
- #218 75 BK 180
- #229 Stone Roller
- #230 94 I/R DD24
- #232 Rosco
- #219
- #235 85 I/R DA50
- #236 90 I/R DA50
- #237 Stone Roller
- #240 Bomag
- #241 86 Wacker
- #246 Barber Grn

EXCAVATION (E100)

- #200 Water Truck
- #215 77 Cat Grd
- #234 I/R SP56
- #238 Gallion
- #242 87 D4 Dz
- #244 82 D53 Dz
- #245 76 Case Dz
- #247 81 Cat Grd
- #248 555B Bkh
- #249 85 Gradall
- #250 655A Bkh
- #255 655D Bkh
- #260 88 Kobelco
- #270 NH Skd Str
- #275 Bobcat Skd Str
- #280 Compressor
- #281 Payloader
- #282 85 D31 Dz
- #283 86 D31 Dz
- #290 Bros. Pulv
- #293 MPH100

Materials:

Type of Material	Source	Estimated Quantity	Actual Quantity	# of Tickets
3	Benchmark		322	321.99
7	Dakr cement		180	180.28

Rental Equipment:

Source	Equipment Used	Time In	Time Out	Hours Used	# of Loads
Long milk	Truck	7	1	6	5

Work Performed and Comments:

1/2" 2" Binder and 1" TOP
in cut out

RUSTON PAVING CO., INC.

FOREMAN'S REPORT

Job Name: FIDELINE

Job Location: GEORGETOWN

Weather: am: _____ pm: _____

Date: 10-6-98

Project Manager: SEAN

Job Number: 98-2084

Labor Codes: Foreman (1) Operator (2) Driver (3) Laborer (4)

Name	Labor	Equipment	Clocked In	Time On Site	Time Off Site	# Hrs On Job	Clocked Out	Lunch Y/N
John Benedict	1/2			7:15	12:45	5.5		NL
Bob Lark	2/4			7:15	12:45	5.5		NL

Equipment Codes: (Circle Equip Used - List Misc Other Below)

PAVING (E200)

- #214 96 BK 172B #235 85 I/R DA50
- #216 95 BK 161 #236 90 I/R DA50
- #219 98 BK 161 #237 Stone Roller
- #229 Stone Roller #240 Bomag
- #230 94 I/R DD24 #241 86 Wacker
- #228 97 I/R DD24 #365 Infrared Htr
- Other: _____ Other: _____

EXCAVATION (E100)

- #200 Water Truck
- #215 77 Cat Grd
- #234 I/R SP56
- #238 Gallion
- #242 87 D4 Dz
- #244 82 D53 Dz
- #245 76 Case Dz
- #247 81 Cat Grd
- #248 555B Bkh
- #249 85 Gradall
- #250 655A Bkh
- #255 655D Bkh
- #260 88 Kobelco
- #270 NH Skd Str
- #275 Bobcat Skd Str
- #280 Compressor
- #281 Payloader
- #282 85 D31 Dz
- #283 86 D31 Dz
- #290 Bros. Pulv
- #293 MPH100

Materials:

Type of Material	Source	Estimated Quantity	Actual Quantity	# of Tickets

Rental Equipment:

Source	Equipment Used	Time In	Time Out	Hours Used	# of Loads
Don't know	Truck	9:00	11:30	2.5	

Work Performed and Comments: Got To Site And Waited For Grades To Arrive - 2:45 P.M.
Grades W/ Loader Got Sites And Moved To Site 2:00

RUSTON PAVING CO., INC.

FOREMAN'S REPORT

Job Name: ELDERLEE
 Job Location: GENEVA
 Weather: am: _____ pm: _____

Date: ~~10-2-98~~ 10-2-98
 Project Manager: Sean
 Job Number: 98-2084

Labor Codes: Foreman (1) Operator (2) Driver (3) Laborer (4)

Name	Labor	Equipment	Clocked In	Time On Site	Time Off Site	# Hrs On Job	Clocked Out	Lunch Y/N
JOHN BENEDETT	1/2			7:30	3:00	7.5		NL
BOB LAMAY	2/4			8:00	3:00	7		NL

Equipment Codes: (Circle Equip Used - List Misc Other Below)

PAVING (E200)

- #214 96 BK 172B
- #216 95 BK 161
- #219 98 BK 161
- #229 Stone Roller
- #230 94 I/R DD24
- #228 97 I/R DD24
- Other: _____

- #235 85 I/R DA50
- #236 90 I/R DA50
- #237 Stone Roller
- #240 Bomag
- #241 86 Wacker
- #365 Infrared Htr
- Other: _____

EXCAVATION (E100)

- #200 Water Truck
- #215 77 Cat Grd
- #234 I/R SP56
- #238 Gallion
- #242 87 D4 Dz
- #244 82 D53 Dz
- #245 76 Case Dz
- #247 81 Cat Grd
- #248 555B Bkh
- #249 85 Gradall
- #250 655A Bkh
- #255 655D Bkh
- #260 88 Kobelco
- #270 NH Skd Str
- #275 Bobcat Skd Str
- #280 Compressor
- #281 Payloader
- #282 85 D31 Dz
- #283 86 D31 Dz
- #290 Bros. Pulv
- #293 MPH100

Materials:

Type of Material	Source	Estimated Quantity	Actual Quantity	# of Tickets

Rental Equipment:

Source	Equipment Used	Time In	Time Out	Hours Used	# of Loads

Work Performed and Comments: Exc 6' x 12' what w. could if the 1st - Electric Line
Being Lowered Area. Time Needs To Be Moved Building (S&W) Needs To Be
Demol. P. Ltd. V. etc. Materials. Into 1 Hr



TriTech

1100 University Ave.
Rochester, New York 14807
Tel: 718.258.8211
Fax: 718.258.8244

Project Name

NYSDEC Consent Order
No. B8-0428-93-04

Elderlee, Inc.
729 Cross Road
Oaks Corners, NY 14518

Drawing Name

Drawing 1
Paving Plan As-built
Area A

Revisions

No.	By	Date

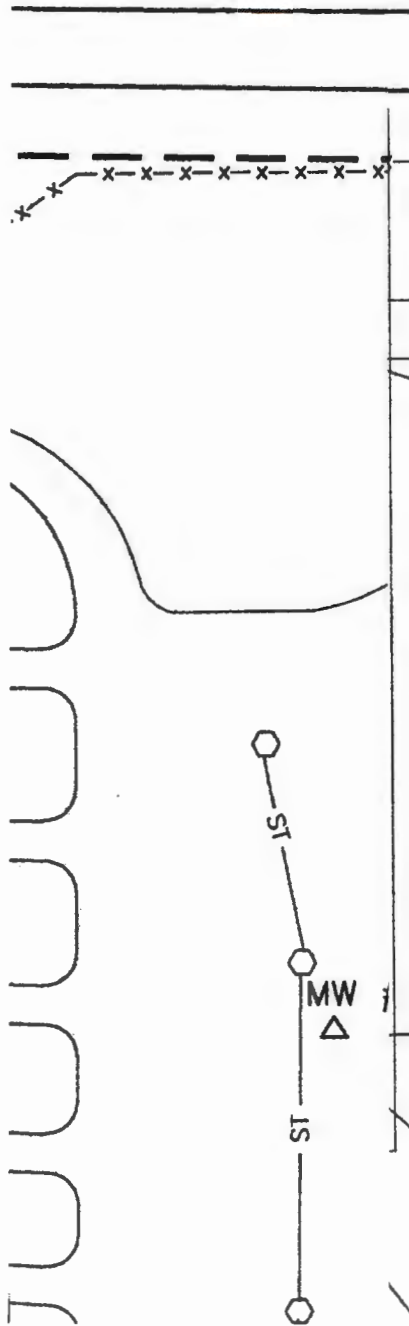
Date: December 1999

Scale: 1" = 60'

Drawn by: MV/TR

Approved by:

Project No.: 9963



oring well
 aved October 1998

Appendix C

Oxygen Injection System Construction Information

80 SCFH TRAILER MOUNTED OXYGEN INJECTION SYSTEM

The injection of pure oxygen into groundwater using oxygen generators is a patent pending remediation process developed by Matrix. It is a proven remediation technique for sites with conditions that are difficult to remediate: shallow groundwater, steep groundwater gradient, and fractured bedrock. There is no need for vapor extraction and absolutely no generation of hazardous vapors. It has also resulted in the biodegradation of MTBE, a fuel additive which is very difficult to extract from the subsurface or degrade using industry standard remediation methods. Oxygen injection rapidly enhances the biodegradation of organics which are biodegradable under aerobic conditions; from petroleum hydrocarbons to chlorinated solvents. The system is operated to take full advantage of oxygen transport via diffusion and groundwater flow. This process actually uses the same transport mechanisms which resulted in contaminant migration.

Matrix offers trailer mounted oxygen injection systems to be used in a variety of applications including short term "hot spot" cleanups, pilot testing, and full scale remediation. The 80 SCFH system is a full scale remediation system which consumes far less power than a comparable air sparging system and is often used on a short term basis to complete an on-going remediation project. Once an air sparging system has removed the majority of the contaminant mass, the time to completely remediate the site is usually determined by site conditions which are not affected by air sparging (i.e. desorption). Thus the dollar spent per mass of contaminant removed increases substantially as the project proceeds. Using pure oxygen injection at this phase of the project will not only reverse this trend but also shorten the time to closure.

The 80 SCFH Trailer Mounted Oxygen Injection System includes the following components:

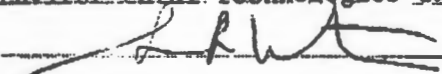
- Six foot by ten foot insulated cargo trailer with inside lighting and double doors in rear.
- Electric heater and power roof ventilator with thermostat for year round operation.
- AirSep Model AS-80 oxygen generator with a 60 gallon surge tank and regulator. The generator produces 80 SCFH of oxygen at 90-95% purity. 1 phase/60 Hz/120 volts.
- Atlas Copco rotary screw air compressor with air dryer, vertical tank with autodrain, and low sound enclosure. Rated for 25 ACFM @ 125 PSIG. 7.5 HP TEFC motor, 3 phase/60 Hz/230-460 volts.
- Static phase converter standard on all systems to operate compressor on single phase power.
- Manifold for six injection points to include individual variable area flowmeter with needle control valve and pressure gauge.
- Adjustable timer and solenoid valve to control oxygen flow for pulse injection.
- Main electrical panel with breakers for easy connection to power supply.
- Fully integrated remediation system with all plumbing, electrical, and mechanical components installed.

Bid Price Sheet

Oxygen Injection System
Elderlee, Inc.

Bid Costs

Item	Units	Qty	Unit Cost	Total Cost
Oxygen Inj. wells	job	6	\$ 575.00	\$ 3,450.00
Vacuum extraction points	job	1	\$ Deleted	\$ 0.00
Oxygen Injection underground piping	job	1	\$4,160.00	\$ 4,160.00
Surface seal	sf	3,500	\$ Deleted	\$ 0.00
Pilot test	test	1	\$ Deleted	\$ 0.00
Enclosure w/concrete pad	ea	1	\$ Deleted	\$ 0.00
Equipment installation	job	1	\$ 2,500.00	\$ 2,500.00
80 SCFM Oxygen Injection Trailer		1	\$ 35,000.00	35,000.00
System Monitoring Well		1	575.00	575.00
			Total	\$ 45,685.00

Contractor: Matrix Environmental Technologies Inc.
 Authorized Signature: 
 Title: President
 Date: November 14, 1997

Oxygen Injection Trailer Repurchase Option (sell back to Matrix)

<u>Number of months used</u>	<u>Repurchase Price</u>
1-12	\$12,500.00
13-24 (anticipated)	8,500.00
25-36	5,000.00
37-48	3,000.00
49-60	1,000.00

December 23, 1997

VIA FACSIMILE 256-6244

Mr. Steven Campbell
C&O Technologies
1100 University Avenue
Rochester, NY 14607

MATRIX
Environmental Technologies

5835 Ellis Road
P.O. Box 427
Orchard Park, N. Y. 14127-0427

(716) 662-0745
(716) 662-0946 (Fax)

RE: Elderlee, Inc.
Matrix Project #B1097522

Dear Steven:


Installation of the oxygen injection points will commence on Tuesday, December 30. Steve Marchetti and I will meet you and Jack Briggs at the Main Office at 9 am. I anticipate completing the installation in 2 days.

Enclosed is the System Layout Diagram provided in the bid package. I suggest two modifications to this plan; relocating ASW-3 approximately 5 feet to the North and the addition of ASW-6 approximately 20 feet East of the line connecting ASW-4 and ASW-5. ASW-3 and ASW-6 (if located in the asphalt drive) will be finished with limited access curb boxes set in a concrete pad. The other four injection points will be finished with stick-up protective casings.

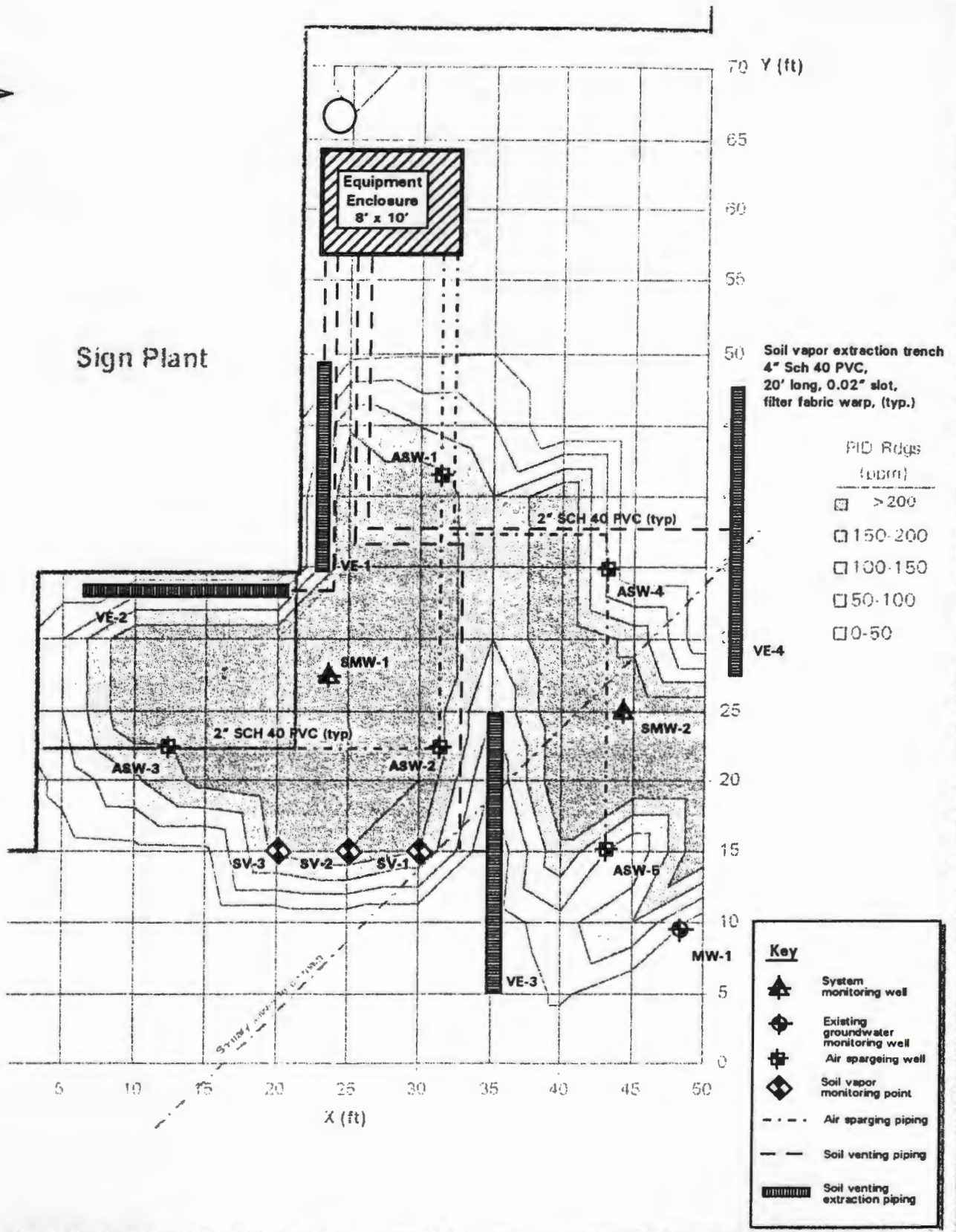
The injection points will be 3/4-inch diameter schedule 40 PVC as opposed to 1-inch diameter specified in the bid package. 3/4-inch diameter points are sized to efficiently deliver the oxygen flow and allow spacing in the borehole for a good bentonite seal to be placed. I suggest that we install the injection points at a depth just above the clay layer located between 9 and 13 feet below grade. To do this properly rods will be driven to 8 feet below grade and removed. A 2-foot long undisturbed sample tube with acetate liner will be used to sample soils beginning at the 8 foot depth to locate the top of the clay layer. This will allow accurate placement of the injection points in the shallow water bearing zone.

I will fax you a contract for Elderlee, Inc. later today.

Sincerely,
Matrix Environmental Technologies Inc.


Sean R. Carter
President

Enclosure



CO Technologies

1100 University Ave.
Rochester, New York 14607
Tel: (716) 256-6211
Fax: (716) 256-6244

Drawing 1

**Soil Vapor Extraction System Layout
Elderlee Area B**

Date: September 1997

Scale: As shown

Drawn by: TJR

Inspection Log

Project Name: Elderice Interim Remedial. Page: 1 of 1
Location: Main Plant & Sign Plant Date: 1/5/98
Inspector: JTB + SAC Weather: 55-65° sunny

Notes:

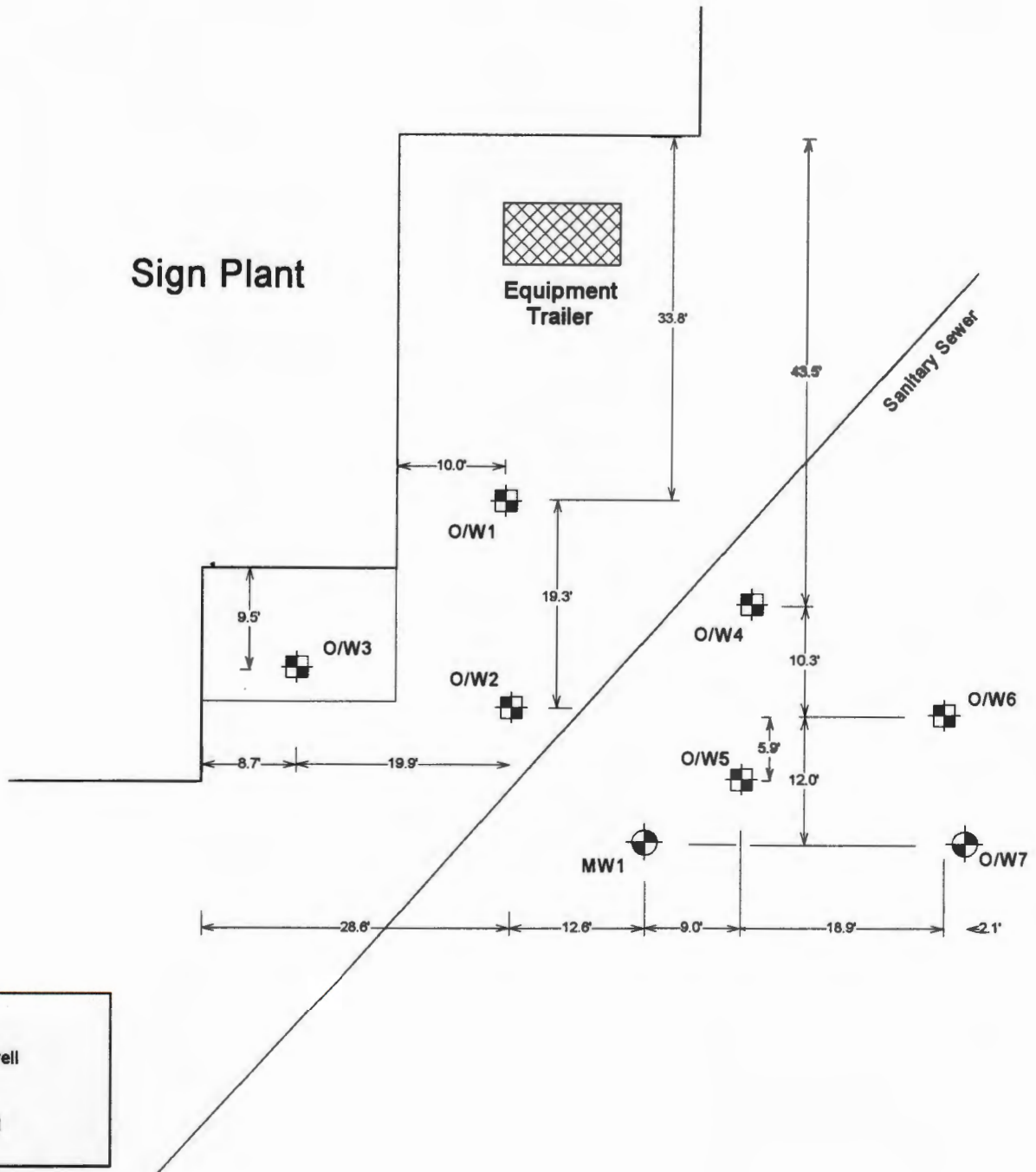
- 9⁰⁰ SAC, JTB & CTD Tech onsite. Sean Carter & Steve of Matrix onsite w/ trailer mounted GEOPROBE.
9²⁰ Meet @ site + review scope of work. Health! Safety Plan reviewed.
9³⁰ Injection points (location(s)) reviewed. 3 points moved further away from proposed suspected source to affect larger area.
9⁴⁰ Point 1 installed by GEOPROBE. GEOPROBE point advanced to depth of 7.5' to 8.0' feet ^{at} all locations.
10⁰⁰ 3/4" PVC installed (screened + solid PVC). Point sealed w/ SAND PAK + bentonite. 2.5' - 3.5' riser left (above grade).
ANU readings taken on all points (either after drilling or during by inserting probe into open hole). No readings seen above 14 ppm (calibrated to Benzene).
1²⁵ Point under canopy @ back door of sign plant installed. PVC riser left flush to asphalt grade.
2²⁰ Area cleaned and all parties off site.

Inspection Log

Project Name: Elderlee Interim Remediation Page: 1 of 1
Location: Main Plant & Sign Plant Date: 1/6/98 Tuesday
Inspector: J. T. Betras Weather: 50°F slight rain

Notes:

- 9^{am} JTB. of C:O Tech. and Steve of Matrix Technologies on site.
- 9^{15am} Charlie A. of Elderlee is designated backhoe operator.
- 9^{30am} Explain purpose of project to Charlie + locate sanitary sewer line. Trenching begins.
- 10^{am} Hand dig around sanitary sewer line to prevent damage to line. Points connected w/ pvc line.
- 11^{am} Break for lunch.
- 12^{am} Resume trenching and installation of O₂ injection points.
- 12^{am} Sawcut asphalt under canopy (near back door of sign plant) where xylenes stored.
- 12¹⁵ Trenching done.
- 12³⁰ Trenching started at injection point under canopy. Once asphalt removed, xylenes + point odor heavy. HNU reading of > 250ppm (calibrated to benzene) seen. All trenching work done in Level C (work stopped till PPE upgraded). Sharon D notified by JTB.
- 1¹⁵ All injection points installed and pvc tubing ready for attachment.
- 1⁵⁰ Charlie backgrading area.
- 2⁴⁵ All pvc tubing installed, ends labeled and wrapped at area of proposed trailer location.
- 3^{am} Caution tape installed around area
- 3^{am} All parties off site.
- 4^{am} I+V returned to Response Rentals



TriTech
Environmental Health and Safety, Inc.
1100 University Ave.
Rochester, New York 14607
Tel: 716.256.6211
Fax: 716.256.6244

System Layout As-built Drawing Oxygen Injection System Elderlee, Inc. Area B

Date: March 1998

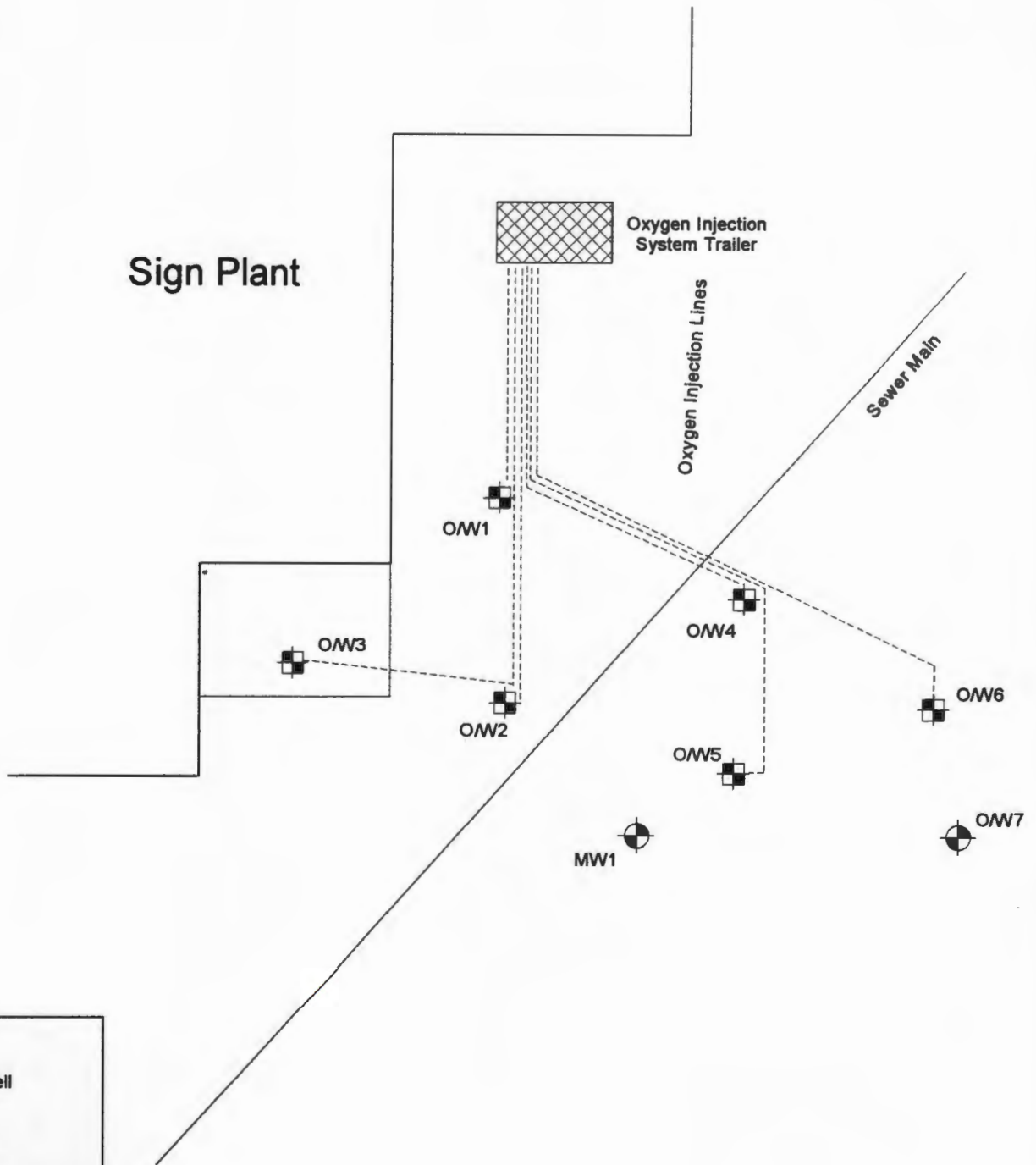
Scale: 1/16" = 1'

Drawn by: TJR


Source: C&O Field Measurements
March 1998




Sign Plant



Key

 MW1 Monitoring well

 OW1 Injection well



TriTech
Environmental Health and Safety, Inc.
1100 University Ave.
Rochester, New York 14607
Tel: 716.256.8211
Fax: 716.256.8244

**Site Piping Layout As-built
Oxygen Injection System
Elderlee, Inc. Area B**

Date: March 1998/December 1999
Scale: 1/16" = 1'
Drawn by: TJR
Source: C&O Field Measurements March 1998

PROJECT LOCATION: Elderlee, Inc. Oaks Corners, New York PROJECT NUMBER: Bio 97-522

WELL TYPE: Oxygen Injection Point WELL NUMBER: IP1

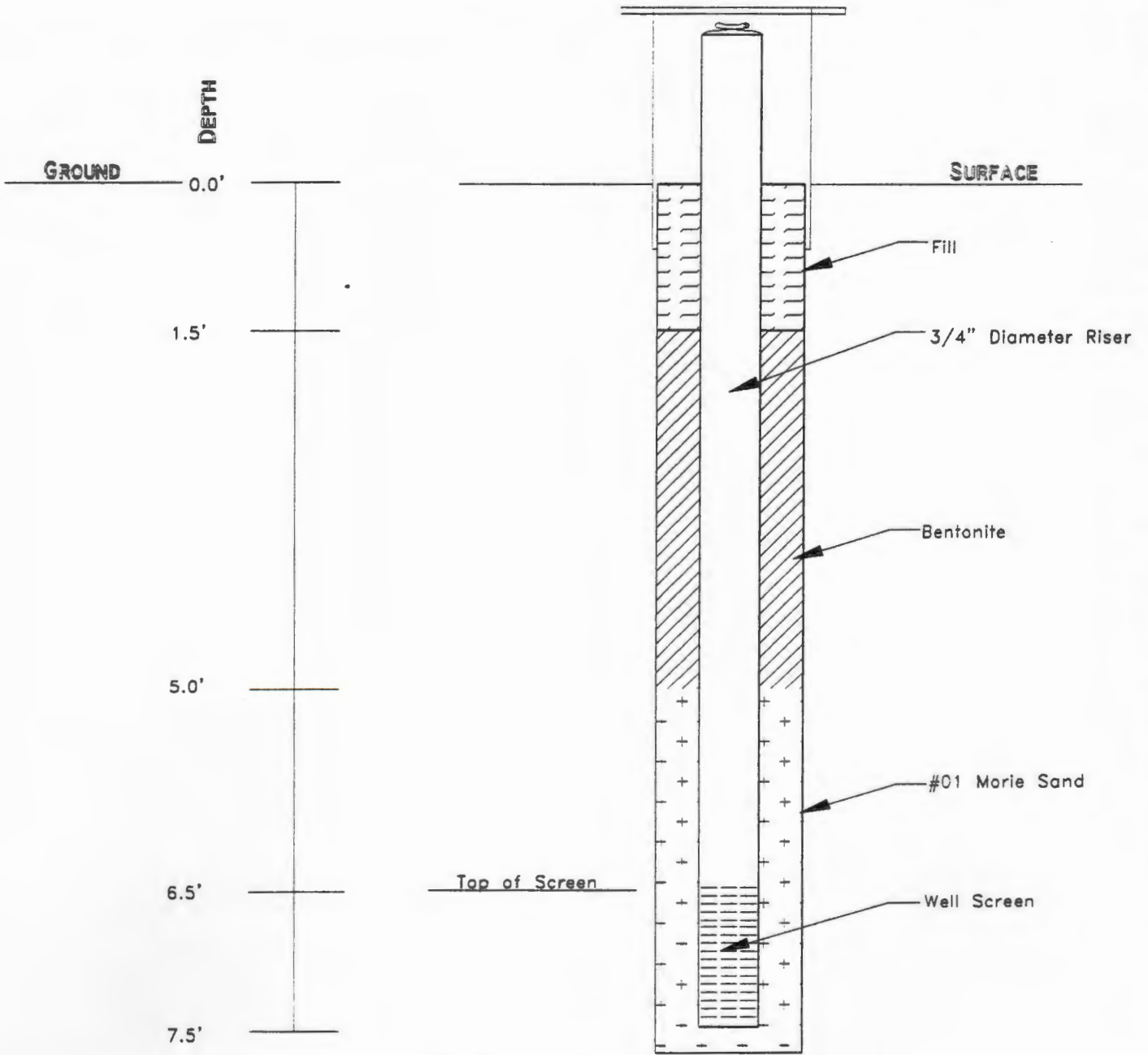
DATE COMPLETED: January 5, 1998 SUPERVISED BY: S. Carter

WELL SIZE AND TYPE: 3/4" Dia., Sch. 40 PVC DRILLING COMPANY: Matrix Environmental

SCREEN SIZE AND TYPE: 3/4" Dia., 0.020 Slot, Sch. 40 PVC DRILLERS NAMES: S. Marchetti

BOREHOLE SIZE: 2" Diameter DRILL RIG MODEL: Matrix Terraprobe

WELLHEAD ELEVATION: _____



NOT TO SCALE

PROJECT LOCATION: Elderlee, Inc. Oaks Corners, New York PROJECT NUMBER: Bio 97-522

WELL TYPE: Oxygen Injection Point WELL NUMBER: IP2

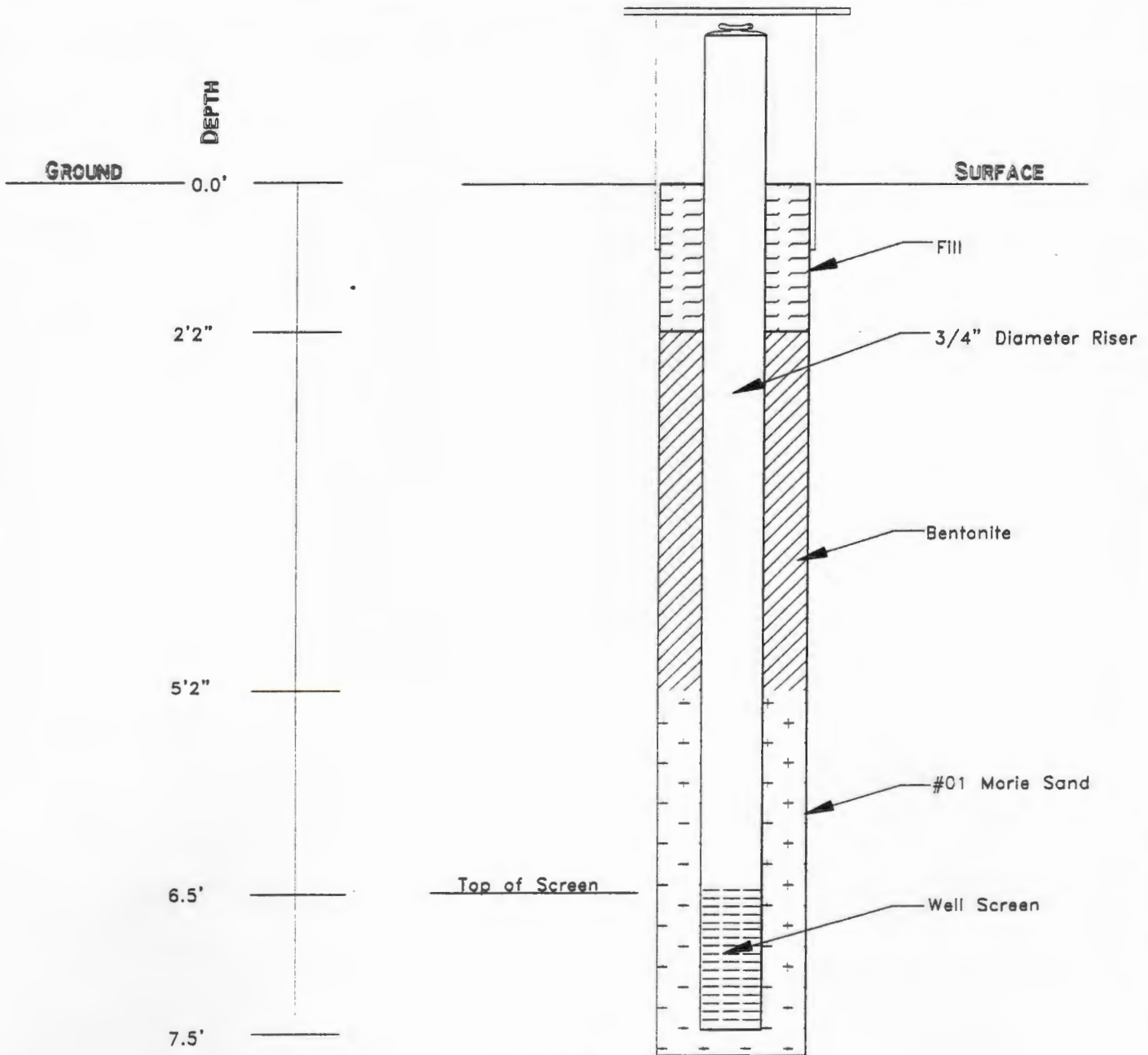
DATE COMPLETED: January 5, 1998 SUPERVISED BY: S. Carter

WELL SIZE AND TYPE: 3/4" Dia., Sch. 40 PVC DRILLING COMPANY: Matrix Environmental

SCREEN SIZE AND TYPE: 3/4" Dia., 0.020 Slat, Sch. 40 PVC DRILLERS NAMES: S. Marchetti

BOREHOLE SIZE: 2" Diameter DRILL RIG MODEL: Matrix Terraprobe

WELLHEAD ELEVATION: _____



NOT TO SCALE

PROJECT LOCATION: Elderlee, Inc. Oaks Corners, New York PROJECT NUMBER: Bto 97-522

WELL TYPE: Oxygen Injection Point WELL NUMBER: IP3

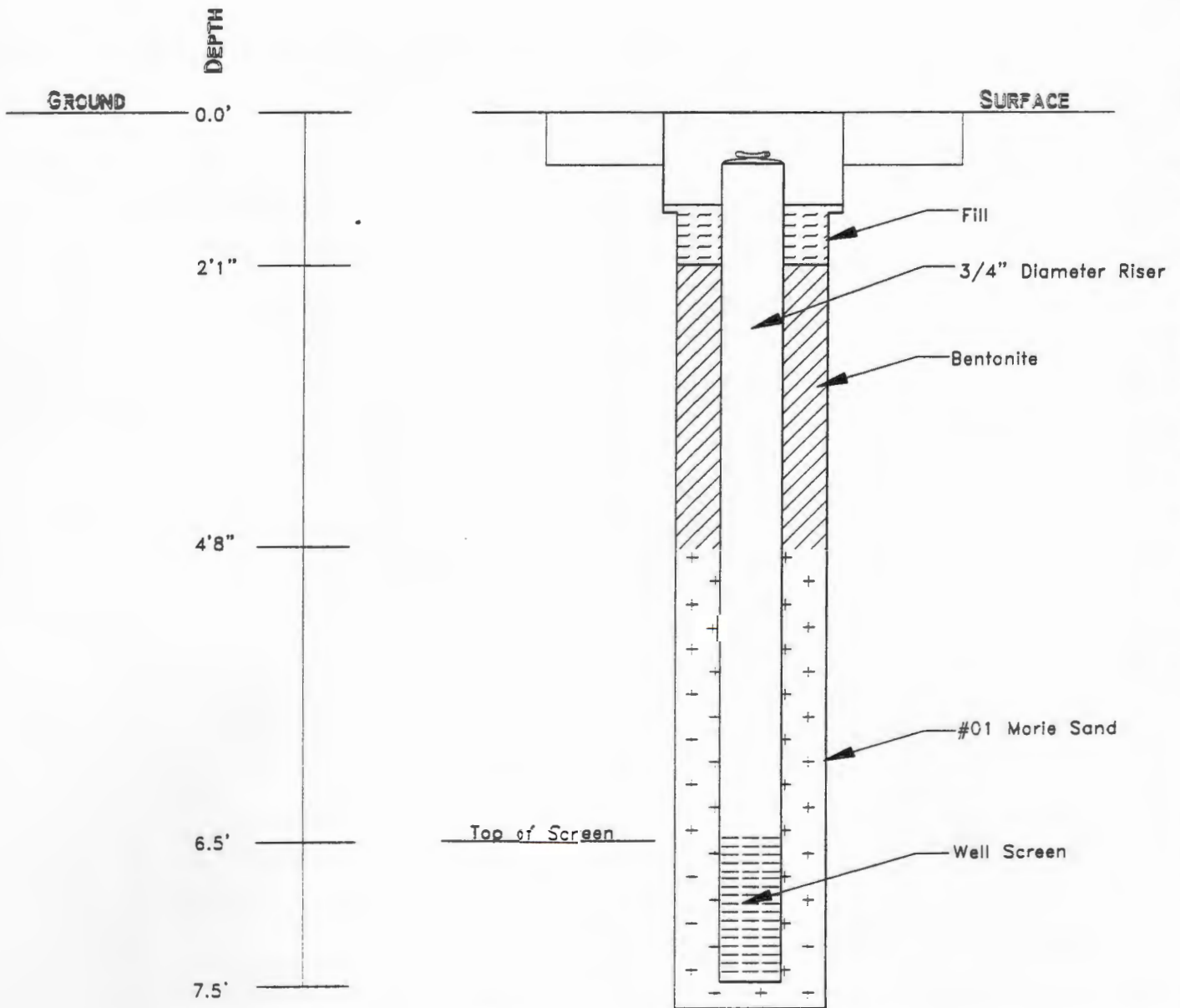
DATE COMPLETED: January 5, 1998 SUPERVISED BY: S. Carter

WELL SIZE AND TYPE: 3/4" Dia., Sch. 40 PVC DRILLING COMPANY: Matrix Environmental

SCREEN SIZE AND TYPE: 3/4" Dia., 0.020 Slot, Sch. 40 PVC DRILLERS NAMES: S. Marchetti

BOREHOLE SIZE: 2" Diameter DRILL RIG MODEL: Matrix Terraprobe

WELLHEAD ELEVATION: _____



NOT TO SCALE

PROJECT LOCATION: Elderlee, Inc. Oaks Corners, New York PROJECT NUMBER: Bio 97-522

WELL TYPE: Oxygen Injection Point WELL NUMBER: IP4

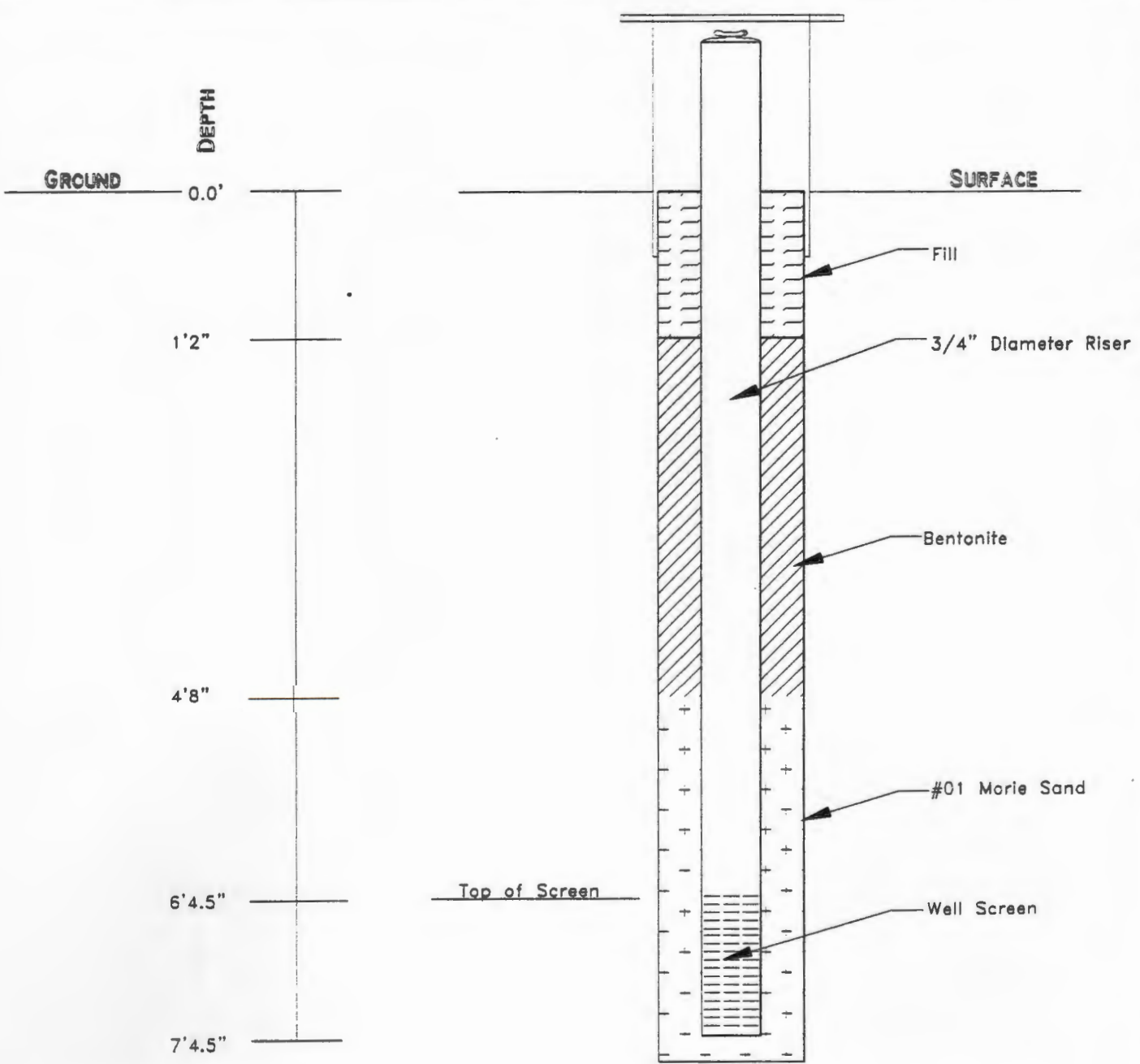
DATE COMPLETED: January 5, 1998 SUPERVISED BY: S. Carter

WELL SIZE AND TYPE: 3/4" Dia., Sch. 40 PVC DRILLING COMPANY: Matrix Environmental

SCREEN SIZE AND TYPE: 3/4" Dia., 0.020 Slot, Sch. 40 PVC DRILLERS NAMES: S. Marchetti

BOREHOLE SIZE: 2" Diameter DRILL RIG MODEL: Matrix Terraprobe

WELLHEAD ELEVATION: _____



NOT TO SCALE

PROJECT LOCATION: Elderlee, Inc. Oaks Corners, New York PROJECT NUMBER: Bio 97-522

WELL TYPE: Oxygen Injection Point WELL NUMBER: IP5

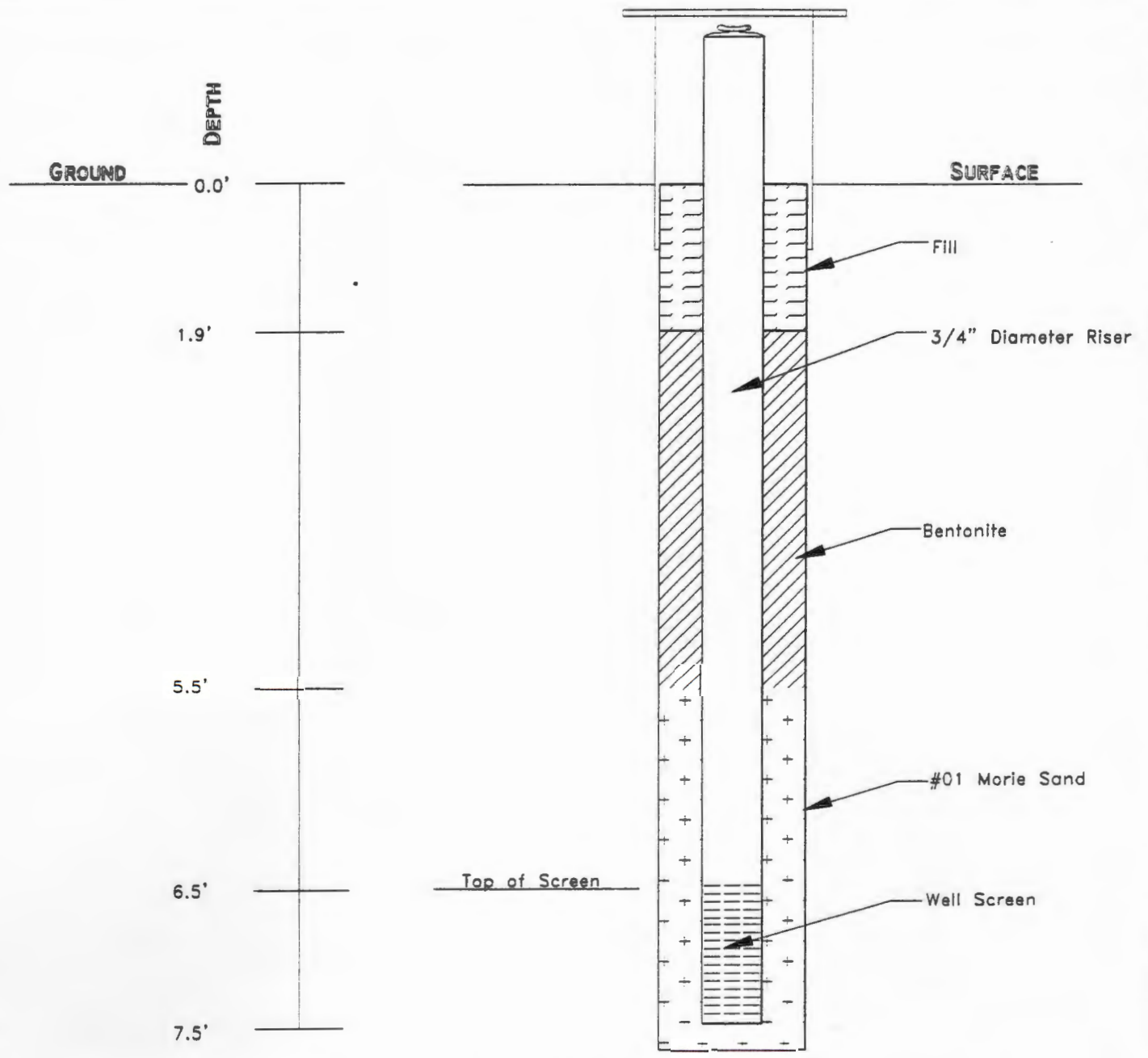
DATE COMPLETED: January 5, 1998 SUPERVISED BY: S. Carter

WELL SIZE AND TYPE: 3/4" Dia., Sch. 40 PVC DRILLING COMPANY: Matrix Environmental

SCREEN SIZE AND TYPE: 3/4" Dia., 0.020 Slot, Sch. 40 PVC DRILLERS NAMES: S. Marchetti

BOREHOLE SIZE: 2" Diameter DRILL RIG MODEL: Matrix Terraprobe

WELLHEAD ELEVATION: _____



NOT TO SCALE

PROJECT LOCATION: Elderlee, Inc. Oaks Corners, New York PROJECT NUMBER: Bio 97-522

WELL TYPE: Oxygen Injection Point WELL NUMBER: IP6

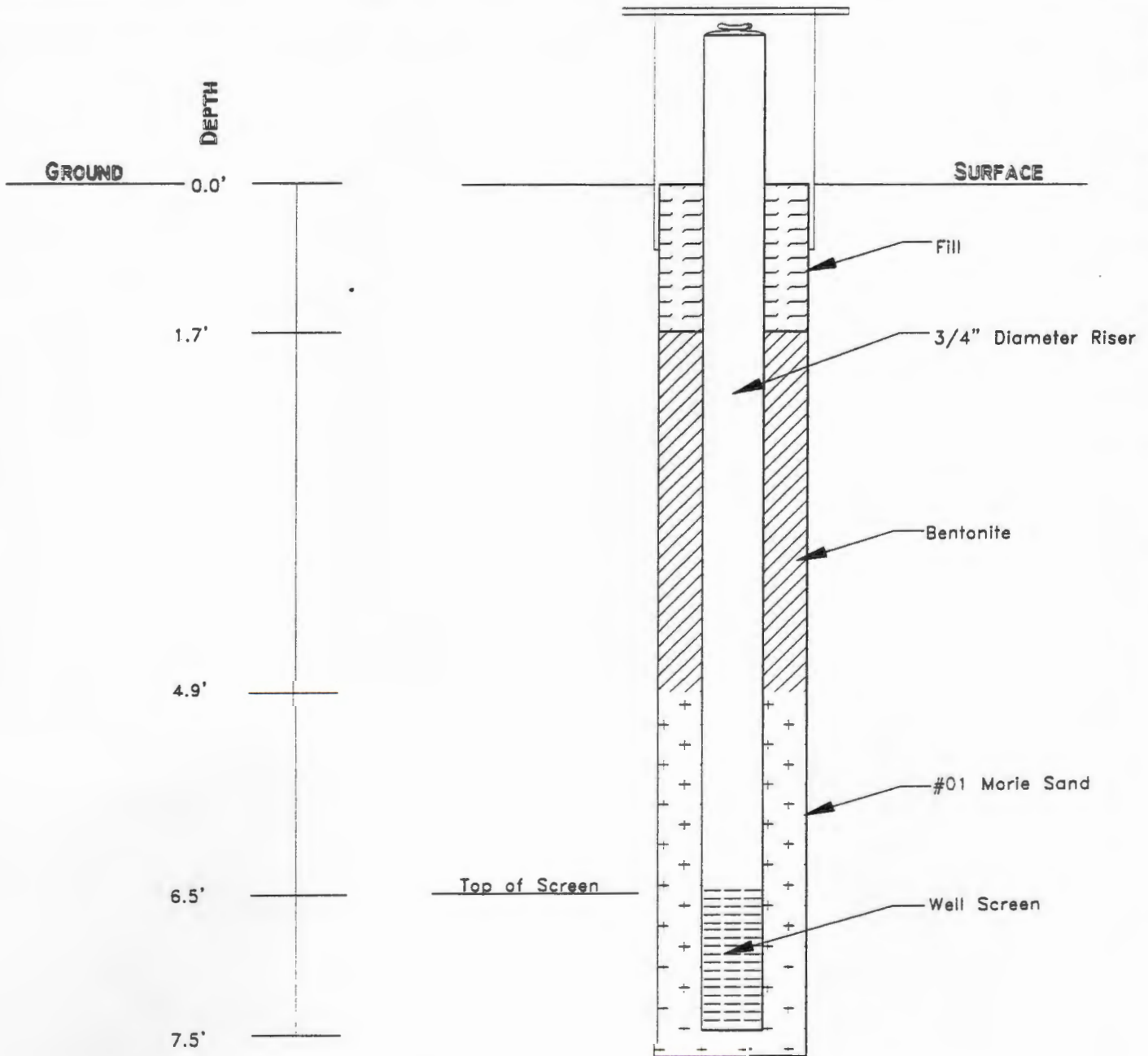
DATE COMPLETED: January 5, 1998 SUPERVISED BY: S. Carter

WELL SIZE AND TYPE: 3/4" Dia., Sch. 40 PVC DRILLING COMPANY: Matrix Environmental

SCREEN SIZE AND TYPE: 3/4" Dia., 0.020 Slot, Sch. 40 PVC DRILLERS NAMES: S. Marchetti

BOREHOLE SIZE: 2" Diameter DRILL RIG MODEL: Matrix Terraprobe

WELLHEAD ELEVATION: _____



NOT TO SCALE

WELL CONSTRUCTION DETAIL

PROJECT LOCATION: Elderlee, Inc. Oaks Corners, New York PROJECT NUMBER: Bio 97-522

WELL TYPE: Groundwater Monitoring Well WELL NUMBER: Micro Well 1

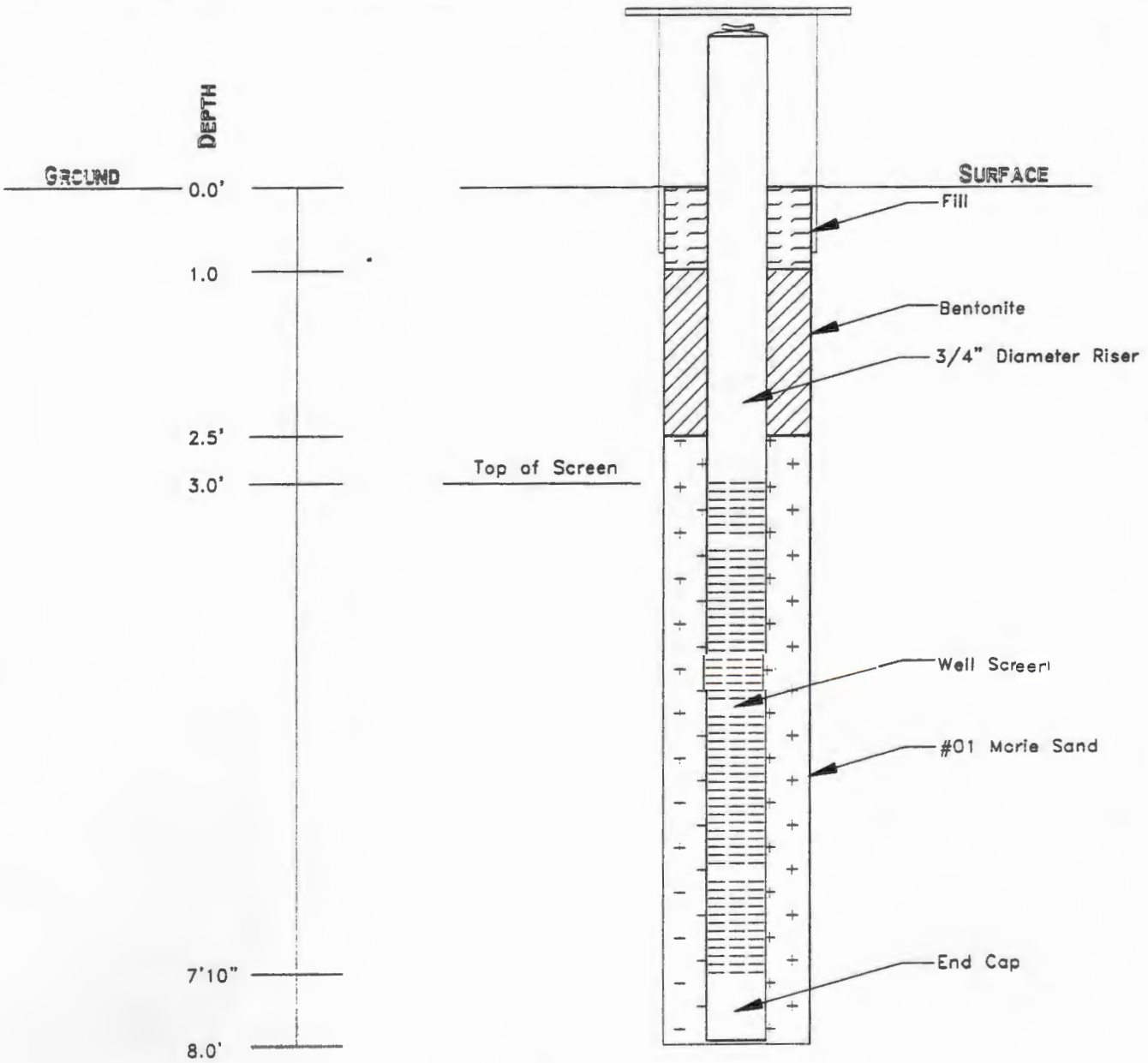
DATE COMPLETED: January 5, 1998 SUPERVISED BY: S. Carter

WELL SIZE AND TYPE: 3/4" Dia., Sch. 40 PVC DRILLING COMPANY: Matrix Environmental Tech.

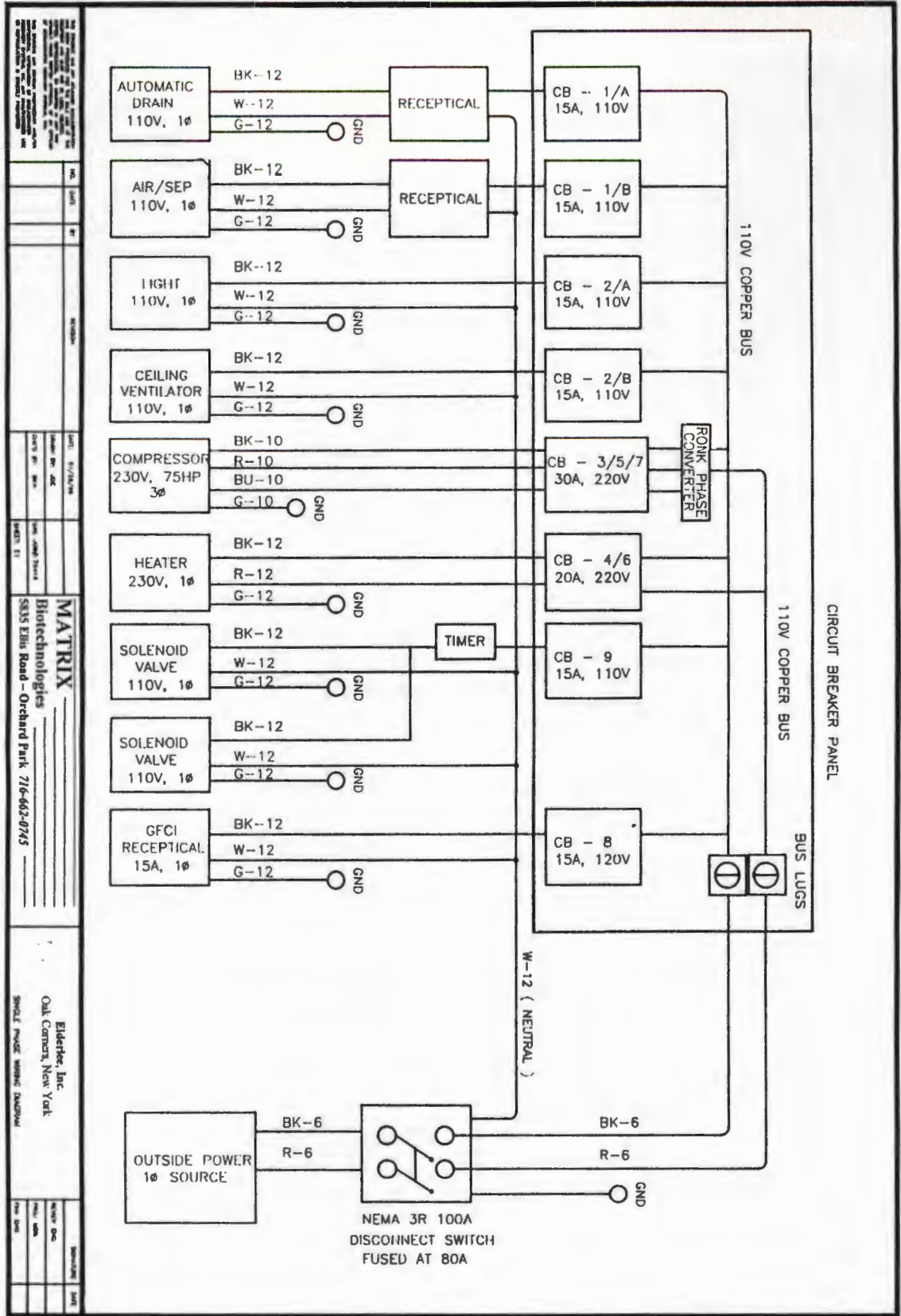
SCREEN SIZE AND TYPE: 3/4" Dia., 0.020 Slot, Sch. 40 PVC DRILLERS NAMES: S Marchetti

BOREHOLE SIZE: 2" Diameter DRILL RIG MODEL: Matrix Terraprobe

WELLHEAD ELEVATION: _____



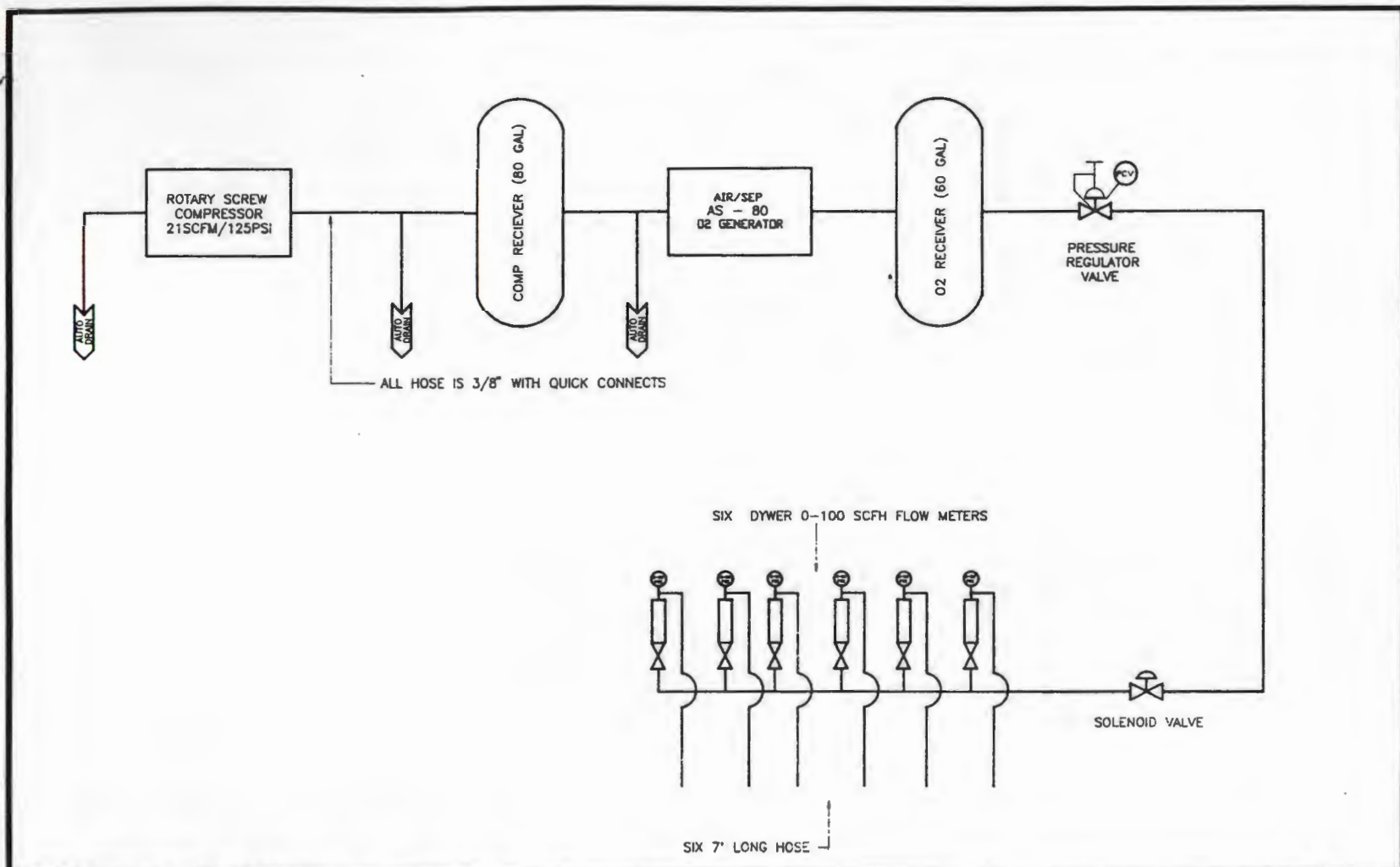
NOT TO SCALE



MATRIX

Biotechnologies
 5535 Edin Road - Orchard Park 716-662-0745

ElderJet, Inc.
 Oak Corners, New York
 SINGLE PHASE WIRING DIAGRAM



<small> THE COMPANY AND ANY OTHER ORGANIZATION ASSOCIATED WITH THE DESIGN OF THIS PROJECT, AND ANY INDIVIDUALS ASSOCIATED WITH THE DESIGN OF THIS PROJECT, SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THIS PROJECT IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS, CODES, AND STANDARDS. </small>	NO.	DATE	BY	REVISION	DATE	MATRIX Biotechnologies 5835 Ellis Road - Orchard Park 716-662-0745	Eldertec, Inc. Oak Corners, New York PIPING & INSTRUMENTATION DIAGRAM	<small> SIGNATURE DATE REVIEW ENG PREP MGR PWA ENG </small>

Appendix D
Monitoring Well Locations



TriTech

1100 University Ave.
Rochester, New York 14807
Tel: 718.258.6211
Fax: 718.258.6244

Project Name

NYSDEC Consent Order
No. B8-0428-93-04

Elderlee, Inc.
729 Cross Road
Oaks Corners, NY 14518

Drawing Name

Drawing 1
Monitoring Well Locations
Area A

Revisions

No.	By	Date

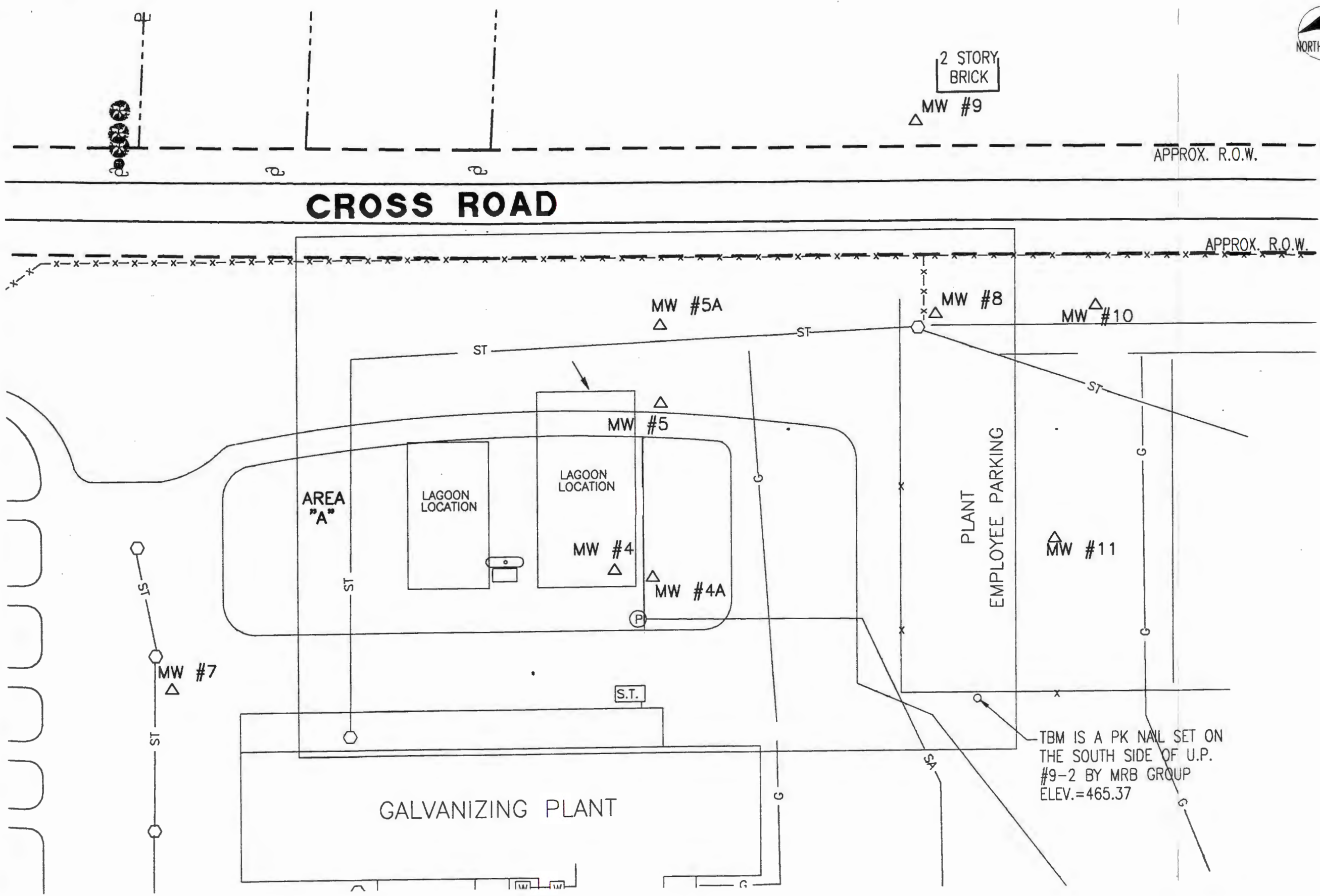
Date: December 1999

Scale: 1" = 60'

Drawn by: MV

Approved by:

Project No.: 9963



Key

△ MW2 Monitoring Well



TriTech
 1100 University Ave.
 Rochester, New York 14807
 Tel: 716.258.8211
 Fax: 716.258.8244

Project Name
 NYSDEC Consent Order
 No. B8-0428-93-04

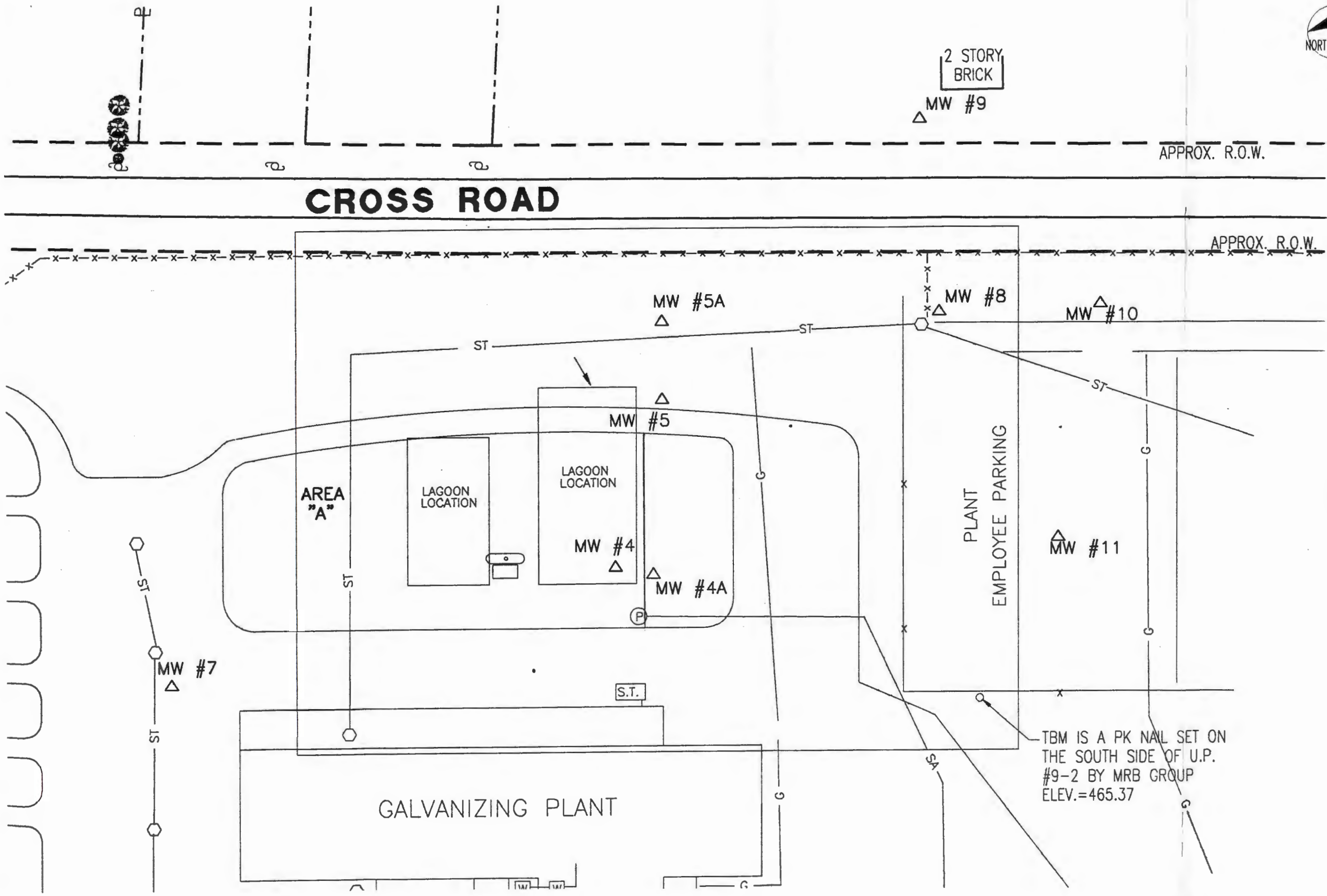
 Elderlee, Inc.
 729 Cross Road
 Oaks Corners, NY 14518

Drawing Name
 Drawing 1
 Monitoring Well Locations
 Area A

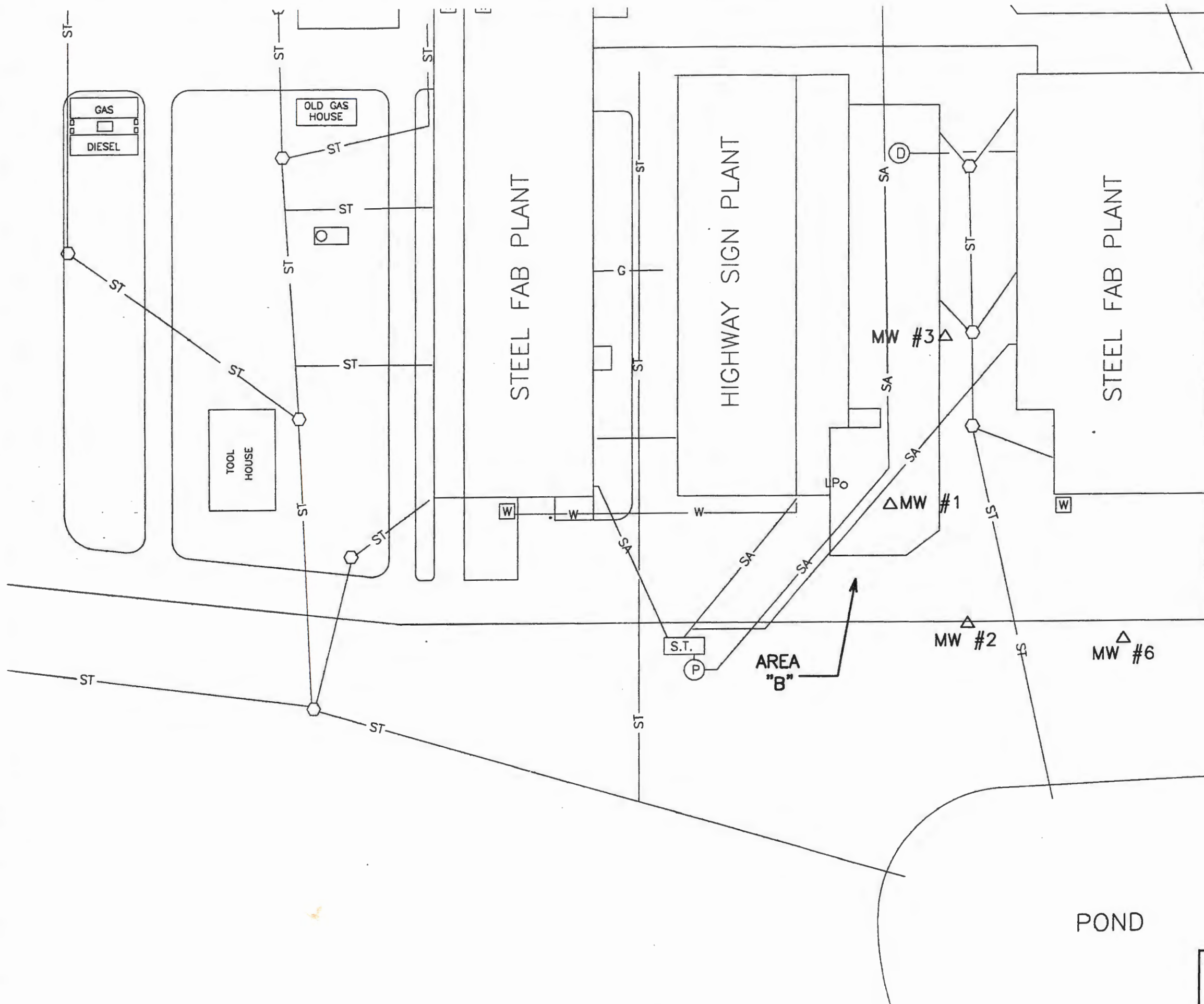
Revisions

No.	By	Date

Date: December 1999
 Scale: 1" = 60'
 Drawn by: MV
 Approved by:
 Project No.: 9963



Key
 △ MW2 Monitoring Well



TriTech
 1100 University Ave.
 Rochester, New York 14607
 Tel: 716.259.6211
 Fax: 716.259.6244

Project Name
 NYSDEC Consent Order
 No. B8-0428-93-04

 Elderlee, Inc.
 729 Cross Road
 Oaks Corners, NY 14518

Drawing Name
 Drawing 2
 Monitoring Well Locations
 Area B

Revisions

No.	By	Date

Date: December 1999

Scale: 1" = 60'

Drawn by: MV

Approved by:

Project No.: 9962

Key
 △ MW2 Monitoring Well

Appendix E
Groundwater Sampling Log

Groundwater Sampling Log

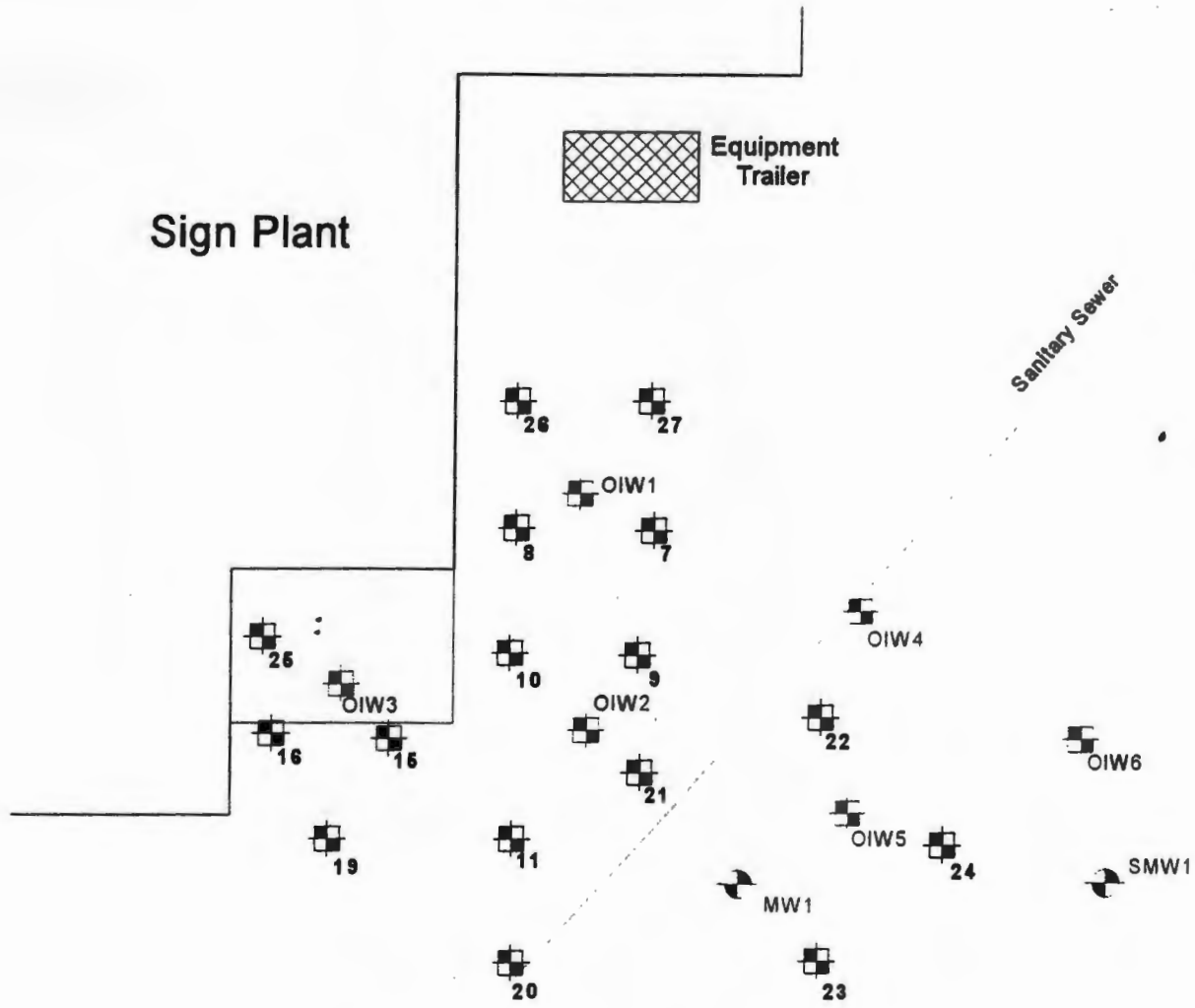
Project Name _____ Page _____ of _____
 Location _____ Date _____
 Inspector _____ Weather _____

- A. Well No. _____
- B. Depth to groundwater (ft) _____
- C. Depth to bottom (ft) _____
- D. Water column height (ft) (C-D) = _____
- E. Well volume (gal) For 2" well, (C-D)*0.163 = _____
 For ¾" well, (C-D)*0.023 = _____
- F. Sampling/purge method _____

Time	Depth to GW (ft)	Turbidity (NTU)	pH (SU)	Conductivity	Temp. (deg F)	Pump Rate	Total Volume	Notes

Notes: _____

Appendix F
Soil Boring Location Plan



Key	
	Monitoring well
	Injection well
	Boring Location

TriTech
 Environmental Health and Safety, Inc.
 1100 University Ave.
 Rochester, New York 14607
 Tel: 716.258.6211
 Fax: 716.258.6244

**Soil Sample Locations
 November 23, 1999
 Elderlee, Inc. Area B**

Date: November 1999
Scale: 1/16" = 1'
Drawn by: TJR
Source:

Appendix G
Inspection Logs

Oxygen Injection System Tri-Weekly Inspection Log

Date _____
Time _____
Inspector _____
System condition On Off
Atlas Copco hour meter reading _____
Alarm status On Off
Alarm light timer reading _____
Manifold pressure (if system on) _____
Manifold flow (if system on) _____
Notes/Unusual Conditions _____

Date _____
Time _____
Inspector _____
System condition On Off
Atlas Copco hour meter reading _____
Alarm status On Off
Alarm light timer reading _____
Manifold pressure (if system on) _____
Manifold flow (if system on) _____
Notes/Unusual Conditions _____

Date _____
Time _____
Inspector _____
System condition On Off
Atlas Copco hour meter reading _____
Alarm status On Off
Alarm light timer reading _____
Manifold pressure (if system on) _____
Manifold flow (if system on) _____
Notes/Unusual Conditions _____

MATRIX OXYGEN INJECTION SYSTEM EVALUATION SHEET

Project Name: TriTech/Elderlee

Project Number: #97-522

Technician(s): _____

Date Work Performed: _____

System Arrival Status On/Off: _____

Oxygen Injection Delivery Bank

	IP1	IP2	IP3	IP4	IP5	IP6
Flow (SCFH)						
Pressure (PSI)						

AirSep Unit

	AirSep Unit	Oxygen Delivery Tank
Feed Pressure (PSI)		
Cycle Pressure (PSI)		
Oxygen Reciever (PSI)		
Oxygen Delivery Tank Pressure (PSI)		
Hour Meter Reading (Hours)		

Atlas Copco Compressor

	Atlas Copco Compressor
Air Supply Delivery Pressure (PSI)	
Hour Meter Reading (Hours)	

Oxygen Injection Point Data

Injection Point	Dissolved Oxygen (ppm)	Temperature (°C)	ORP (mv)
O/W1			
O/W2			
O/W3			
O/W4			
O/W5			
O/W6			
O/W7			
MW1			

Comments: