SOMA
ENVIRONMENTAL ENGINEERING, INC.
2680 Bishop Drive, Suite 203, San Ramon, CA 94583
TEL (925) 244-6600 * FAX (925) 244-6601

January 22, 2003

Mr. Scott O. Seery
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Former Chevron Service Station located at 7240 Dublin Boulevard, Dublin, California

Dear Scott:

Enclosed is our **second revision** of the workplan for the subject site. Section 2.2 was revised based on our discussion. Section 2.3.1 was added to the workplan to include the current status of the soil vapor extraction system at the subject property. In addition, Appendix A includes the results of the laboratory analysis on soil gas samples collected in early 2002.

As we discussed the literature on the Geoprobe Screen Point 15 Groundwater Sampler is also enclosed for your review.

If you have any questions or comments, please do not hesitate to call me 925-244-6600.

Sincerely,

Mansour Sepehr
Principal Hydogeologist

REGISTERED PROFESSIONAL ENGINEER
MANSOUR SEPEHR
No. C042928
Exp. 3-31-04
CIVIL
STATE OF CALIFORNIA

Enclosures

cc: Ms. Karen Streich, Chevron Product Company
Mr. Hooshang Hadjian

ENVIRONMENTAL ENGINEERING, INC.
2680 Bishop Drive, Suite 203, San Ramon, CA 94583
TEL (925) 244-6600 * FAX (925) 244-6601

Second Revision of Workplan to Conduct Soil and Groundwater Remediation At Former Chevron Service Station 7240 Dublin Boulevard Dublin, California

Project 2690

January 22, 2003

Prepared for:
Mr. Hooshang Hadjian
7240 Dublin Boulevard
Dublin, California

Prepared by:
SOMA Environmental Engineering, Inc.
2680 Bishop Drive, Suite 203
San Ramon, California

Certification

This report has been prepared by SOMA Environmental Engineering, Inc. on behalf of Mr. Hooshang Hadjian and Chevron Products, the current and previous property owners of 7240 Dublin Boulevard in Dublin, California, to comply with the Alameda County Environmental Health Services' request dated October 21, 2002.

Mansour Sepehr, Ph.D., P.E.
Principal Hydrogeologist

REGISTERED PROFESSIONAL ENGINEER
MANSOUR SEPEHR
No. C042928
Exp. 3-31-04
CIVIL
STATE OF CALIFORNIA

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1.0 INTRODUCTION

This workplan has been prepared by SOMA Environmental Engineering, Inc. (SOMA) on behalf of Mr. Hooshang Hadjian and Chevron Products, the current and previous property owners of 7240 Dublin Boulevard, Dublin, California (the "Site"). Currently the Site is known as Dublin Auto Wash, see Figure 1.

Currently, the Site is being used as a gasoline service station and a car wash facility and is known as Dublin Auto Wash. This workplan has been prepared in response to the Alameda County Department of Environmental Health Services' (ACDEH)'s request dated October 21, 2002.

1.1 Background

The first environmental investigation at the Site began in early 1988 when Chevron Product Company (Chevron) hired EA Engineering, Science, and Technology, Inc. (EA) to conduct a soil vapor investigation at the Site. The results of the soil gas survey indicated elevated levels of hydrocarbons beneath the Site, especially around the southern pump island.

In October 1988, HEW Drilling Company installed three groundwater monitoring wells, EA-1 through EA-3. During the installation of the groundwater monitoring wells, groundwater was encountered at depths ranging between 15 to 23 feet below ground surface (bgs). The depths of the groundwater monitoring wells were 35 to 40 feet bgs. Following the installation of the groundwater monitoring wells, the quarterly groundwater monitoring programs started. Currently, the groundwater monitoring program is conducted at the Site on a quarterly basis.

In February 1989, one 5,000-gallon and two 10,000-gallon underground storage tanks (USTs) were excavated and removed from the Site and replaced with three new USTs. During this activity, soil and groundwater samples were collected and analyzed for petroleum hydrocarbons. Following the USTs' removal and their upgrade, a total of 180 cubic yards of soil was removed and sent to Class I and Class II landfill facilities.

In March 1989 Western Geologic Resources, Inc. (WGR) drilled and sampled five soil borings in the area of the former pump island. In addition, nine soil samples were collected from the vicinity of the former product-line trenches at depths ranging from 2.5 feet to 10.5 feet bgs. Laboratory analyses results indicated total petroleum hydrocarbon (TPH) concentrations from non-detectable to 750 milligram per kilograms (mg/Kg). In May 1990, three vapor extraction wells were installed. Air samples collected from these wells contained a maximum of 29,000 ppm benzene at the beginning of the test and 5,300 ppb after 2,049 minutes into the test. Following the installation of the three vapor extraction wells in 1990, in March 1992 the soil vapor extraction (SVE) system began operating. From December 1992 through June 1995, Geraghty & Miller operated the SVE system. Reportedly, during this period a total of 13,470 pounds of hydrocarbons were removed from the subsurface.

In September 1994, Groundwater Technology, Inc. (GTI) installed three groundwater monitoring wells, MW-1 through MW-3. The depths of these wells ranged between 21 to 26.5 feet bgs. In March 1995, elevated levels (up to 64,000 microgram per liter (µg/L)) of Methyl tertiary Butyl Ether (MtBE) were reported for the first time in MW-3.

In February 1996, Bay Area Exploration Services, Inc. installed two groundwater monitoring wells, MW-4 and MW-5 each with a total depth of 21 feet bgs. During the well installation, soil and groundwater samples were collected and analyzed for petroleum hydrocarbons. No petroleum hydrocarbons were detected in soil or groundwater samples collected from these wells. Apparently, these wells are upgradient wells and have not been impacted by the petroleum hydrocarbons.

In December 1996, Weiss and Associates conducted a Risk Based Corrective Action (RBCA) and concluded that the Site is a "Low Risk" soil and groundwater petroleum release site and recommended the SVE system to be shut down. Based on Weiss Associates' recommendation, the SVE system was shut down, however, the ACDEH required quarterly groundwater monitoring and free product removal reports.

In February 1997, a leak in a stainless steel flex hose to dispenser No. 2 was discovered and reported to the ACDEH. Subsequently, a new product delivery system was installed to replace the existing lines. Free product was also detected in MW-3. The results of subsequent groundwater monitoring events in 1998 and 1999 showed elevated levels of MtBE (up to 13,000 µg/L) and free product in MW-3.

Due to the occurrence of the new release at the Site, Chevron Product Company believes that they should no longer be the responsible party for further site characterization, removal and monitoring of contaminants at the Site. Chevron is ready to negotiate with Mr. Hooshang Hadjian to take over the environmental responsibility for the new release at this Site.

Currently, the exiting eight groundwater monitoring wells at the Site are being monitored by Gettler-Ryan, Inc. (GRI) a subcontractor of Chevron. Figure 2 illustrates the location of the existing groundwater monitoring wells.

2.0 SCOPE OF WORK

Based on the ACDEH's letter dated October 21, 2002, the proposed scope of work includes:

1. A Conduit Study;
2. Contaminant Plume Definition;
3. Interim Soil and Groundwater Remediation;
4. Mitigation Control; and

5. A Corrective Action Plan

The following is a brief description of each task.

2.1 Conduit Study

In October 1995, GRI conducted a conduit study to evaluate the preferential flow pathways at the Site and the surrounding areas. Based on the results of GRI's report an 18-inch diameter sewer drain is passing through the eastbound lane of Dublin Boulevard immediately adjacent to the Site. The top of the 18-inch diameter sewer line is approximately 16 feet bgs. Per GRI, a 12-inch diameter water main is passing through the westbound lane of Dublin Boulevard across from the Site. The top of the 12-inch diameter water main is approximately 7 feet and 4-inches bgs.

Based on the ACDEH's request, the accuracy of the conduit study results performed by GRI will be verified and updated in order to evaluate the preferential flow pathways at the Site. In addition, a sensitive receptors survey will be conducted. The preferential flow pathways include storm drains, sewer lines and other utility lines and corridors. The sensitive receptors includes domestic, irrigation, industrial, public and drinking water wells as wells as rivers, creeks, lakes, bays, estuaries, homes, schools, day care centers and hospitals within a 2,000-foot radius of the Site. The results of the conduit study and sensitive receptor survey along with available soil and groundwater data will be used to evaluate the Site's conceptual model. However, as data indicate groundwater beneath the Site occurs at about 10 to 11 feet below the grade, therefore, the sewer lines, which are located below the watertable, could potentially act as preferential flow pathways. The accuracy of data and possibility of such a phenomenon will be verified in conducting this task.

The Site's conceptual model synthesizes Site characterization data (geology, hydrogeology, contaminant distribution, migration pathways and potential human receptors) to provide a framework for selecting pathways for quantitative analysis in conducting risk-based corrective action for evaluation of the Site's regulatory status.

2.2 Contaminant Plume Definition in Soil and Groundwater

Historical groundwater data has indicated elevated levels of petroleum hydrocarbons and its constituents in the groundwater beneath the Site. The maximum concentrations of contaminants have been reported in MW-3. The maximum reported concentrations of MtBE, benzene, toluene, ethylbenzene and xylenes (BTEX) and total petroleum hydrocarbons as gasoline (TPH-g) were 162,000, 4,810, 11,400, 2,800, 18,000 and 110,000 µg/L, respectively. MW-3 is a 2-inch diameter monitoring well with a total depth of 24 feet and located at the northern boundary of the Site next to the Dublin Boulevard. Historically, free phase petroleum product has been reported in MW-3. MW-3 has been completed within thick clayey sediments whose screen interval extends from 5 to 24 feet bgs.

Historically, elevated levels of chemicals especially MtBE were also reported in MW-1 and MW-2 at 5,200 and 3,100 µg/L, respectively. MW-1 and MW-2 are also 2-inch diameter wells whose screen intervals are from 5 feet bgs to 24 feet bgs, respectively.

The results of the laboratory analyses on groundwater samples collected from the downgradient monitoring wells EA-1 through EA-3 do not suggest the presence of elevated levels of MtBE and other contaminants. However, reviewing the lithologic logs of EA-1 through EA-3 indicate that these are deeper than the upgradient monitoring wells (MW-1 through MW-5) and their screen intervals are much longer than the upgradient wells. The screened interval of EA-1 and EA-2 are from 10 to 40 feet bgs and the screen interval of EA-3 is from

5 feet to 35 feet bgs. This makes the data interpretation somewhat difficult since the depth and the screen interval of the upgradient and downgradient wells are not identical.

In light of the current information it appears that the vertical and horizontal extent of MtBE and other petroleum chemicals have not been identified. In order to better understand the Site's geology and evaluate the actual thickness of the water-bearing zone(s), initially, SOMA proposes to drill a cone penetrometer test (CPT) hole at the Site. CPT is a process whereby subsurface soil characteristics are determined when a cone penetrometer attached to a data acquisition system is pushed into the subsurface using a hydraulic ram. The CPT provides a rapid, reliable and economical means of determining soil stratigraphy, relative density, strength and hydrogeologic information. Using direct push methodology, CPT does not generate soil cuttings, thus eliminating the need for special handling and costly disposal.

In order to calibrate the CPT readings, SOMA proposes to drill a stratigraphy borehole using a hollow stemmed auger adjacent to the CPT hole. The auger hole will be continuously logged throughout the entire depth of the hole by SOMA's geologist and compared with the CPT readings for calibration purposes. The geological information gathered in conducting this task will be used for identification of different water-bearing zones and aquitards as well as different lenses of clay layers beneath the Site at the locations of the other CPTs. Figure 3 shows the location of the proposed CPT and exploratory borehole.

After evaluation of the Site's geology using the exploratory boring and correlating the CPT data with actual boring logs, additional CPTs will be installed within the chemical plume area in order to evaluate the vertical and horizontal extent of the groundwater contamination. As such, specially designated probes and samplers will be deployed by the CPT rig to obtain soil and groundwater samples at desired depths beneath the Site. Soil and groundwater samples will be collected at 5-foot intervals. Based on our conversation with David Fisch of Fisch Environmental in order to avoid cross contamination when advancing the CPT probe through multiple water-bearing zones, the groundwater sampling chamber will be over-purged and the entire probe will be retrieved and the sampling chamber and screen will be decontaminated. In addition, the connections and fittings will be sealed with Teflon tape to exclude external influences.

In general, soil and groundwater samples will be collected at 5-foot internals. However, SOMA's field crew will attempt to collect soil and groundwater samples at interface between the vadose zone and saturated zones or wherever the lithology changes in order to evaluate the vertical extent of contaminants along the entire borehole. The actual depth of the CPT hole will be determined in the field after reviewing the mobile laboratory test results on soil and groundwater samples. If the results of two consecutive samples do not indicate the presence of petroleum hydrocarbons, the drilling operation will be terminated. Figure 3 shows the location of the proposed CPTs. Since a mobile laboratory will be used, soil samples will be collected in the conventional way instead of using EPA 5035 protocol.

To evaluate the horizontal extent of soil contamination additional shallow soil borings may be required. As such, SOMA is planning to drill 6 additional shallow soil borings in the vicinity of the former damaged flex line area where the spill occurred. Figure 3 shows the location of the proposed shallow soil borings. The data from these borings will help delineate the extent of soil contamination. If the results of the further evaluation indicate that the soil excavation is an effective alternative, the data generated during this investigation will help remove fuel-impacted soils within the chemical source areas.

All sampling equipment will be cleaned with a tri-sodium phosphate solution and double rinsed with clean water between samplings. All sampling equipment and augers will be steam cleaned between borings. All rinsed water and soil cuttings will be stored on-site in 55-gallon hazardous waste drums pending the analytical results for disposal.

To expedite the soil and groundwater investigation, Severn Trent Laboratory (STL) of Pleasanton, California, a state certified laboratory will be retained to conduct on-site laboratory analysis of the soil and groundwater samples. STL is capable of analyzing 15-16 soil and groundwater samples per day. Each soil and groundwater sample will be analyzed for TPH-g, BTEX, and fuel additives, such as oxygenates and HVOCs lead scavengers including:

1. MtBE;
2. tertiary amyl methyl ether (TAME);
3. ethyl tertiary butyl ether (ETBE)
4. diisopropyl ether (DIPE)
5. tertiary butyl alcohol (TBA);
6. ethanol;
7. methanol;
8. 1,2-dichloroethane (1,2-DCA); and
9. dibromomethane;

using EPA Method 8260.

TPH-g will be measured using EPA Method 5030/GCFID. EPA Method 8260 will be used to measure BTEX.

The data generated during the soil and groundwater investigation (SWI) will be used to plot three-dimensional plots and assess the total mass of petroleum hydrocarbons in the soil and groundwater.

2.3 Interim Soil and Groundwater Remediation

If the results of the SWI suggest the presence of ongoing source(s) that are continuing to add mass to the existing plume, they will be removed. The removal process may include excavation and off-site transport of contaminated soils, piping or any other remaining sources. The removal process may also include operation of the existing SVE system, testing and repairing of the system if necessary.

If the results of the SWI suggest the presence of floating product at the top of the watertable, a new groundwater well will be drilled and a product skimmer canister will be installed to remove the free product from groundwater before formulating and evaluating a corrective action plan (CAP).

2.3.1 Status of Existing Soil Vapor Extraction System

The existing vapor extraction system is composed of three horizontal wells. The first horizontal well is located at the northwest end of the pump islands. The second well is located east side of the pump island, while the third horizontal well is located along the north, east and south perimeter of the tank field. The horizontal wells are presumably buried between 3 and 4 feet below surface grade inside piping trenches. In addition, there are three recovery wells namely VW-1 through VW-3, which are used to monitor the radius of influence only, and they were never directly connected to the system. The existing system was designed to remove absorbed phase hydrocarbons within the vadose zone in the vicinity of the pump islands. The current system is not designed to remediate groundwater and would not effectively remove dissolved MtBE from the groundwater.

Based on the ACHEH's request, on January 29, 2002, the SVE system was turned on and two soil gas samples were collected. The soil gas samples were analyzed for BTEX, TPH-g and MtBE. The results of the laboratory analyses showed that only one of the samples contained 0.66 micro gram per liter of benzene. The other sample did not contain the hydrocarbons and MtBE concentrations above the laboratory detection limits. Appendix A includes the laboratory results and chain of custody form.

Based on the fact that depth to groundwater is about 10 feet bgs and the burial depth of the horizontal wells is about 3 to 4 feet bgs and the results of the latest investigation did not indicate the presence of hydrocarbons and MtBE in the soil gas, operation of the SVE system does not seem to be effective in the remediation and removal of MtBE from the groundwater.

2.4 Mitigation Control

The purpose of mitigation control is to intercept the contaminant plumes and preventing them from further migrating to off-site receptors. SOMA is planning to conduct a groundwater pumping/slug test and groundwater flow and chemical transport modeling to design a groundwater extraction system that would effectively remove the contaminant plume from the groundwater and prevent it from further migration.

2.4.1 Perform Aquifer Hydraulic Testing

To evaluate hydraulic conductivity of the saturated sediments, aquifer hydraulic testing will be conducted on on- and off-site monitoring wells. Due to the fine-grained nature of saturated sediments, the existing groundwater monitoring wells cannot be used for conducting conventional groundwater pumping tests. The existing wells will go dry upon pumping, therefore a long term pumping test cannot be performed. As a result, SOMA is planning to perform slug tests on all groundwater monitoring wells. Falling head or rising head tests will be performed on these wells and the results will be analyzed using an in-house computer software called "SLUG". This software is SOMA's proprietary software, which has been developed to evaluate the results of slug test analysis using Hvorslev, Jacob Cooper & Bredehoeft, Ferris and Knowles and Bouwer Methods.

2.4.2 Conduct Groundwater Flow and Chemical Transport Modeling

SOMA will compile groundwater monitoring data, hydraulic conductivity and site characterization data to conduct groundwater flow and chemical transport modeling. The purpose of the groundwater flow modeling and chemical transport assessment is to assess plume stability under a no-action scenario and to evaluate the effectiveness of different remedial alternatives. The groundwater flow modeling also may assess to design a groundwater extraction system to remove fuel-impacted groundwater if warranted. The results of this groundwater study may also help evaluate the capture zone and simulated flow rates out of the groundwater extraction system if the pump-and-treat becomes an attractive remedial alternative. Evaluation of the groundwater extraction rate is an important parameter in selecting an effective groundwater treatment technology for removing chemicals from impacted groundwater. This information is essential in the evaluation and preparation of a CAP, which will be discussed later.

SOMA proposes utilizing the combination of the U.S. Geological Survey Modular 3-Dimensional Groundwater Flow Model (MODFLOW) and the 3-D Modular Transport (MT-3D) model of Zhang (1998) for conducting groundwater flow and chemical transport modeling. SOMA will calibrate MODFLOW using site-specific data to design a groundwater extraction system.

2.4.3 Conduct Risk-Based Corrective Action Plan (RBCA)

The State Water Control Board's supplemental instructions dated December 8, 1995 entitled "Interim Guidance on Required Cleanup at Low Risk Fuel Site" will be followed to define the Site's regulatory status in connection with the soil and groundwater contamination. Based on the interim guidance document, in order to define the Site's regulatory status the following items will be considered using the existing soil and groundwater data:

1. The leak has been stopped and on-going source(s) including free-product, have been removed or remediated to the extent practicable;
2. The Site has been adequately characterized;
3. Status of the dissolved hydrocarbon plumes; are they expanding or shrinking?;
4. No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted;
5. The Site presents no significant risks to human health; and finally
6. The Site presents no significant risk to the environment.

The result of the SWI will reveal if the source of the contamination still exists. Historically, MW-3 has shown the presence of floating product. During the SWI, it will be furthered determined whether or not the free phase petroleum product still exists beneath the Site. In the event the free product still exists, it will be removed using a product removal canister.

By implementation of the SWI, the Site would be adequately characterized as stated in item #2, see Section 2.2.

SOMA will conduct a 2,000-foot radius search to locate sensitive receptors such as water wells, and surface water bodies. The results of such an evaluation will be incorporated into a RBCA study.

To evaluate the impact of the Site related chemicals on on- and off-site workers, SOMA proposes to use the ASTM-RBCA approach. The results of a RBCA study will reveal the impact of Site related chemicals on current Site workers and nearby workers and determine risk-based cleanup levels of soil and groundwater, which will be protective of human health and the environment.

Finally, by taking the above-mentioned steps, SOMA will determine whether or not the Site can be categorized as a "High Risk Soil/Groundwater Site" based on the State Water Board Interim Guidance Document. Such an evaluation will necessitate and justify the need for soil and groundwater remediation in on- and off-site areas.

SOMA will utilize the U.S. Geological Survey Modular Three-Dimensional Groundwater Flow Model (MODFLOW) developed in 1998 in combination with Modular Three Dimensional Transport Model (MT-3D) developed in 1998 in conducting the modeling. To conduct groundwater flow modeling SOMA is planning to conduct a pumping test or at least a series of slug tests to evaluate the hydraulic conductivity of the saturated sediments. The results of the pumping tests will be incorporated in the groundwater flow model to evaluate the expected flow rate and simulated capture zone of the groundwater extraction system. The simulated flow rate will be used in conducting a CAP for the selection of the most effective, feasible and least costly alternative for groundwater remediation.

2.5 Corrective Action Plan

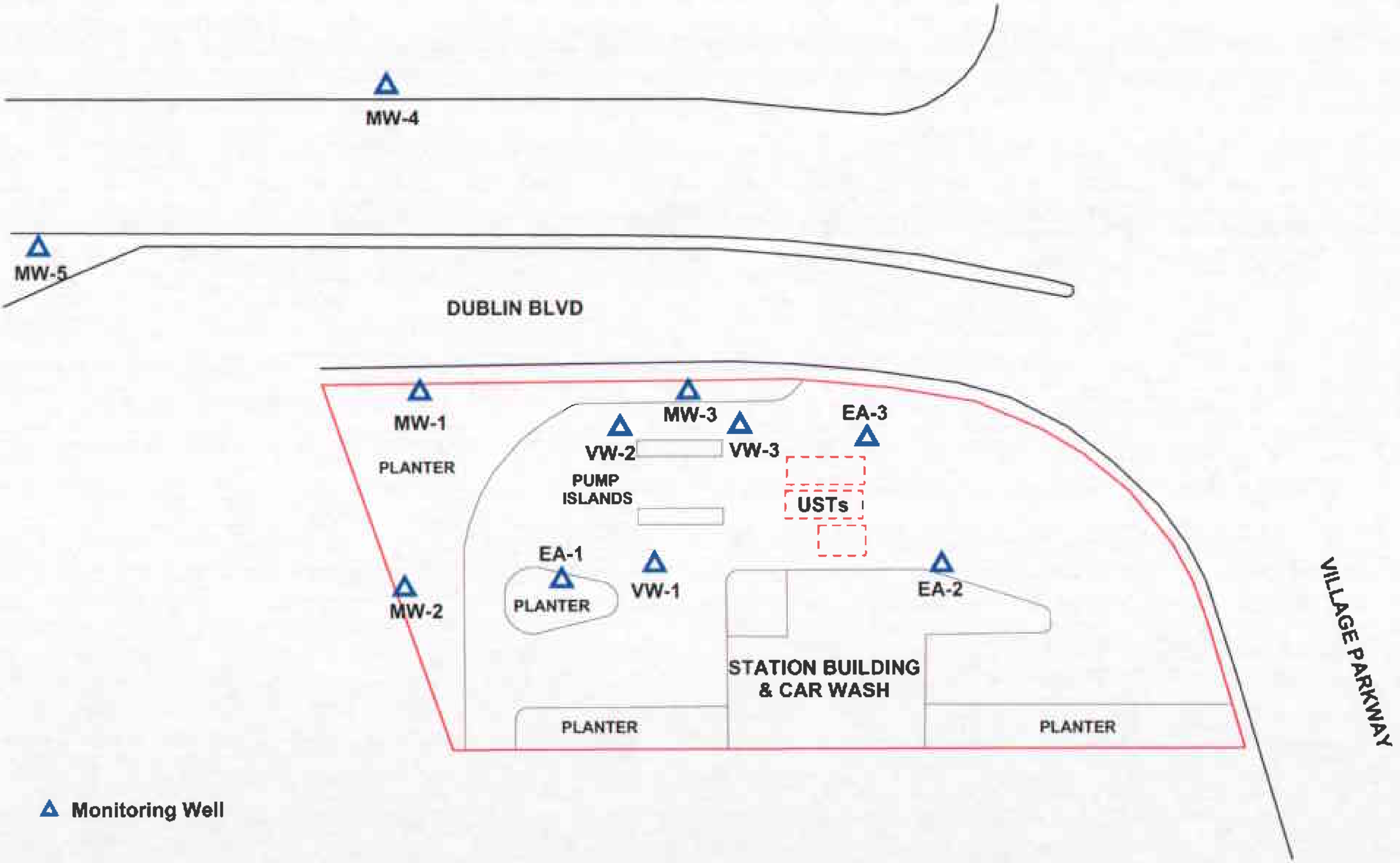
If the results of our evaluation require us to categorize the Site as a High Risk Soil/Groundwater site, then site remediation will become necessary. As such, SOMA will prepare a CAP and submit it to the ACDEH for regulatory review/approval. The CAP will compare different remedial alternatives in terms of their effectiveness, implementability and cost. As a result, the most feasible, effective and at the same time less costly alternative will be selected for the soil/groundwater remediation in on- and off-site areas for the protection of human health and the environment.

2.6 Report Preparation

A technical report will be prepared to document the soil and groundwater conditions and the extent of petroleum chemical contamination in on- and off-site areas. The technical report will include figures, tables and a detailed description of field investigation procedures and the results of soil and groundwater evaluations, as well as our recommendations for remediation purposes, if warranted.

FIGURES

Figure 1: Site vicinity map.

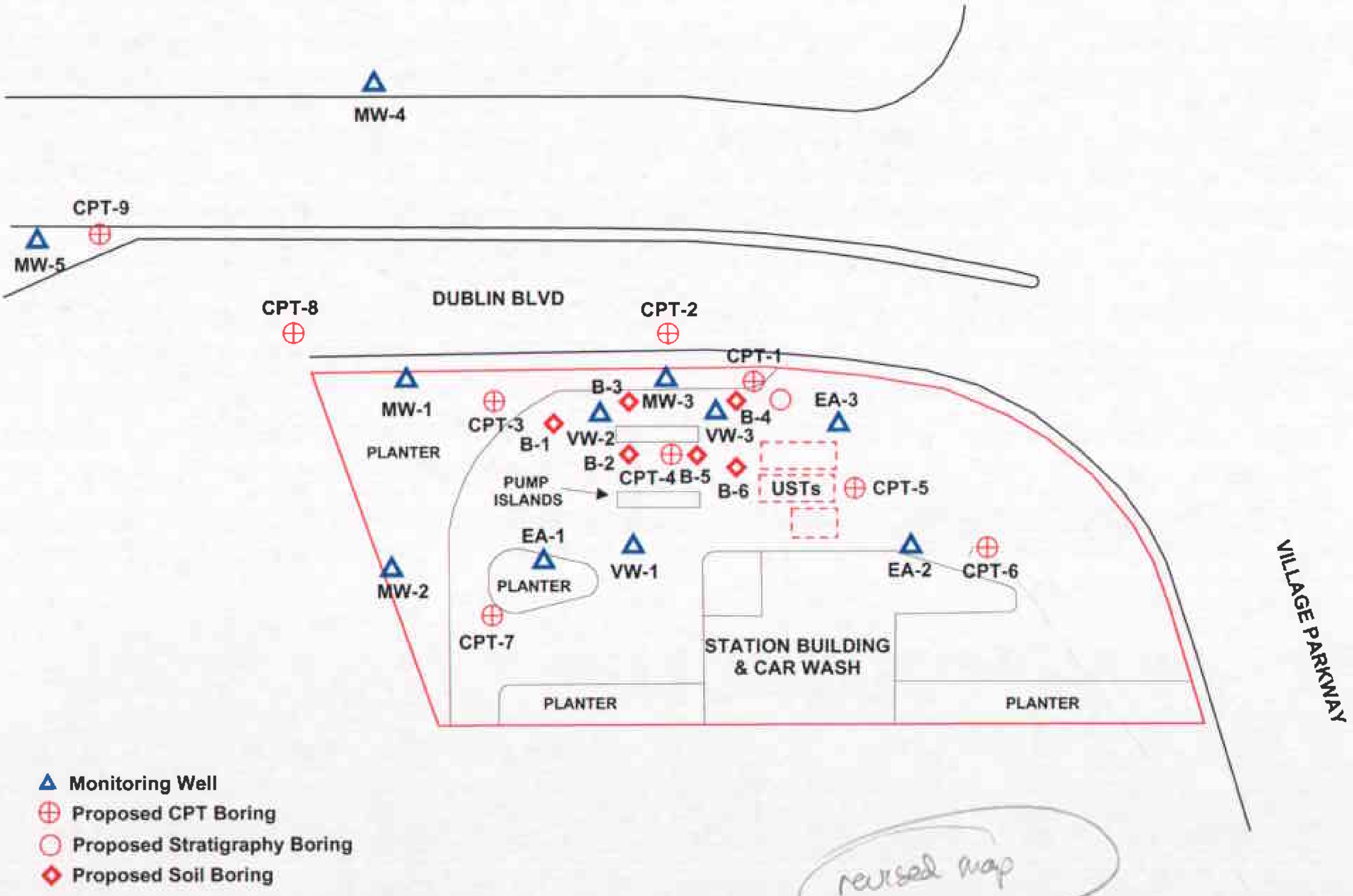


approximate scale in feet

0 25 50

Figure 2: Site map showing location of existing monitoring wells.

SOMA ENVIRONMENTAL ENGINEERING, INC.



revised map

approximate scale in feet

0 25 50

Figure 3: Proposed Location of CPTs and Soil Borings.

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Appendix A

Laboratory Report and Chain of Custody Form

Submission #: 2002-01-0477

Date: February 14, 2002

SEVERN
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STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com
CA DHS ELAP#1094

RECEIVED FEB 2 2 2002

Decon Env. Services, Inc.
23490 Connecticut Street.
Hayward, CA 94545

Attn: Mr. Jason Gulbransen

Project: 3855
Dublin Beacon

Dear, Jason

Attached is our report for your samples received on Tuesday January 29, 2002
This report has been reviewed and approved for release. Reproduction of this report is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after March 15, 2002 unless you have requested otherwise.
We appreciate the opportunity to be of service to you. If you have any questions, please call me at (925) 484-1919.
You can also contact me via email. My email address is: vvancil@chromalab.com

Sincerely,

Vincent Vancil
Project Manager

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CA DHS ELAP#1094

Submission #: 2002-01-0477

Gas/BTEX Compounds by 8015M/8021

Decon Env. Services, Inc.

Attn: Jason Gulbransen

3855

☒ 23490 Connecticut Street.
Hayward, CA 94545

Phone: (510) 732-6444 Fax: (510) 782-8584

Project: Dublin Beacon

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
I-1A	Air	01/29/2002 14:05	1
E-2A	Air	01/29/2002 14:20	2

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Submission #: 2002-01-0477

Gas/BTEX Compounds by 8015M/8021

Decon Env. Services, Inc.

Attn: Jason Gulbransen

Test Method: 8021B
8015M

Prep Method: 5030

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1220 Quarry Lane
Pleasanton, CA 94566

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www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Sample ID: I-1A
Project: 3655
Dublin Beacon

Sampled: 01/29/2002 14:06
Matrix: Air

Lab Sample ID: 2002-01-0477-001
Received: 01/29/2002 15:15

Extracted: 01/30/2002 22:19
QC-Batch: 2002/01/30-01.02

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	50	ug/L	1.00	01/30/2002 22:19	
Benzene	0.86	0.50	ug/L	1.00	01/30/2002 22:19	
Toluene	ND	0.50	ug/L	1.00	01/30/2002 22:19	
Ethyl benzene	ND	0.50	ug/L	1.00	01/30/2002 22:19	
Xylene(s)	ND	0.50	ug/L	1.00	01/30/2002 22:19	
MTBE	ND	5.0	ug/L	1.00	01/30/2002 22:19	
Surrogate(s)						
Trifluorotoluene	69.3	58-124	%	1.00	01/30/2002 22:19	
4-Bromofluorobenzene-FID	73.2	50-150	%	1.00	01/30/2002 22:19	

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Submission #: 2002-01-0477

Gas/BTEX Compounds by 8015M/8021

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www.chromalab.com

CA DHS ELAP#1094

Decon Env. Services, Inc.

Attn: Jason Gulbransen

Test Method: 8021B
8015M

Prep Method: 5030

Sample ID: E-2A
Project: 3665
Dublin Beacon

Sampled: 01/29/2002 14:20
Matrix: Air

Lab Sample ID: 2002-01-0477-002
Received: 01/29/2002 15:15

Extracted: 01/30/2002 12:57
QC-Batch: 2002/01/30-01.02

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Gasoline	ND	50	ug/L	1.00	01/30/2002 12:57	
Benzene	ND	0.50	ug/L	1.00	01/30/2002 12:57	
Toluene	ND	0.50	ug/L	1.00	01/30/2002 12:57	
Ethyl benzene	ND	0.50	ug/L	1.00	01/30/2002 12:57	
Xylene(s)	ND	0.50	ug/L	1.00	01/30/2002 12:57	
MTBE	ND	5.0	ug/L	1.00	01/30/2002 12:57	
Surrogate(s)						
Trifluorotoluene	87.8	58-124	%	1.00	01/30/2002 12:57	
4-Bromofluorobenzene-FID	89.1	50-150	%	1.00	01/30/2002 12:57	

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CA DHS ELAP#1094

Submission #: 2002-01-0477

Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8015M
8021B

Prep Method: 5030

Method Blank **Water** **QC Batch # 2002/01/30-01.02**

MB: 2002/01/30-01.02-003

Date Extracted: 01/30/2002 08:14

Compound	Result	Rep.Limit	Unit	Analyzed	Flag
Gasoline	ND	50	ug/L	01/30/2002 08:14	
Benzene	ND	0.5	ug/L	01/30/2002 08:14	
Toluene	ND	0.5	ug/L	01/30/2002 08:14	
Ethyl benzene	ND	0.5	ug/L	01/30/2002 08:14	
Xylene(s)	ND	0.5	ug/L	01/30/2002 08:14	
MTBE	ND	5.0	ug/L	01/30/2002 08:14	
Surrogate(s)					
Trifluorotoluene	94.5	58-124	%	01/30/2002 08:14	
4-Bromofluorobenzene-FID	99.2	50-150	%	01/30/2002 08:14	

Submission #: 2002-01-0477

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www.chromalab.com

CA DHS ELAP#1094

Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8015M

Prep Method: 5030

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/01/30-01.02**

LCS: 2002/01/30-01.02-006 Extracted: 01/30/2002 09:50 Analyzed: 01/30/2002 09:50

LCSD: 2002/01/30-01.02-007 Extracted: 01/30/2002 10:21 Analyzed: 01/30/2002 10:21

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Gasoline	459	445	500	500	91.8	89.0	3.1	75-125	20		
Surrogate(s)											
4-Bromofluorobenzene	534	523	500	500	106.8	104.6		50-150			

Submission #: 2002-01-0477

SEVERN
TRENT
SERVICES

STL San Francisco
1220 Quarry Lane
Pleasanton, CA 94566

Tel 925 484 1919
Fax 925 484 1096
www.stl-inc.com
www.chromalab.com

CA DHS ELAP#1094

Gas/BTEX Compounds by 8015M/8021

Batch QC report

Test Method: 8021B

Prep Method: 5030

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2002/01/30-01.02**

LCS: 2002/01/30-01.02-004 Extracted: 01/30/2002 08:46 Analyzed: 01/30/2002 08:46

LCSD: 2002/01/30-01.02-005 Extracted: 01/30/2002 09:18 Analyzed: 01/30/2002 09:18

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery		RPD	Ctrl.Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recover	RPD	LCS	LCSD
Benzene	96.3	94.8	100.0	100.0	96.3	94.8	1.6	77-123	20		
Toluene	90.8	89.8	100.0	100.0	90.8	89.8	1.1	78-122	20		
Ethyl benzene	94.8	93.6	100.0	100.0	94.8	93.6	1.3	70-130	20		
Xylene(s)	278	277	300	300	92.7	92.3	0.4	75-125	20		
Surrogate(s)											
Trifluorotoluene	476	469	500	500	95.2	93.8		58-124			

Reference #: Job # 3555

2002-01-0477 64387

Chain of Custody

Decon Environmental Svcs.

DATE 1/29/02 PAGE 1 OF

PROJ. MGR J. Gulbransen
COMPANY Decon Env
ADDRESS 23490 Connecticut
Hayward Ca

SAMPLERS (SIGNATURE) Mudd
(PHONE NO.) 510 732 4444
(FAX NO.) 510 782 8584

ANALYSIS REPORT

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	TPH-(EPA 8015,8020) ☑ Gas w/ ☑ BTEX ☐ MTBE	PURGEABLE AROMATICS BTEX (EPA 8020)	TPH-Diesel (EPA 8015M)	TEPH (EPA 8015M) ☐ Diesel ☐ M.O. ☐ Other	PURGEABLE HALOCARBONS (HVOCs) (EPA 8010)	VOLATILE ORGANICS (VOCs) (EPA 8260)	SEMIVOLATILES (EPA 8270)	TOTAL OIL AND GREASE (SM 5520 B+F, E+F)		☐ PESTICIDES (EPA 8080) ☐ PCB's (EPA 8080)	PNA's by ☐ 8270 ☐ 8310	☐ Spec. Cond. ☐ TSS ☐ TDS	LUFT METALS: Cd, Cr, Pb, Ni, Zn	CAM 17 METALS (EPA 6010/7470/7471)	TOTAL LEAD	☐ W.E.T. (STLC) ☐ TCLP	☐ Hexavalent Chromium ☐ pH (24 hr hold time for H2O)				NUMBER OF CONTAINERS
2 1A	1/29/02	14:05			X																				
E 2A	1/29/02	14:20			X																				

RUSH

PROJECT INFORMATION

PROJECT NAME: Dublin Beacon
PROJECT NUMBER 3555
P.O. #

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS	2
HEAD SPACE	
TEMPERATURE 17.4°C	
CONFORMS TO RECORD	

TAT: STANDARD 5-DAY / 24 / [✓ 48] / 72 / OTHER

SPECIAL INSTRUCTIONS/COMMENTS:
Report: ☑ Routine ☐ Level 2 ☐ Level 3 ☐ Level 4 ☐ Electronic Report

RELINQUISHED BY 1.
Scott Mudd
(SIGNATURE) (TIME) 15:15
Scott Mudd
(PRINTED NAME) (DATE) 1/29/02
Decon Env
(COMPANY)

RELINQUISHED BY 2.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RELINQUISHED BY 3.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY 1.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY 2.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

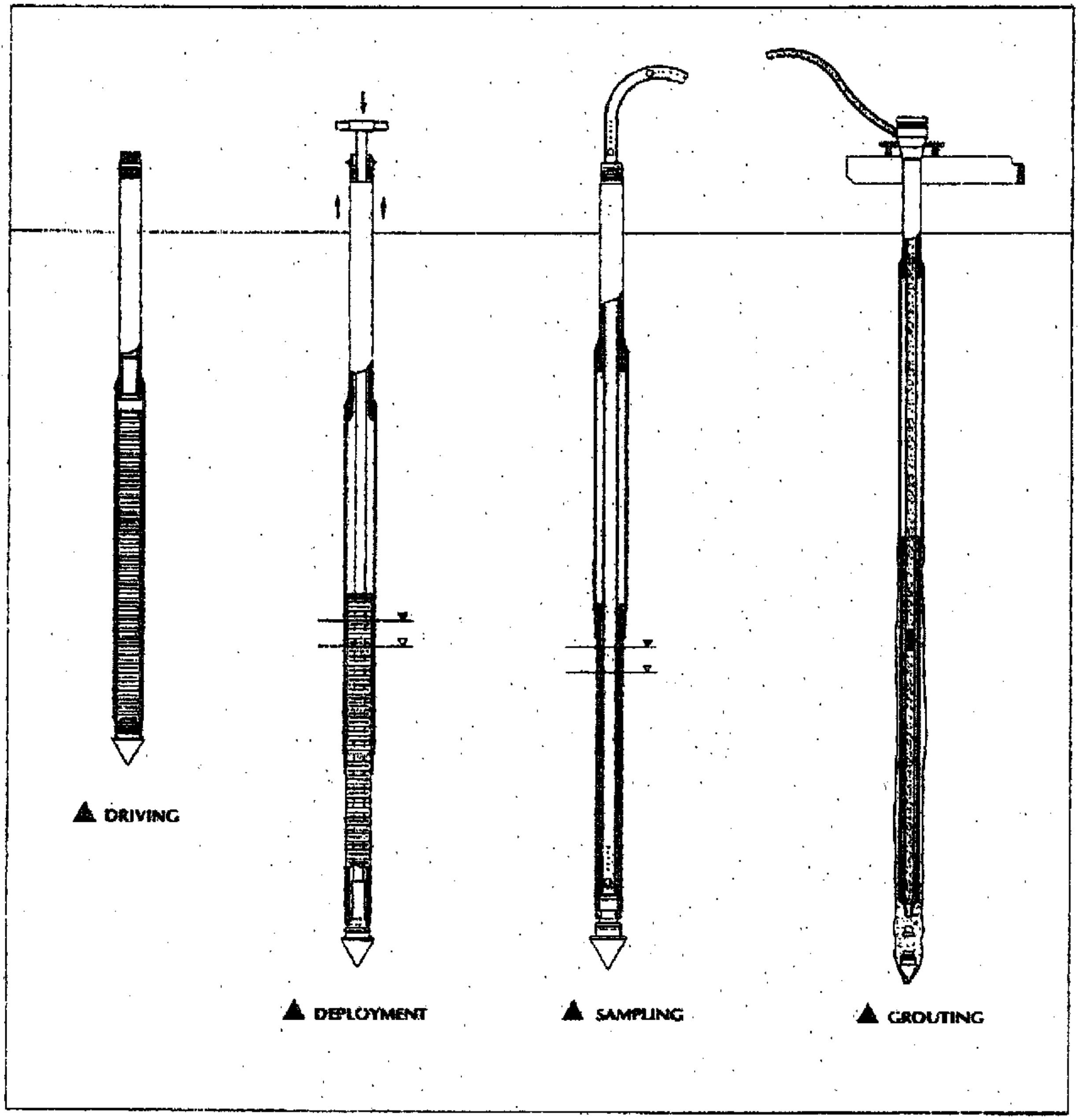
RECEIVED BY (LABORATORY) 3.
N. Khan 15:15
(SIGNATURE) (TIME)
N. Khammanivong 1/29/02
(PRINTED NAME) (DATE)
STL SF
(LAB)

GEOPROBE SCREEN POINT 15 GROUNDWATER SAMPLER

STANDARD OPERATING PROCEDURE

Technical Bulletin No. 95-1500

PREPARED: October, 1995



GEOPROBE SCREEN POINT 15 GROUNDWATER SAMPLER

1.0 OBJECTIVE

The objective of this procedure is to drive a sealed stainless steel or PVC screen to depth, deploy the screen, obtain a representative water sample from the screen interval, and grout the probe hole during abandonment. The Screen Point 15 Groundwater Sampler enables the operator to conduct abandonment grouting that meets American Society for Testing and Materials (ASTM) Method D 5299-92 requirements for decommissioning wells and borings for environmental activities (ASTM 1993).

2.0 BACKGROUND

2.1 Definitions

Geoprobe*: A vehicle-mounted, hydraulically-powered, soil probing machine that utilizes static force and percussion to advance small diameter sampling tools into the subsurface for collecting soil core, soil gas, or groundwater samples.
** Geoprobe is a registered trademark of Kejr Engineering, Inc., Salina, Kansas.*

Screen Point 15 Groundwater Sampler: The assembled Screen Point 15 Sampler (GW-1500K) is 1.5 inches (38 mm) O.D. (outside diameter) x 52 inches (1321 mm) overall length. A stainless steel or PVC screen with an exposed screen length of 41 inches (1041 mm) is utilized.

Casing Puller: An assembly which makes it possible to retract the sampler string with extension rods protruding from the top of the probe rods. The casing puller for units originally equipped with the GH-40 hammer consists of the following:

PART NAME/NUMBER	QUANTITY
Casing Pull Bracket Assembly (GW-3337)	(1)
Casing Pull Plate Assembly (GW-468)	(1)
Casing Pull Anchor Assembly (GW-3286)	(1)
Bolt, HHCS 1/2"-13 x 2" GR 5 PLTD	(2)
Lock Washer, 1/2" PLTD	(2)

These items may be obtained separately or as a Casing Pull Kit (GW-4600K).

Units originally equipped with the SK-58 hammer or retrofitted with the GH-40 hammer require a different casing puller kit. Contact Geoprobe Systems for specific information.

2.2 Discussion

In this procedure, the assembled Screen Point 15 Groundwater Sampler (Fig. 2.1A) is threaded onto the leading end of a Geoprobe probe rod and driven into the subsurface with a Geoprobe machine. Additional probe rods are subsequently added and driven until the desired sampling interval is reached. While the sampler is driven to depth, O-ring seals at the drive head and expendable drive point provide a watertight system. This system eliminates the threat of formation fluids entering the screen before deployment and assures sample integrity.

Once at the desired sampling interval, extension rods are sent downhole until the leading rod contacts the bottom of the sampler screen. The tool string is then retracted approximately 44 inches (1118 mm) while the screen is held in place with the extension rods (Fig. 2.1B). As the tool string is retracted, the expendable point is released from the sampler sheath. An O-ring on the screen head maintains the seal at the top of the screen. As a result, any liquid entering the sampler during screen deployment must first pass through the screen. The tool string and sheath may be retracted the full length of the screen or as little as a few inches if a small sampling interval is desired.

The Screen Point 15 Sampler utilizes a screen with a standard slot size of 0.004 inches (0.1 mm) and an exposed length of 41 inches (1041 mm). Alternate slot sizes and lengths may be custom ordered. Contact Geoprobe Systems for available options. The screen is constructed such that a check valve or mini-bailer can be inserted into the screen cavity. This makes direct sampling possible from anywhere within the saturated zone. A removable plug in the lower end of the screen allows the user to grout as the sampler is extracted for further use.

Groundwater samples can be obtained in a number of ways. The most common method utilizes polyethylene or Teflon® tubing and a Tubing Bottom Check Valve (GW-42). The check valve (with check ball) is attached to one end of the tubing and inserted down the casing until it is immersed in groundwater. Water is pumped through the tubing and to the ground surface by oscillating the tubing up and down. Another means of collecting groundwater samples is to attach a peristaltic or vacuum pump to the tubing. This method is limited in that water can be pumped to the surface from a maximum depth of approximately 26 feet (8 m). A final technique for groundwater sampling is to use a stainless steel Mini-Bailer Assembly (GW-41). The mini-bailer is lowered down the inside of the casing below the water level where it fills with water and is then retrieved from the casing.

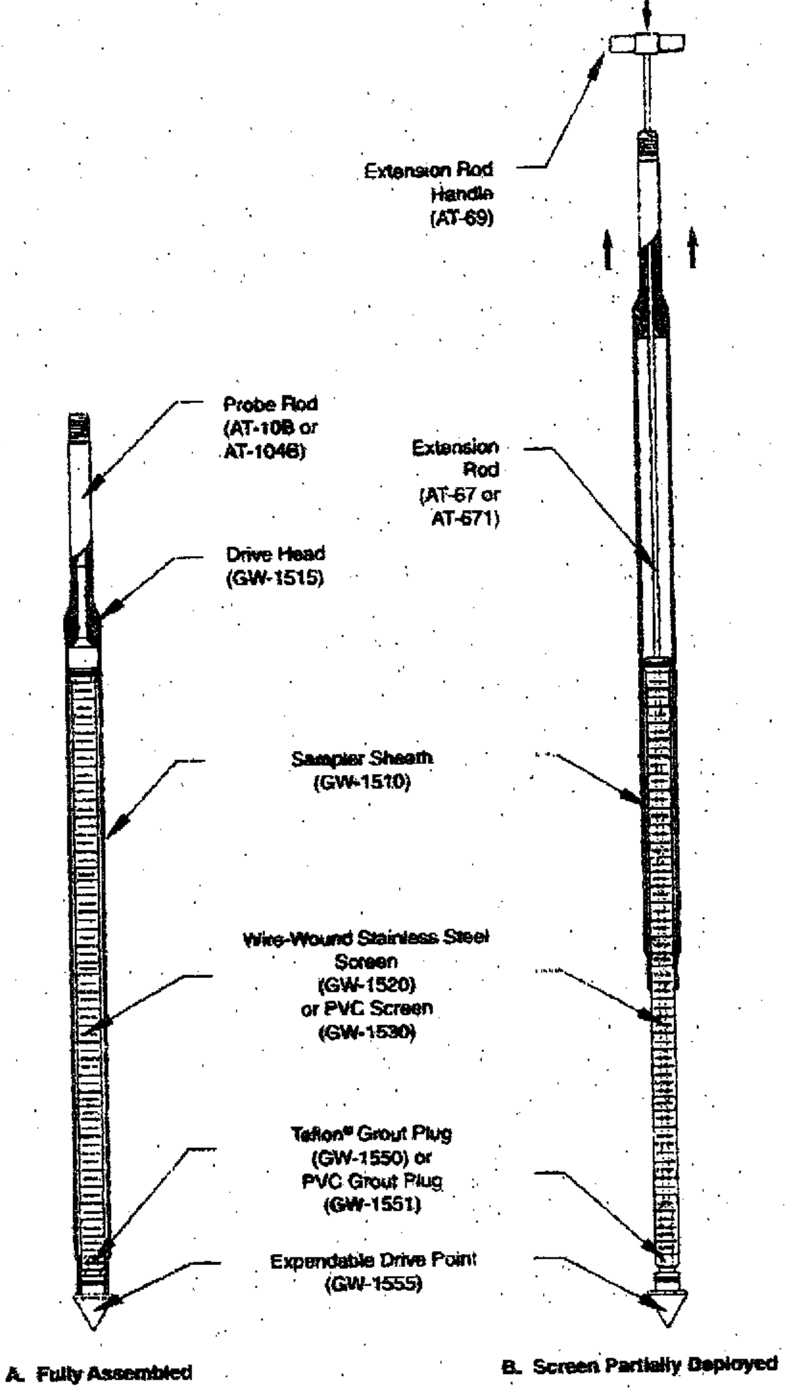


FIGURE 2.1
Screen Point 15 Groundwater Sampler

3.0 REQUIRED EQUIPMENT

The following equipment is required to successfully recover representative groundwater samples with the Geoprobe Screen Point 15 Groundwater Sampler and probing system. See Figure 3.1 for Screen Point 15 parts identification.

Screen Point 15 Groundwater Sampler Parts	Quantity	Part Number
O-ring Service Kit (contains 100 of each O-ring required)	-1-	GW-1504K*
Sampler Sheath	-1-	GW-1510*
Drive Head	-1-	GW-1515*
Wire-Wound Stainless Steel Screen, 4-Slot	-1-	GW-1520*
PVC Screen (optional)	-1-	GW-1530
Screen Push Adapter	-1-	GW-1535*
Grout Plug Push Adapter	-1-	GW-1540*
Grout Plugs, Teflon® (Pkg. of 25 plugs)	-1-	GW-1550K
Grout Plugs, PVC (Pkg. of 25 plugs)	-1-	GW-1551K*
Expendable Drive Points (Pkg. of 25 points)	-1-	GW-1555K*
Grout Nozzle	-1-	GW-1545
Casing Puller Kit (for GH-40 hammer)	-1-	GW-4600K

O-ring Service Kit (contains 100 of each O-ring required)

*Denotes part is included in Screen Point 15 Groundwater Sampler Kit (GW-1500K).

Geoprobe Tools	Quantity	Part Number
Probe Rod (36")**	Variable	AT-10B
Probe Rod (48")**	Variable	AT-104B
Drive Cap	-1-	AT-11B
Pull Cap	-1-	AT-12B
Split Pull Cap (Optional)	-1-	AT-113
Extension Rod (36")**	Variable	AT-67
Extension Rod (48")**	Variable	AT-671
Extension Rod Coupler	Variable	AT-68
Extension Rod Handle	-1-	AT-69
Extension Rod Jig	-1-	AT-690
Quick Link Extension Rod Connectors (Optional)	Variable	AT-694K

**Either 36-inch or 48-inch probe rods and extension rods may be used. Both lengths are not required.

Additional Tools	Quantity
Locking Pliers	-1-
Pipe Wrenches	-2-

Note: Replacement parts may be obtained in various kits. Contact Geoprobe Systems for specific packages.

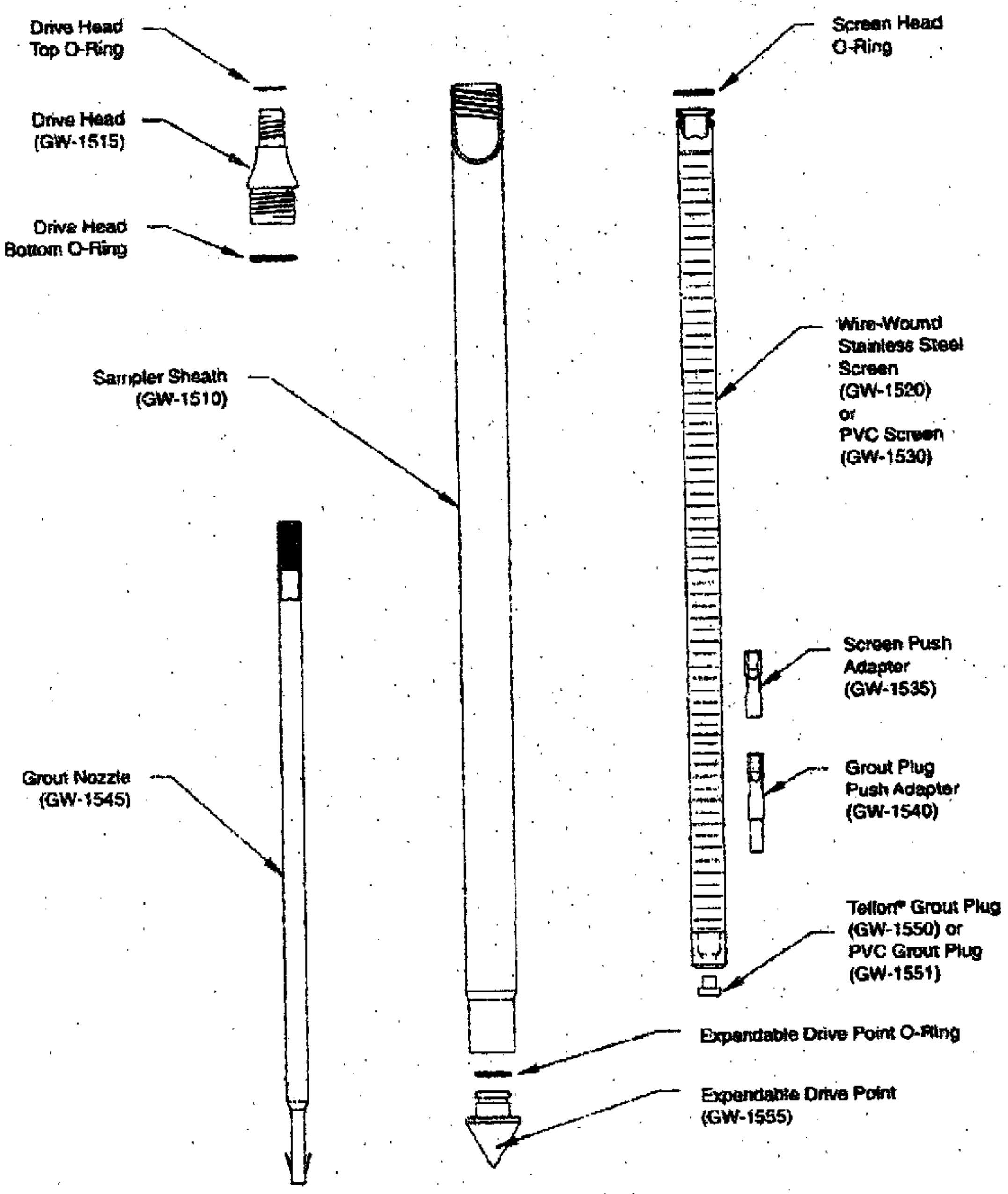


FIGURE 3.1
Screen Point 15 Groundwater Sampler Parts

4.0 OPERATION

4.1 Basic Operation

The Screen Point 15 Groundwater Sampler utilizes a stainless steel or PVC screen which is encased in an alloy steel sampler sheath. An expendable drive point is placed in the lower end of the sheath while a drive head is attached to the top. O-rings on the drive head and expendable point provide a watertight sheath which keeps contaminants out of the system as the sampler is driven to depth. Once the desired sampling interval is reached, extension rods equipped with a screen push adapter are inserted down the inside diameter of the probe rod string. The tool string is then retracted approximately 44 inches (1118 mm) while the screen is held in place with the extension rods. At this point the system is ready for groundwater sampling. When sampling is complete, a removable plug in the bottom of the screen allows for grouting below the sampler as the tool string is retrieved.

4.2 Decontamination

In order to collect representative groundwater samples, all Screen Point 15 parts must be thoroughly cleaned before and after each use. Scrub all metal parts using a stiff, long-bristle brush and a nonphosphate soap solution. Steam cleaning may be substituted for hand-washing if available. Rinse with distilled water and allow to air-dry before assembly.

4.3 Sampler Assembly (Fig. 4.1)

1. Install an O-ring on an expendable drive point (GW-1555). Firmly seat the expendable point in the necked end of a sampler sheath (GW-1510).

2. Place a grout plug (Teflon® GW-1550 or PVC GW-1551) in the lower end of a wire-wound stainless steel (GW-1520) or PVC screen (GW-1530). When using the stainless steel screen, install an O-ring in the groove on the upper end of the screen. Slide the screen inside of the sampler sheath with the grout plug toward the bottom of the sampler. Ensure that the expendable point was not displaced by the screen.

3. Install a bottom O-ring on a drive head (GW-1515). Thread the drive head onto the sampler sheath. Attach a drive cap (AT-11B) to the top of the drive head. The drive head and cap must only be hand tight. Tools are not required as long as the attachments completely thread together.

4. Sampler assembly is complete.

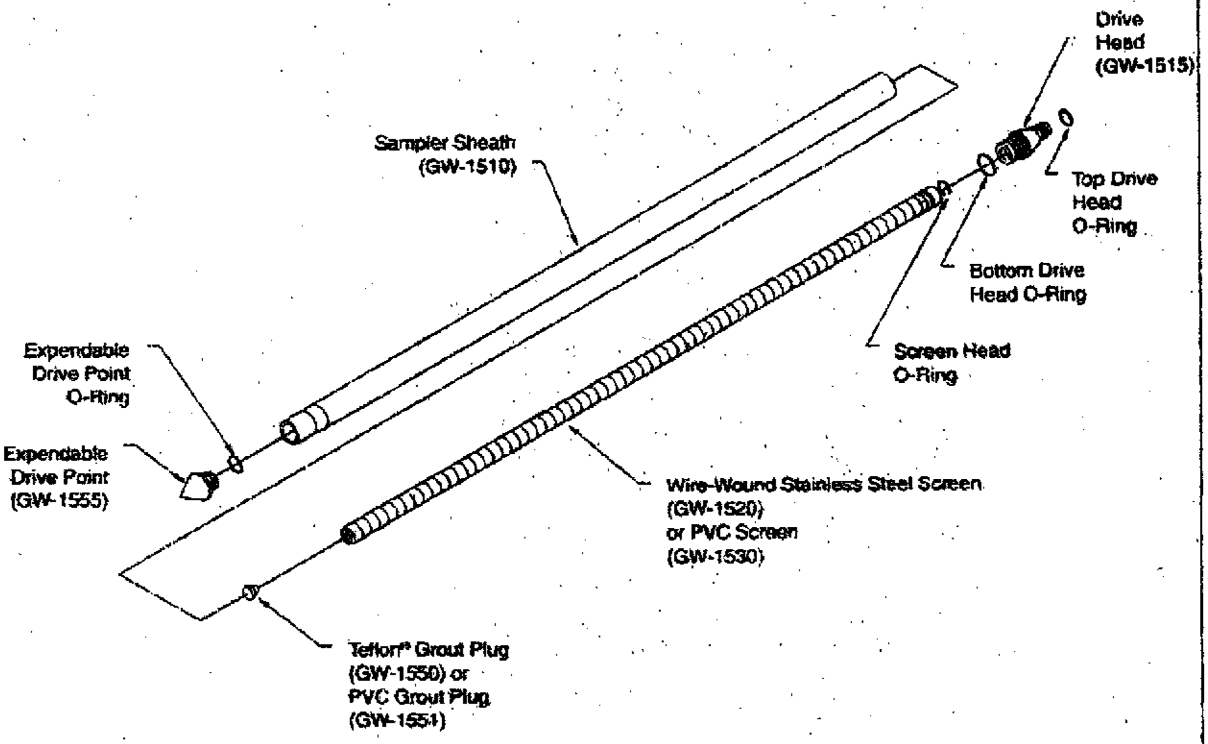


FIGURE 4.1
Screen Point 15 Groundwater Sampler Assembly

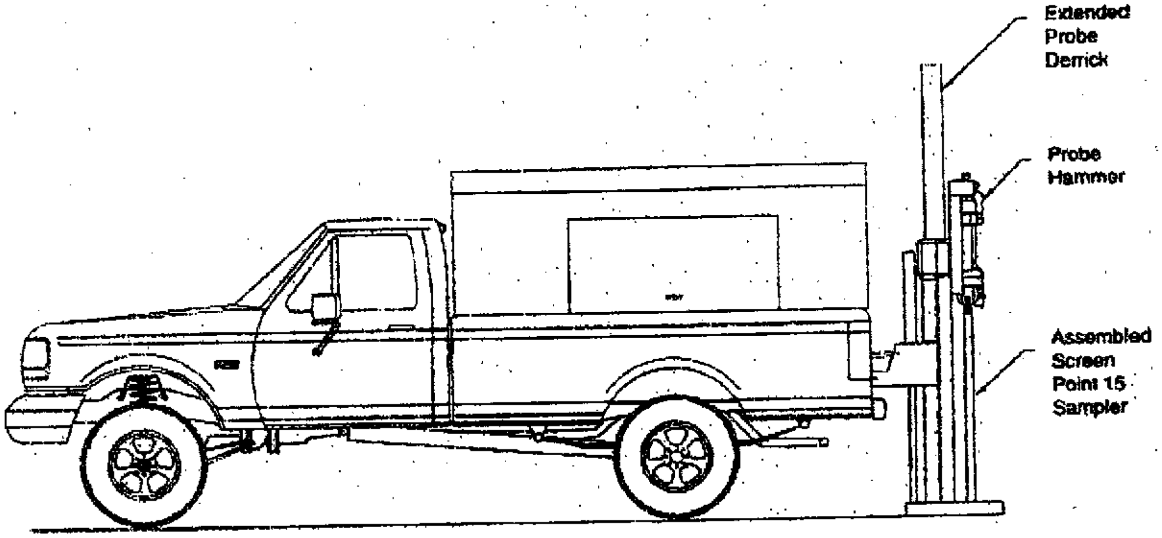


FIGURE 4.2
Screen Point 15 Groundwater Sampler in Driving Position

4.4 Driving the Screen Point 15 Sampler

To provide adequate room for screen deployment with the casing puller assembly, the probe derrick should be extended a little over halfway out of the carrier vehicle before driving the Screen Point 15 Sampler

1. Begin by placing the assembled sampler (Fig. 2.1) in the driving position beneath the hammer anvil on the extended probe derrick (Fig. 4.2).

2. Drive the sampler with throttle control at slow speed for the first 1 or 2 feet to ensure that the sampler is driving straight. Switch the throttle control to fast speed for the remainder of the probe stroke.

3. Completely raise the hammer assembly. Remove the drive cap and place an O-ring in the top groove of the drive head. Distilled water may be used to lubricate the O-ring if needed. Add a 36- or 48-inch (914 or 1219 mm) probe rod and reattach the drive cap to the rod string. Drive the sampler the entire length of the new rod with the throttle control at fast speed.

4. Repeat Step 3 until the desired sampling interval is reached. Approximately 12 inches (305 mm) of the last probe rod must extend above the ground surface to allow attachment of the puller assembly. A 12-inch (305 mm) rod may be added if the tool string is over-driven.

5. Remove the drive cap and retract the probe derrick away from the tool string.

4.5 Screen Deployment

1. Thread the screen push adapter (GW-1535, Fig. 4.3) on an extension rod (AT-67 or AT-671). Attach a coupler (AT-68) to the other end of the extension rod. Lower the extension rod inside of the probe rod taking care not to drop it down the tool string. An extension rod jig (Fig. 4.3) may be used to hold the rods.

2. Add extensions until the adapter contacts the bottom of the screen. To speed up this step, extension rod Quick Links (AT-694K, Fig. 4.3) are recommended.

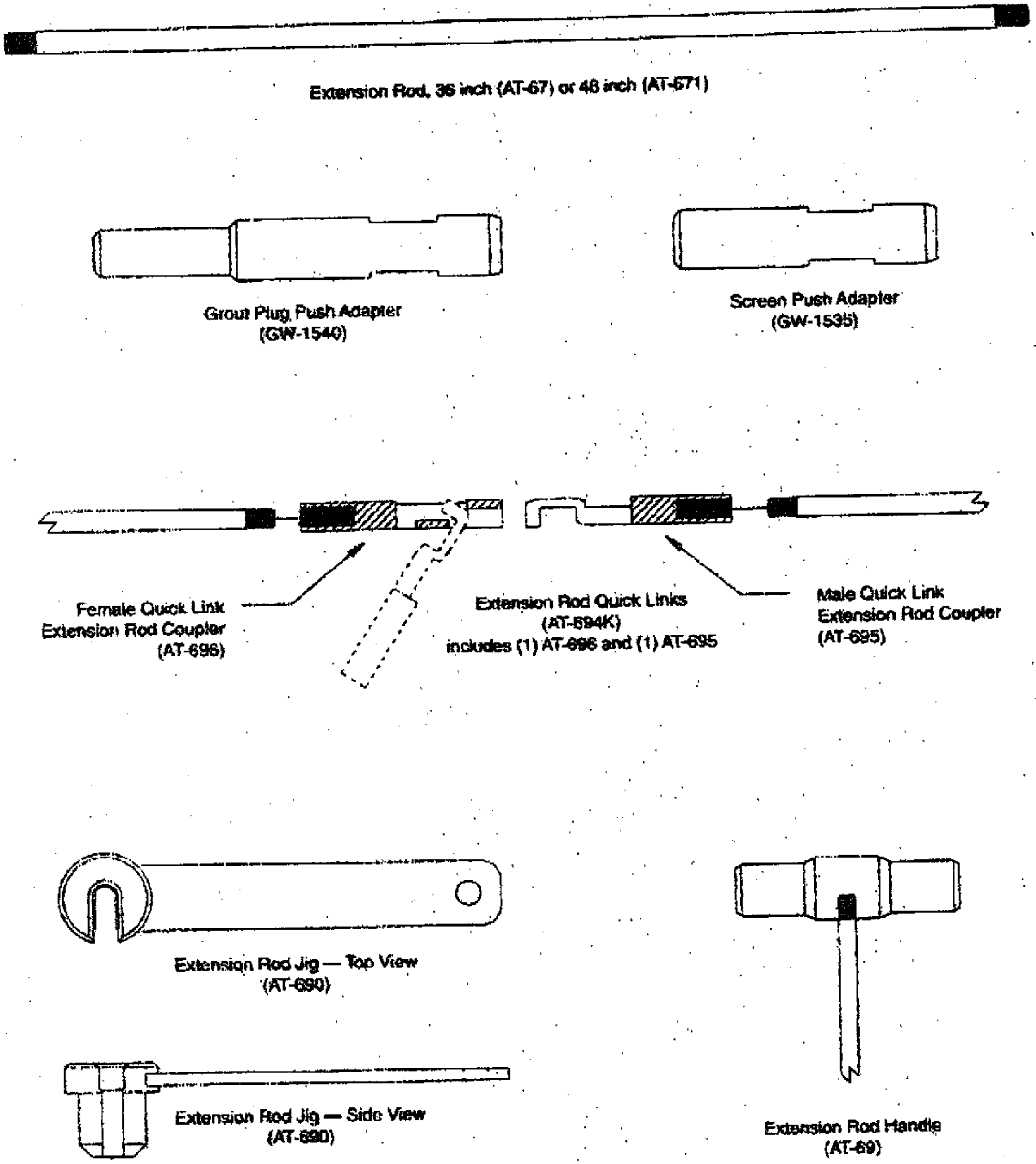
3. Install the casing pull bracket (GW-3337) on the probe hammer (Fig. 4.4).

4. Reposition probe derrick and hammer assembly such that casing pull bracket is below top of probe rod.

5. Place the casing pull plate (GW-468) over the probe rod and install an open-bore pull cap (AT-12B) as shown in Figures 4.5A and B.

6. Ensure that at least 48 inches (1219 mm) of extension rod protrudes from the probe rod. Thread an extension rod handle (AT-69, Fig. 4.3) on the top extension.

7. Retract probe rods and sampler sheath while physically holding the screen in place with the extension rods (Fig. 4.5B). A slight knock with the extension rod string will help to dislodge the expendable point and start the screen moving inside the sheath. Raise the hammer and pull bracket assembly about 44 inches (1118 cm). At this point the screen head will contact the necked portion of the sampler sheath (Fig. 4.5C.) and the extension rods will rise with the probe rods. The screen is now deployed. Use care when deploying a PVC screen so as not to break the screen when it contacts the bottom of the sampler sheath.



Extension Rod, 36 inch (AT-67) or 48 inch (AT-671)

Grout Plug Push Adapter
(GW-1540)

Screen Push Adapter
(GW-1535)

Female Quick Link
Extension Rod Coupler
(AT-696)

Extension Rod Quick Links
(AT-694K)
includes (1) AT-696 and (1) AT-695

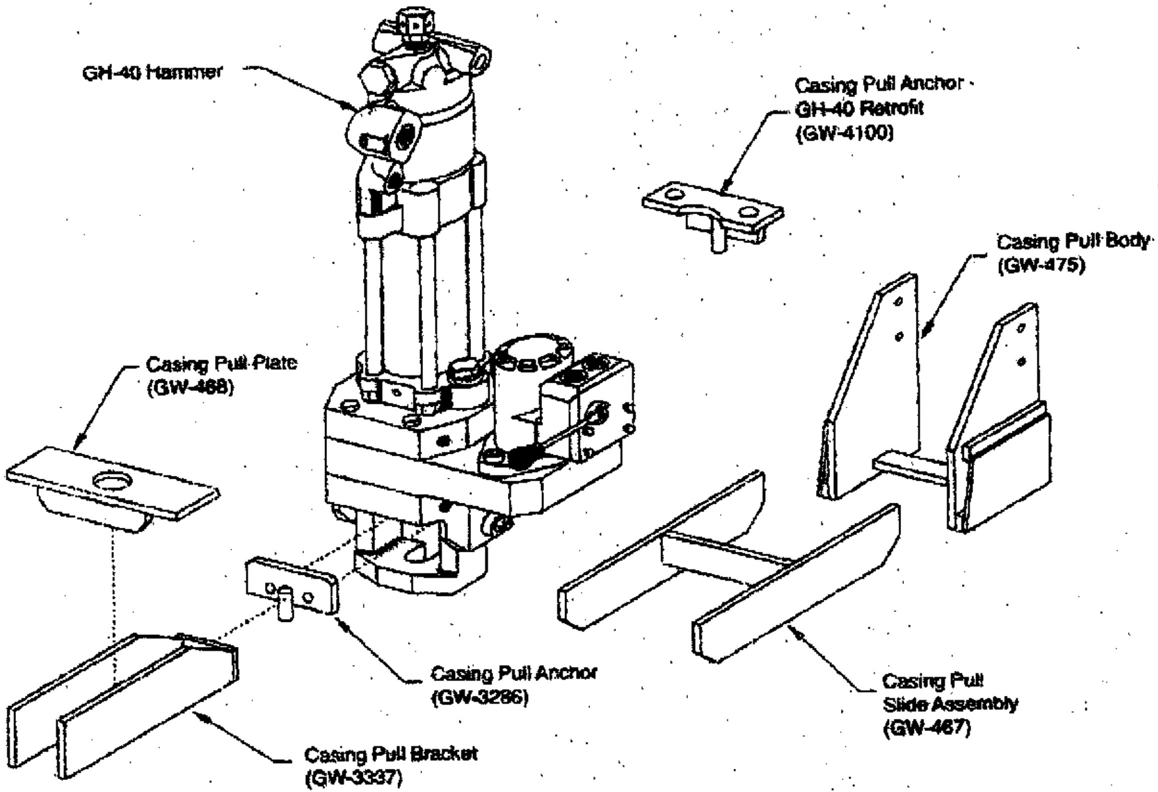
Male Quick Link
Extension Rod Coupler
(AT-695)

Extension Rod Jig — Top View
(AT-690)

Extension Rod Jig — Side View
(AT-690)

Extension Rod Handle
(AT-69)

FIGURE 4.3
Geoprobe Extension Rods and Accessories



NOTES:
1) For GH-40 Hammer Retrofit Applications, Substitute GW-4100 for GW-3286.
2) For SK58 Hammer Applications, Substitute GW-467 for GW-3337, and GW-475 for GW-3286.

FIGURE 4.4
Casing Pull Assembly for Units Originally Equipped With The GH-40 Hammer

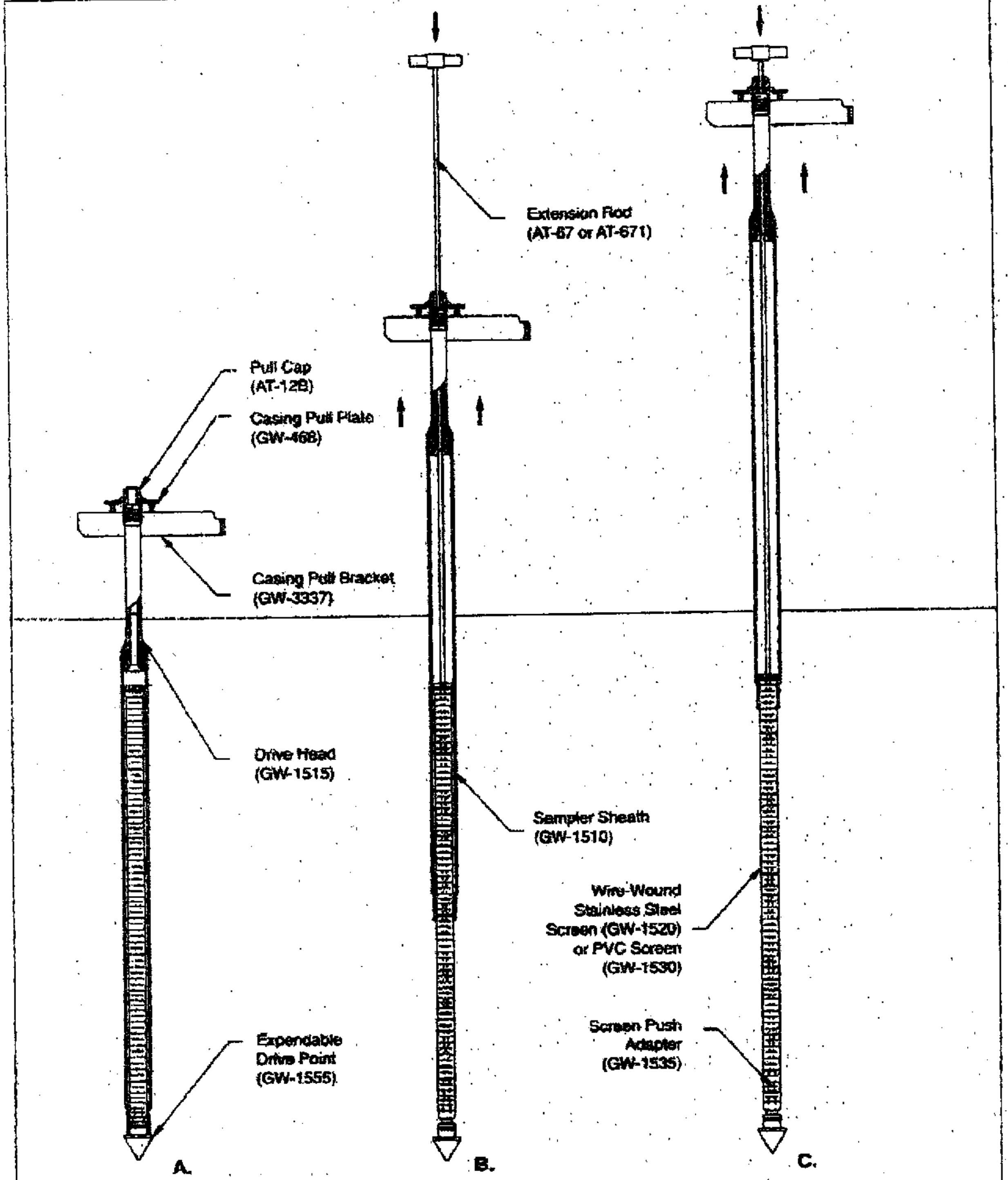


FIGURE 4.5
Screen Deployment

8. Lower the hammer assembly and retract the probe derrick. Remove the top extension rod and handle, pull cap, casing pull plate, and top probe rod. Finally, extract all extension rods.

9. Groundwater samples can now be collected with a mini-bailer, peristaltic or vacuum pump, tubing / bottom check valve assembly, or other acceptable small diameter sampling device.

10. When inserting the tubing down the rod string to collect a sample, ensure that the tubing enters the screen interval. The tubing will sometimes catch on the edge of the funnel opening of the screen head. An up-and-down and turning motion with the tubing helps to move it past the lip and into the screen.

4.6 Abandonment Grouting

The Screen Point 15 Sampler can meet ASTM D 5299-92 requirements for abandoning environmental wells or borings when grouting is conducted properly. A removable grout plug makes it possible to deploy tubing through the bottom of the screen. Grout is then pumped into the open probe hole as the sampler is withdrawn. The following procedure is presented as an example only and should be modified to satisfy local abandonment grouting regulations.

1. Position the casing pull bracket and pull plate over the tool string and place a split pull cap (AT-113) on the top probe rod. The sampler string can be pulled with the hammer latch while grouting. It is easier to manipulate the grout tube and probe rods, however, when the casing puller is utilized. A split pull cap is necessary for abandonment grouting as it makes it possible to pull probe rods without disconnecting the grout tube from the pump.

   Raise the tool string approximately 4 to 6 inches (102 to 152 cm) to allow removal of the grout plug. Remove the pull cap.

2. Thread the grout plug push adapter (GW-1540, Fig. 4.3) onto an extension rod. Insert the adapter and extension rod inside the probe rod string. Add extensions until the adapter contacts the grout plug at the bottom of the screen. When the extension rods are slightly raised and lowered, a relatively soft rebound should be felt as the adapter contacts the grout plug. This is especially true when using a PVC screen.

3. Apply pressure to the extension rods and push the grout plug out of the screen. If working with a stainless steel screen, it may be necessary to raise and quickly lower the extension rods (much like a hammering action) to jar the plug free. When the plug is successfully removed from the stainless steel screen, a metal-on-metal sensation will be noted as the extension rods are quickly raised and lowered.

   Note: Do not attempt to hammer on the grout plug if utilizing a PVC screen as the screen may break. A steady downward force should dislodge the plug.

   When the grout plug is pushed from the screen, remove all extension rods.

4. A grout nozzle (GW-1545) is now connected to polyethylene tubing and inserted into the probe rods and down through the bottom of the screen (Fig. 4.6). Water flow should be maintained through the grout tubing and nozzle during deployment to prevent plugging the tube with sediment. Resistance will be felt as the grout nozzle passes through the drive head. Note this point as the nozzle tip should exit the end of the screen in approximately another 92 inches (2337 mm). Mark the tubing as desired.

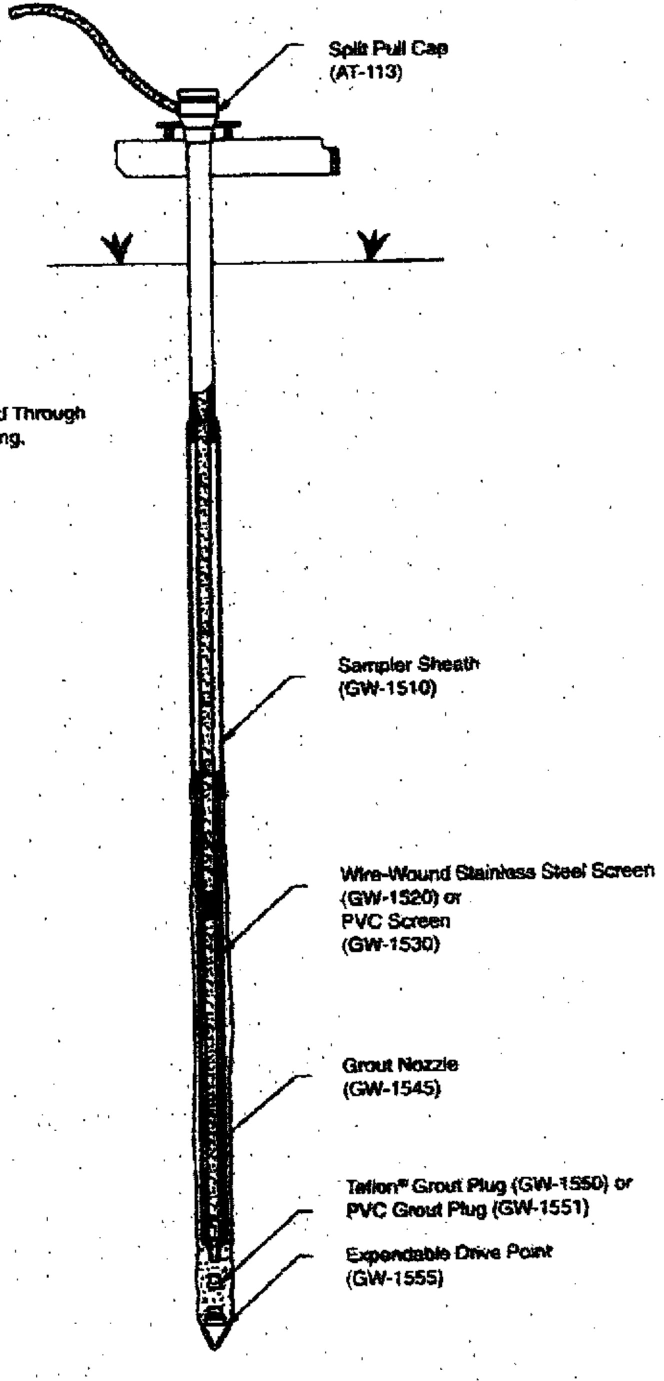


FIGURE 4.6
Grouting Through The Screen Point 15 Groundwater Sampler

Once fully deployed, the two spring-like tongues at the end of the grout nozzle (Fig. 4.6) will expand and prevent it from coming up out of the hole while pumping grout. Gently pull up on the polyethylene tubing to ensure that the nozzle has locked into place.

Note: All probe rods remain strung on the tubing as the tool string is pulled. Provide extra tubing length to allow sufficient room to lay the rods on the ground as they are removed. An additional 30 percent length is generally enough.

5. Attach a split pull cap to the top probe rod. Position the polyethylene tubing in the pull cap slot taking care not to pinch or bind the tubing. Operate the grout pump while pulling the first rod. Remove the split pull cap and unscrew the probe rod. Slide the rod over the tubing and place it on the ground near the end of the tubing to leave room for the remaining probe rods.
6. Repeat Step 5 until the sampler is retrieved. Do not bend or kink the tubing when pulling and laying out the probe rods. Sharp bends create weak spots in the tubing which may burst when pumping grout. Remember to operate the grout pump only when pulling the rod string. The probe hole is thus filled with grout from the bottom up as the rods are extracted.
7. Promptly clean all probe rods and sampler parts before the grout sets up and clogs the equipment.

4.7 Retrieving the Screen Point 15 Sampler

If grouting is not required, the Screen Point 15 sampler can be retrieved by pulling the probe rods as with most other Geoprobe sampling applications.

1. Position the probe derrick and hammer assembly over the tool string. Thread a pull cap onto the top probe rod. Once again, a split pull cap may be used to save time.
2. Lower the hammer latch over the pull cap and retract the tool string one probe rod length.
3. Remove the pull cap and top probe rod and repeat Step 2 until the sampler sheath is at the ground surface.
4. Physically pull the sampler sheath and screen out of the ground taking care not to bend the screen on the way out. The Screen Point 15 Groundwater Sampler is now retrieved and ready to decontaminate for further use.