ES
ENGINEERING-SCIENCE, INC.

290 ELWOOD DAVIS ROAD
SUITE 312
LIVERPOOL, NY 13088
TEL: (315) 451-9560
FAX (315) 451-9570

92 OCT -2 12:07

October 1, 1992

Ms. Susan Hugo
Alameda County Department
of Environmental Health
80 Swan Way
Oakland, California 94621

Re: Greyhound Terminal
Location 8934
Oakland, California
Hydrocarbon Recovery System Installation/Monitoring

Dear Ms. Hugo:

On behalf of Greyhound Lines, Inc., and based on our conversation on September 2, 1992, Engineering Science, Inc. (ES) is pleased to submit this letter which summarizes the planned installation of a hydrocarbon recovery system at the Greyhound terminal located at 2103 San Pablo Avenue, Oakland, California. Greyhound is currently finalizing and obtaining the required permits to install the recovery system at the facility.

The pump and treat system is designed to be an automated system capable of addressing the present contamination concerns at the site. The objective of the pump and treat system is to recover free phase hydrocarbons floating atop the water table in the vicinity of the former UST system located along the west side of the building. The system would be versatile enough to remediate the dissolved phase hydrocarbons, since total fluids pumps would be utilized. A discussion of the components of the pump and treat system is provided herein.

HYDROCARBON RECOVERY SYSTEM INSTALLATION

Several groundwater pumping systems were evaluated for this project. They included: electric submersible pumps, air diaphragm pumps (suction system), reciprocating pumps (electric-drive positive displacement system), and ejector pumps (pneumatic-drive positive displacement system). Electric submersible pumps were eliminated from further consideration because frequent on/off cycling of the pumps could easily burn out the electric motors that drive the submersible pumps. Air diaphragm pumps were eliminated from further consideration based on suction limitations for depths greater than 20 to 22 feet (required to provide adequate draw down for free phase recovery). Positive displacement pump systems were retained for further consideration because of their variable pumping rate capabilities, long operating life, and low maintenance. Ejector pumps were selected over the reciprocating pumps based on the ability to set the controls and drive assembly in a shallow well box below grade and to vary the depth of the pump assembly.

The components of the pump and treat system include the following: four 4-inch diameter recovery wells, 30 feet deep; air supply and discharge lines; four pneumatic total fluids pumps; remote controllers; air solenoids/regulators set inside locking well head boxes at each recovery well; air compressor; free product/water separator; batch tank/sump with explosion-proof pump and level switches; high level shut-off sensors; activated carbon adsorption columns (GAC). Figure 1 shows a plan layout of the pump and treat system.

The total fluids pumps will be driven by a 5-horsepower, heavy-duty air compressor. The remote controllers and air solenoids/regulators will regulate the pressure and activate the pumps in each recovery well. In addition, a cable and crimp assembly will be attached to the well head casing for adjusting the depth of the pump within each well.

The recovery and treatment system schematic and proposed layout are shown as Figures 2 and 3. The separator tank utilizes plate and Norpack coalescers to separate the contaminated groundwater from the free phase hydrocarbons. The free product is removed by a skimmer and stored in a product reservoir, Department of Transportation (DOT) approved 55 gallon storage drum or 275 gallon steel tank, which will be periodically pumped and transported by a waste hauler to an approved reclamation facility. The contaminated groundwater will flow by gravity from the separator tank into a batch tank/sump and subsequently pumped by an electric sump pump through two carbon columns in series. Pressure gauges and sampling ports installed in the fluid line prior to the first column, between the two columns, and following the second column will allow the performance of the treatment system to be monitored. The treated groundwater (effluent) flowing from the second carbon column will be discharged to the sanitary sewer. The flowrate through the treatment system will be monitored by a totalizing flow meter. High-level sensor probes will be installed in the separator tank, batch tank/sump, and product reservoir, and will be operated by electrical control panels that will shut-down the recovery pump system during high level conditions. Additionally, the sump pump and level switch for the batch tank will be operated by its own control panel.

The treatment system and air compressor will be housed inside an industrial chain-linked fence with a locking gate. The fence will be installed for security reasons and only personnel that have received prior authorization from Greyhound will gain access to this area.

RECOVERY SYSTEM MONITORING, OPERATION AND MAINTENANCE

Periodic maintenance of the extraction treatment system will be necessary to ensure proper functioning and effective treatment. ES personnel will make monthly site visits to measure and record fluid levels in the recovery tank and provide maintenance for all mechanical equipment.

Samples of discharge water, upstream and downstream of each carbon canister will be collected and analyzed for total petroleum hydrocarbons as diesel (TPHD) and benzene, toluene, ethylbenzene and xylenes (BTEX). TPHD will be analyzed using the California Environmental Protection Agency Department of Toxic Substances Control Leaking Underground Fuel Tank Field Manual (DTSC/LUFT) Method and BTEX will be quantified using EPA Method 8020. All analyses will be performed by a DTSC certified hazardous waste laboratory. EBMUD may require additional or more frequent sampling as a discharge requirement.

The recovery system has been designed to minimize, to the greatest extent possible, the amount of maintenance required to ensure proper and continuous operation. However, based on the potential for initial rapid recovery of free product, a weekly system maintenance check will be performed by a field technician during the initial start-up and first eight weeks of operation. If it is determined after the initial eight weeks of system monitoring that weekly maintenance will not be required, ES will modify the monitoring schedule accordingly.

The weekly monitoring at this facility will consist of a half day visit by the field technician located near the facility. During the weekly monitoring, the system will be checked for proper operation. The well and sump pumps will be inspected for fouling and efficient operation, and the level sensors, controllers, air compressor and associated piping will also be inspected. In addition, each of the recovery wells will be checked for water level and free product thickness measurements. The product reservoir for recovered diesel fuel will be checked and whenever necessary, a waste hauler will be called to pump out and properly dispose of or recycle the recovered product off-site.

GROUNDWATER MONITORING PROGRAM

ES is presently conducting a monthly monitoring program at the facility. On a monthly basis, free product thickness and depth to groundwater are measured in the wells. Free-product thickness and depth to water are measured with an electronic oil/water interface probe.

On a quarterly basis, water quality samples are being collected from the monitoring wells. Groundwater monitoring has followed established RWQCB guidelines for monitoring free product floating on the water table as required by RWQCB. Prior to sampling, the static water levels are measured at each well using an electronic oil/water interface probe. Quartz Teflon bailers are used to collect samples at the free product/groundwater interface. The samples are field inspected for thickness of product and the presence of any odor and/or sheen. In order to sample for dissolved product, at least three well volumes are purged from each well prior to sampling with a quartz Teflon bailer. During well purging, physical parameters (temperature, electrical conductivity, and pH) are measured. Should these parameters not stabilize after the evacuation of three well volumes, purging continues until a maximum of five well volumes

have been purged. Should a well be evacuated dry prior to purging the required volumes, samples are collected after the water level recovers to 80 percent of its initial level.

The groundwater samples are analyzed for BTEX by EPA Method 8020 and total petroleum hydrocarbons as diesel (TPHD) by the DTSC/LUFT Method (Modified EPA Method 8015) at a DTSC certified hazardous waste laboratory.

All purge water and decontamination rinsate fluids are containerized at the site in Department of Transportation (DOT)-approved, 55-gallon drums for disposal by Greyhound.

REPORTING

ES will prepare a report summarizing recovery operations following system installation, quarterly discharge reports required by the discharge authority EBMUD and monthly letter and quarterly groundwater monitoring progress reports. Draft copies of each report will be submitted to Greyhound for review and comment. The final reports will be submitted to Greyhound, the RWQCB and Alameda County Health Department Services.

Recovery System Installation Report

Following installation of the recovery system a report will be prepared. The Recovery System Installation Report will include:

- A brief description of recovery/treatment system installation activities;
- A description of daily operation and maintenance instructions for the system;
- A monitoring check list used for recording liquid levels, discharge volume and free-product disposal transactions.

Quarterly Discharge Reports

ES will prepare two quarterly discharge reports required by EBMUD. These reports will include:

- A summary of recovery system and any monitoring well sample results that occurred during the prior quarter;
- Carbon treatment performance data (e.g., the estimated date that the primary carbon canister breakthrough will occur, using current loading data);

- Recovery system inspection data. These data will include flow totalizer readings, comments on treatment unit maintenance, any operational changes, visual observations of the treatment unit for leaks or fouling and the types and quantities of wastes hauled off.

Monthly Letter Reports

A monthly letter report will be prepared following each monitoring visit. The report will summarize the monitoring activities and document the findings of the site visit.

Quarterly Progress Reports

ES will prepare quarterly groundwater monitoring progress reports. These progress reports will include:

- A summary of the field work conducted over the previous period;
- A discussion of the local hydrogeological environment including groundwater flow and gradient;
- A discussion of the lateral extent of groundwater contamination including both free and dissolved product;
- Identification and quantification of those constituents detected in the groundwater with local and state "action limits";
- Status of groundwater remediation;
- Certified analytical laboratory results including chain-of-custody records;
- Groundwater monitoring field notes.

PROJECT SCHEDULE

Draft monthly letter reports will be completed within two weeks of the monthly monitoring visit, whereas draft quarterly progress reports will be completed within four weeks of each event to allow for reporting of analytical laboratory results. Following receipt of comments from Greyhound, one week will be required to prepare each final report.

If you have any questions or require additional information, please contact us at (315) 451-9560.

Sincerely,

ENGINEERING-SCIENCE, INC.

Edward W. Roberts

Edward W. Roberts
Project Manager

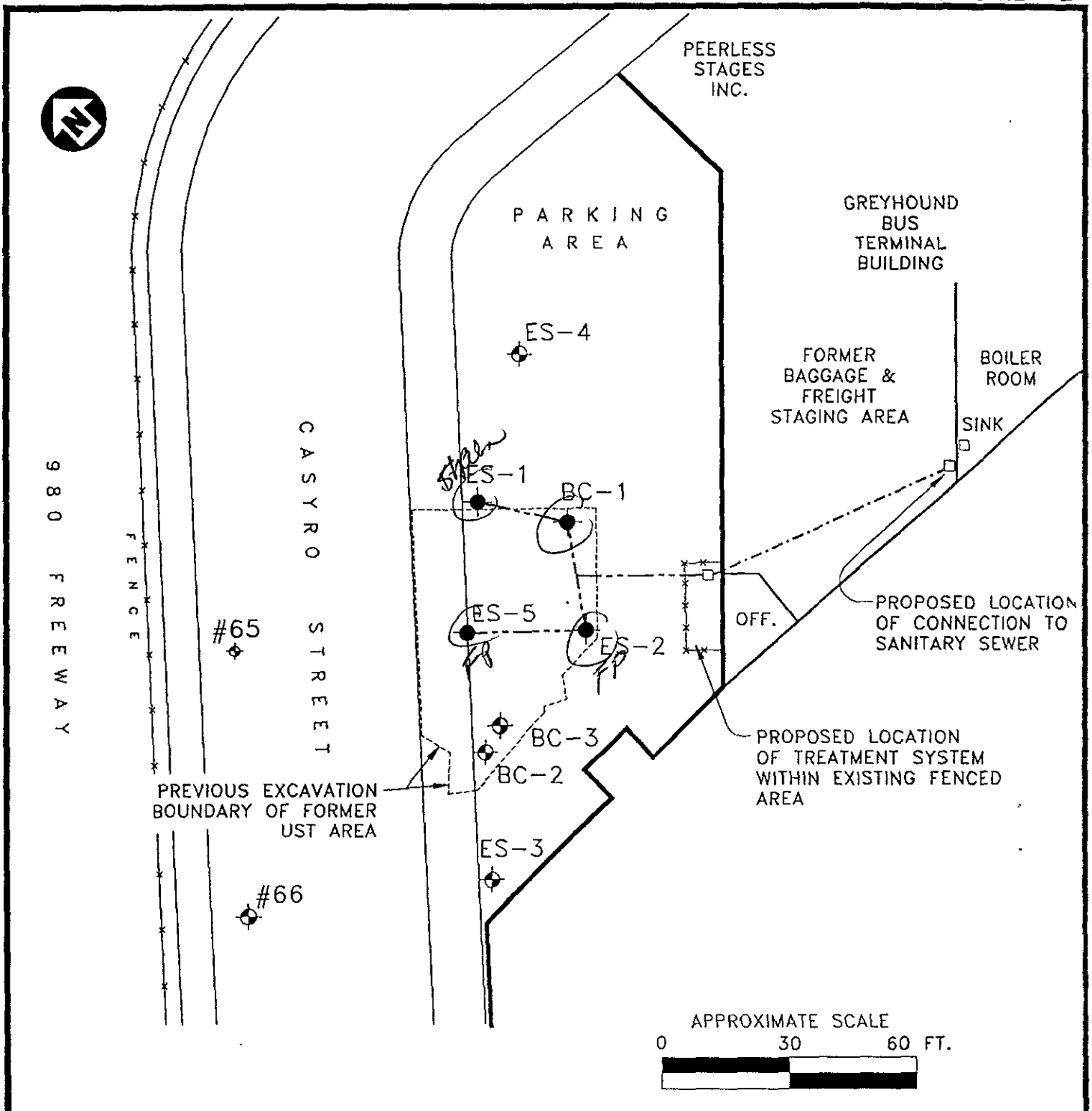
David A. Nickerson

David A. Nickerson, P.G.
Project Manager

EWR/DAN/lml

cc: Mr. Richard Hiatt, RWQCB
Tom Portele, GLI, Dallas, TX
J.N. Baker, ES

FIGURE 1



LEGEND

#66 BC-3 — EXISTING MONITORING WELL

BC-1 ES-2 — PROPOSED RECOVERY WELL

PROPOSED RECOVERY SYSTEM TRENCH

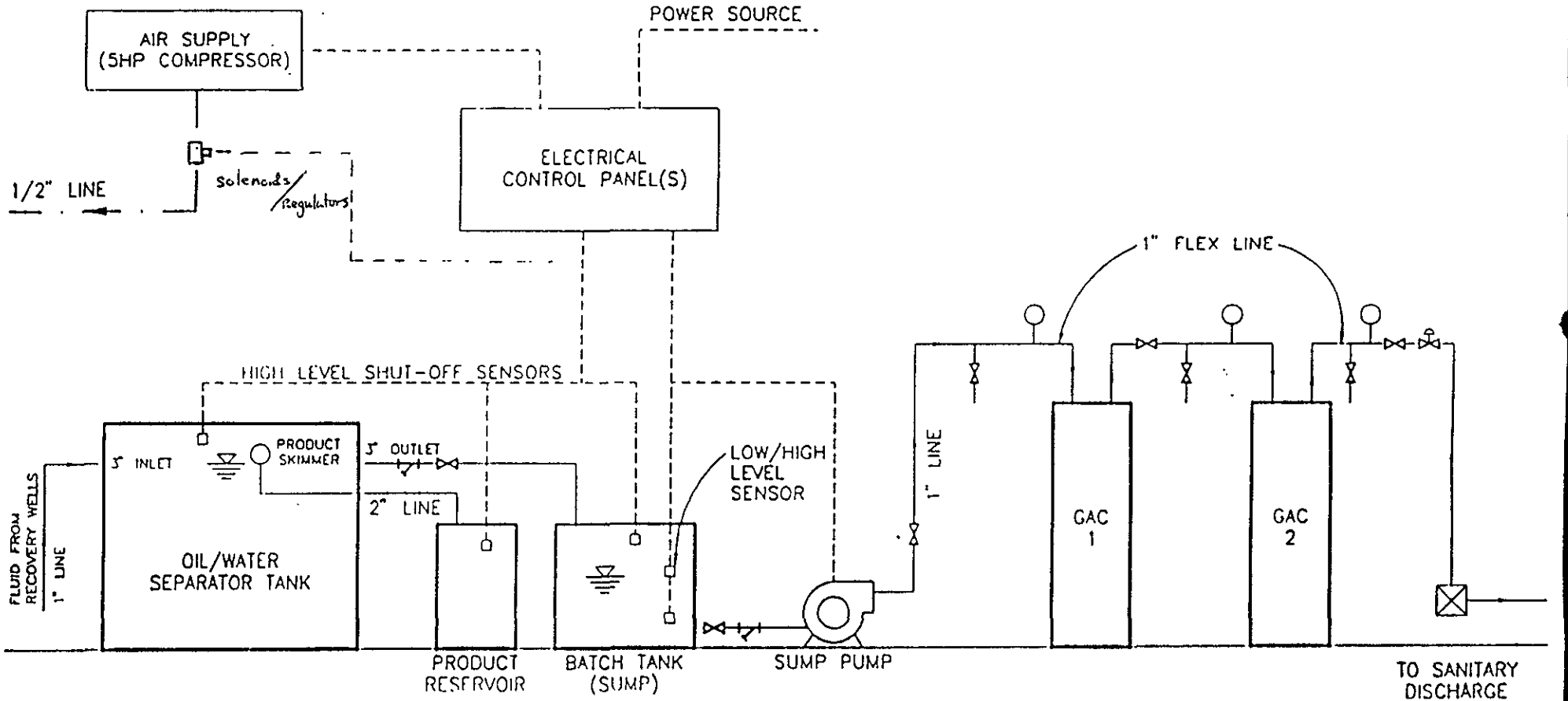
TREATMENT SYSTEM DISCHARGE LINE TO SANITARY SEWER

PROPOSED HYDOCARBON RECOVERY AND GROUNDWATER TREATMENT SYSTEM

GREYHOUND LINES, INC.
LOCATION 8934
2103 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

001631|D:\SY139\SY139005.DWG CREATED: 8/17/92

ES ENGINEERING-SCIENCE



LEGEND:

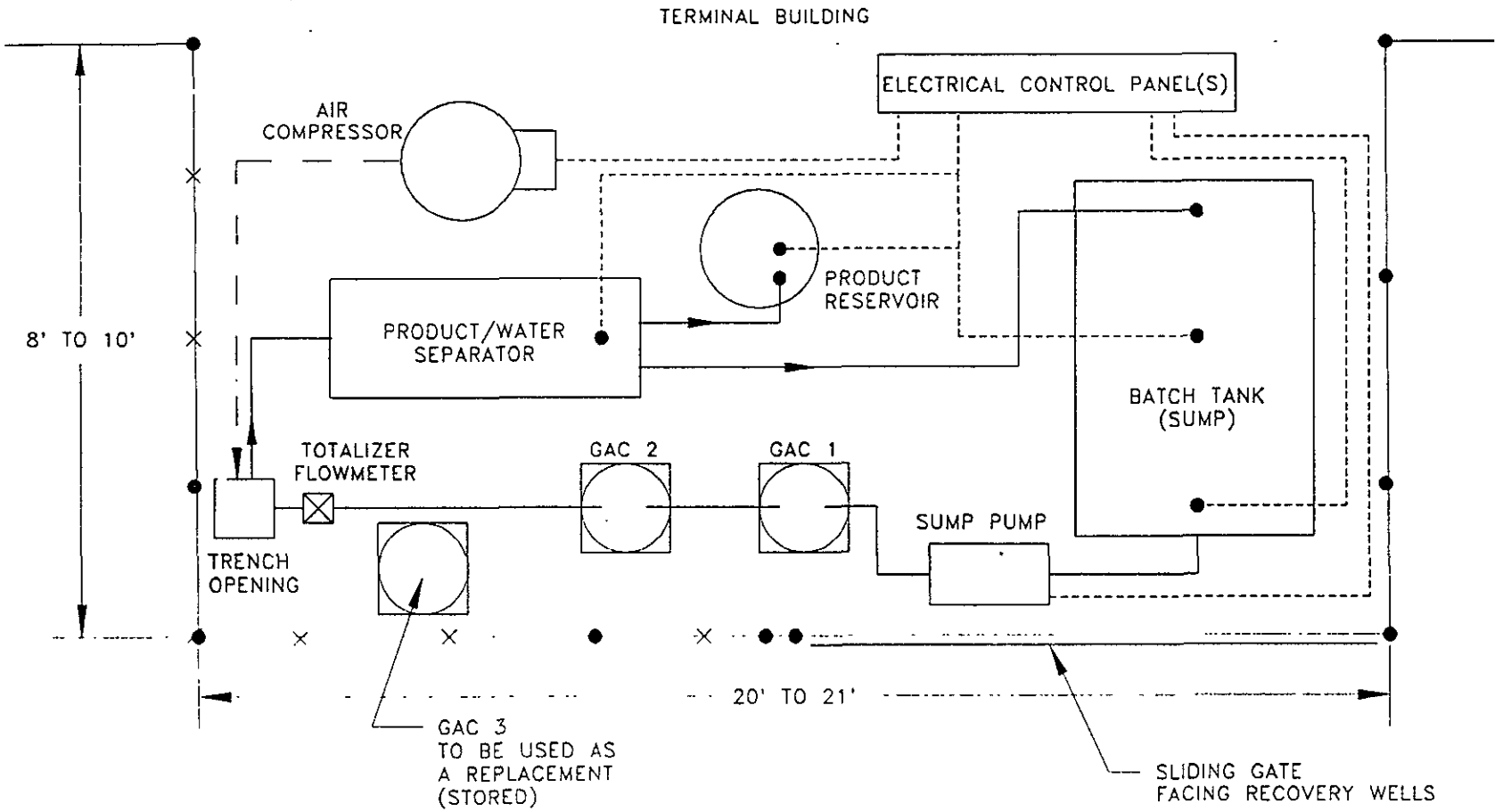
- BALL OR GATE VALVE
- IN-LINE STRAINER
- VACUUM RELIEF VALVE
- PRESSURE GAUGE
- SAMPLE PORT
- FLUID LINES (SCHEDULE 40 PVC AND FLEX PRODUCT HOSE)
- ELECTRICAL LINES
- AIR LINES (160 TO 200 psi RATING)

HYDROCARBON/GROUNDWATER RECOVERY & TREATMENT SYSTEM

Greyhound Terminal Building
Location 8934
Oakland, California

ENGINEERING - SCIENCE

FIGURE 2



LEGEND:

- FLUID LINES
- ELECTRICAL LINES
- AIR LINES
- FENCED AREA

3 FT. 0 3 FT.

SCALE

HYDROCARBON/GROUNDWATER RECOVERY & TREATMENT SYSTEM LAYOUT

Greyhound Terminal Building
Location 8934
Oakland, California

FIGURE 3

ENGINEERING–SCIENCE