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Darin L. Rouse
Senior Engineer
Environmental Remediation

ExxonMobil
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August 2, 2000

Mr. Scott Seery
Alameda County Environmental Health Department
1131 Harbor Bay Parkway
Alameda, CA 94501-6577

00 AUG -3 PM 4:40

Subject: Exxon RAS #7-3399/2991 Hopyard Road, Pleasanton, California

Dear Mr. Seery:

Attached for your review and comment is a copy of the *Addendum to Work Plan for Well Installation* dated August 2000 for the above-referenced site. The addendum was prepared by ETIC Engineering, Inc. of Walnut Creek, California, and proposes an alternative to the drilling method originally proposed for the installation of three monitoring wells. The addendum also more precisely indicates the proposed drilling locations.

If you have any questions or comments, please contact me at (925) 246-8768.

Sincerely,

JC Sedlacek for DLR

Darin L. Rouse
Senior Engineer

Attachment: ETIC Addendum to Work Plan dated August 2000

c: w/attachment:
Mr. Chuck Headlee – Regional Water Quality Control Board, San Francisco Bay Region
Mr. Matthew Katen – Alameda County Flood Control and Water Conservation District (Zone 7)
Mr. Stephen Cusenza – City of Pleasanton Public Works Department
Mr. Thomas Elson – Luhdorff and Scalmanini Consulting Engineers

c: w/o attachment:
Ms. Christa Marting - ETIC Engineering, Inc.

ETIC
Engineering, Inc.

Addendum to Work Plan for Well Installation

Exxon Retail Site 7-3399
2991 Hopyard Road
Pleasanton, California

Prepared for

ExxonMobil Refining and Supply Company
P.O. Box 4032
2300 Clayton Road, Suite 1250
Concord, California 94524-4032

Prepared by

ETIC Engineering, Inc.
144 Mayhew Way
Walnut Creek, California 94596
(925) 977-7914

8/2/00

Joseph T. Muehleck
Project Manager

Date

REGISTERED GEOLOGIST
MARK C. PETERSON
No. 2085
CERTIFIED
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Exp. 3/31/02
STATE OF CALIFORNIA

8/1/00

Mark C. Peterson, C.E.G. #2085
Senior Geologist

Date

August 2000

SITE CONTACTS

Site Name:	Exxon Retail Site 7-3399
Site Address:	2991 Hopyard Road Pleasanton, California
ExxonMobil Project Manager:	Darin L. Rouse ExxonMobil Refining and Supply Company P.O. Box 4032 2300 Clayton Road, Suite 1250 Concord, California 94524-4032 (925) 246-8768
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	Chuck Headlee California Regional Water Quality Control Board San Francisco Bay Region 1515 Clay Street, Suite 1400 Oakland, California 94612 (510) 622-2300
	Mr. Matthew Katen Alameda County Flood Control and Water Conservation District (Zone 7) 5997 Parkside Drive Pleasanton, California 94566 (925) 484-2600
	Mr. Stephen Cusenza City of Pleasanton Public Works Department P.O. Box 520 Pleasanton, California 94566 (925) 931-5507

INTRODUCTION

At the request of ExxonMobil Refining and Supply Company (ExxonMobil), formerly Exxon Company, U.S.A., ETIC Engineering, Inc. (ETIC) has prepared this work plan addendum for the installation of three monitoring wells in the vicinity of Exxon Retail Site (RS) 7-3399, located at 2991 Hopyard Road, Pleasanton, California (Figure 1). A work plan, submitted in May 2000, was prepared in response to a request from the Alameda County Department of Environmental Health (ACDEH) at a meeting held on 2 May 2000, attended by representatives from the ACDEH, City of Pleasanton, Alameda County Flood Control and Water Conservation District (Zone 7), the California Regional Water Quality Control Board San Francisco Bay Region, ETIC, and ExxonMobil. The well installations are requested to monitor groundwater between the site and two water supply wells, belonging to the City of Pleasanton and Zone 7, which exist within 1,000 feet of the site (ETIC 2000).

The purpose of the addendum is twofold:

- To describe an alternative to the drilling method originally proposed (air rotary method is being substituted with sonic method).
- To more precisely indicate the proposed drilling locations.

This addendum has been prepared at the request of the ACDEH.

PROPOSED DRILLING METHOD

After further considering the space constraints of the proposed drilling locations and the amount of water that may be produced using air rotary drilling below the water table, it was decided that sonic drilling would be a more practical method for installing the proposed wells. The sonic drilling method is described below and in Appendix A. The descriptions were taken from information provided by the proposed drilling contractor, Boart Longyear, C57 License #694686.

The sonic drilling method uses a combination of rotation, hydraulic pressure, and mechanical oscillation to advance an outer casing of approximately 8 inches in diameter and an inner core barrel of approximately 6 inches in diameter. The inner core barrel is advanced into the formation until full or until the sample blocks the passage of additional material into the barrel. The outer casing is advanced to prevent collapse of the borehole. The inner core barrel is retrieved to the surface and transferred into a cylindrical polyethylene bag for lithologic examination, minimizing disturbance to soil cuttings. The steps are repeated, providing continuous core sampling to the total depth of the borehole. A more detailed description of the method is provided in Appendix A. The sonic rig also has split-spoon capabilities for collecting undisturbed soil samples for laboratory analysis, although no laboratory analysis of soil samples is planned.

All other aspects of the well installation remain unchanged from the original work plan (ETIC 2000).

PROPOSED WELL LOCATIONS

At the time of submittal of the original work plan (ETIC 2000), uncertainties existed with the location of the public right-of-way, subsurface utilities, and access and encroachment issues. These issues have essentially been resolved.

A map provided by Langford Land Surveying (LLS) established that the two northeastern wells could be installed out of Valley Avenue while within the public right-of-way and far enough from utilities located beneath the planter and sidewalk. Modified copies of maps provided by LLS are included as Appendix B. The original signed and stamped maps were modified for this work plan addendum to show the address of the U.S. Bank property (sheet 1) and to show the proposed well locations (sheet 2). Written permission has been obtained from U.S. Bank to allow support equipment and personnel to occupy a portion of the U.S. Bank property (driveway) during well installation.

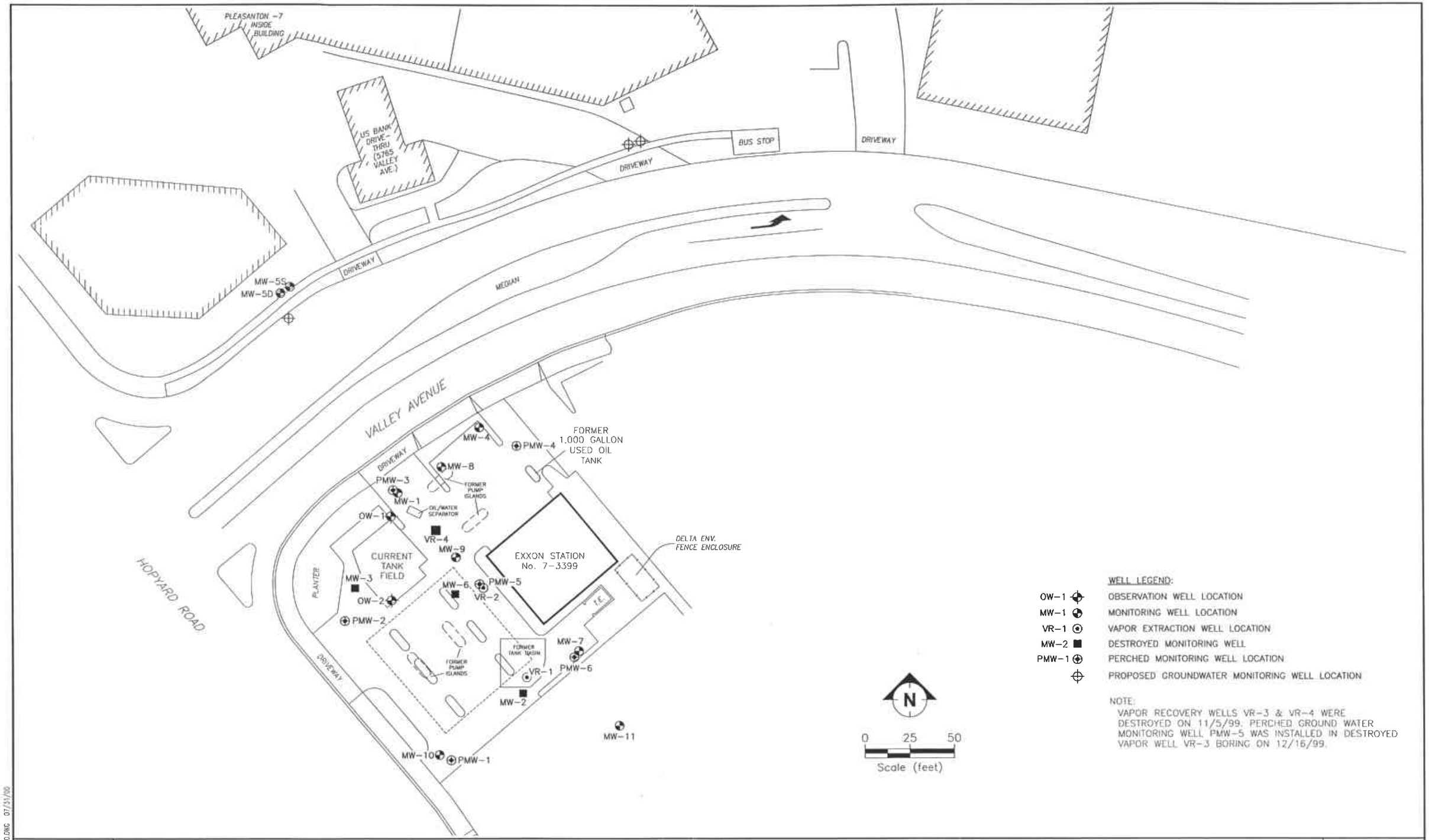
As a condition of an encroachment permit issued by the City of Pleasanton, a site meeting was held on 13 July 2000. Representatives from the City, ACDEH, Boart Longyear, and ETIC attended to discuss logistics of the proposed work. A traffic plan, including partial closure of Valley Avenue during well installation and sampling activities will be submitted to the City of Pleasanton for approval prior to well installation.

The approximate proposed well locations are shown in Figure 1. The well locations were selected with consideration of the following:

- Relation of proposed well locations to site and water supply wells.
- Practicality and safety of drilling and sampling personnel.
- Minimizing traffic and business disruption.

REFERENCES

ETIC (ETIC Engineering, Inc.). 2000. Work Plan for Well Installation, Exxon Retail Site 7-3399, 2991 Hopyard Road, Pleasanton, California. ETIC, Walnut Creek, California. May.



WELL LEGEND:

OW-1	OBSERVATION WELL LOCATION
MW-1	MONITORING WELL LOCATION
VR-1	VAPOR EXTRACTION WELL LOCATION
MW-2	DESTROYED MONITORING WELL
PMW-1	PERCHED MONITORING WELL LOCATION
	PROPOSED GROUNDWATER MONITORING WELL LOCATION

NOTE:
VAPOR RECOVERY WELLS VR-3 & VR-4 WERE DESTROYED ON 11/5/99. PERCHED GROUND WATER MONITORING WELL PMW-5 WAS INSTALLED IN DESTROYED VAPOR WELL VR-3 BORING ON 12/16/99.

FILENAME: TRAFFIC0700.DWG 07/31/00

ETIC Engineering, Inc.

PROPOSED MONITORING WELL LOCATIONS
EXXON RS 7-3399
2991 HOPYARD ROAD
PLEASANTON, CALIFORNIA

FIGURE: 1

Appendix A

Sonic Drilling Method Description

(information provided by Boart Longyear)

The Principle of Sonic Drilling

Sonic Drilling, Rotasonic, Rotosonic, Sonicore, Vibratory or Resonantsonic Drilling, are some of the many names given to a dual cased drilling system that employs the use of high frequency mechanical vibration to take continuous core samples of overburden and most bedrock formations, and to advance casing into the ground for well construction and other purposes.

Any of the names above can be used because they all describe a high frequency vibratory drilling system that is basically the same. The only differences are the rig designs, the operators, and some of the downhole tools and methods of operation that various sonic drillers or companies use. For ease, and to be consistent, we will refer to this system or method as sonic drilling throughout this article.

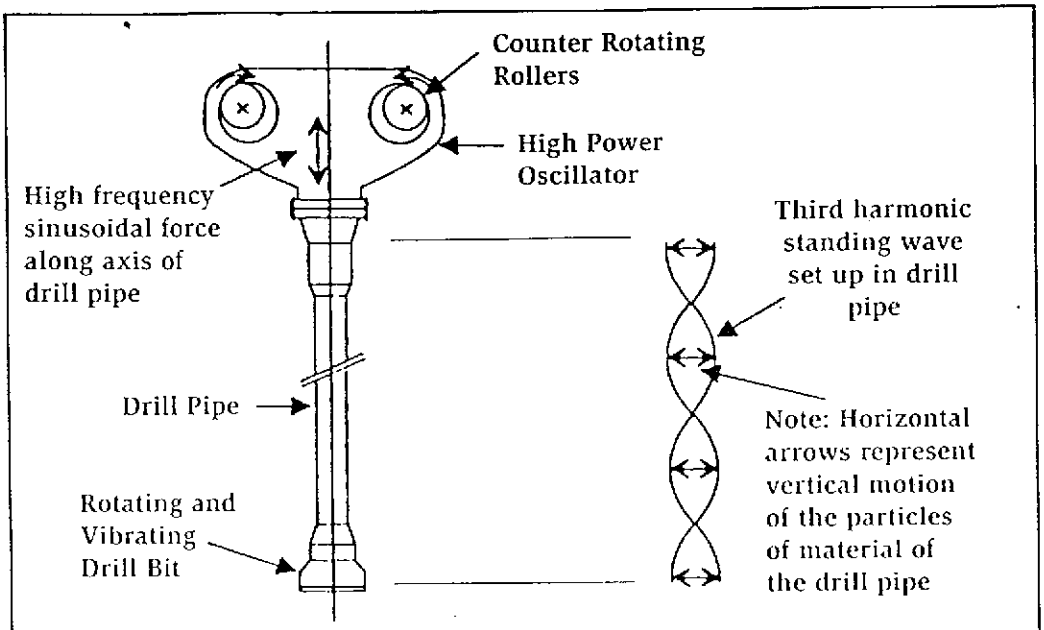
The word sonic appears in most of these names because this drilling technique vibrates the entire drill string at a frequency rate between 50 and 150 hertz or cycles per second. This frequency falls within the lower range of sound vibration that can be detected by the human ear, thus the term sonic has been commonly used to describe this drilling system.

The Rota- or Roto- part of the drilling technique refers to the rotational power that can be applied in hard formations to slowly rotate the drill string to evenly distribute the energy and the wear at the drill bit face.

A sonic drill rig looks and operates very much like any conventional top-drive rotary or auger rig. The main difference is that a sonic drill rig has a specially designed hydraulically powered drill head or oscillator which generates adjustable high frequency vibrational forces. The sonic head is attached directly to the core barrel, drill pipe or outer casing, sending the high frequency vibrations down through the drill steel to the face of the drill bit creating the displacement, fracturing or shearing action depending upon the foundation being drilled.

The oscillator uses two eccentric, counter rotating balance weights or rollers that are timed to direct 100 percent of the vibration at 0 degrees and 180 degrees. There is an air spring system in the drill head that insulates or separates the vibration from the drill rig itself. This principle is shown in Figure 1.

The vibrational frequency is controlled to suit operating conditions and to achieve optimum drilling rates. When the vibrations coincide with the natural resonate frequency of the steel drill rod or casing a natural phenomenon called resonance occurs, therefore the word resonant. A complete or detailed discussion of resonance is beyond the scope of this article. However, a brief explanation of what resonance does with this system is to allow the rig to transfer timed vibrational energy into the top of the drill string, utilizing the natural stored energy of the steel, to cause the drill string to act like a flywheel or a spring delivering tremendous amounts of energy directly to the bit face. This, plus the fact that the soil particles along the side of the drill string tend to fluidize or move away from the drill string allows for very fast penetration rates. In many overburden formations, a sonic drill rig can achieve rates of one foot per second.



Courtesy of Ray Roussy, Sonic Drilling, LTD.

FIGURE 1. BASIC PRINCIPLE OF SONIC DRILLING

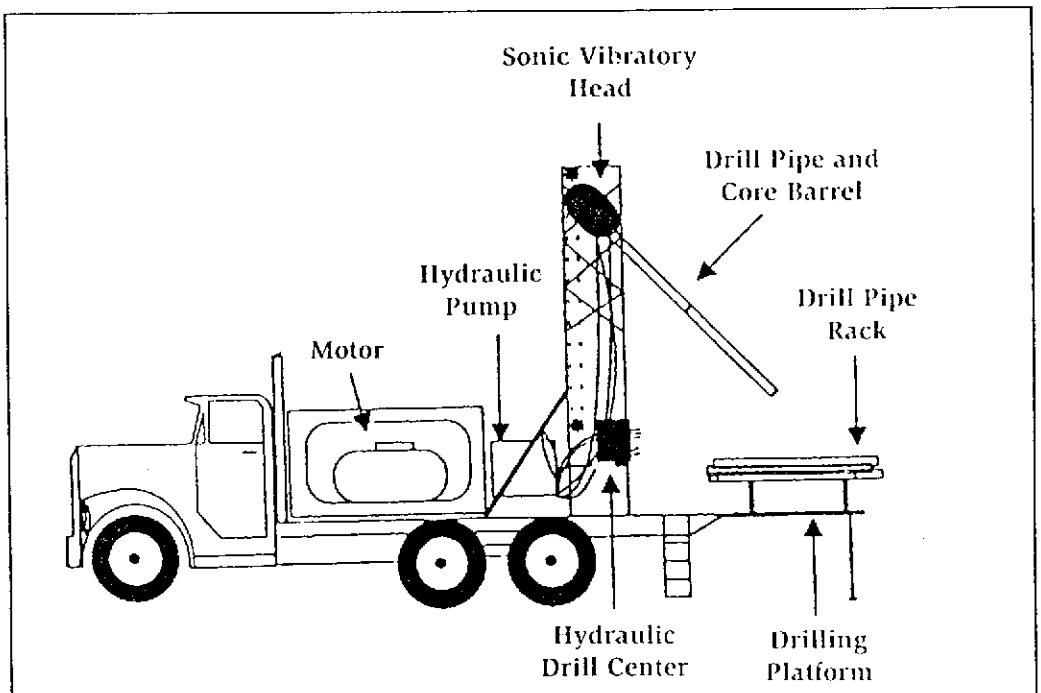


FIGURE 2. SONIC DRILLING

Sonic Bore Hole Advancement

Process: The processes which result in borehole advancement are fracturing, shearing and displacement. Drilling through cobbles, boulders and rock is caused by fracturing of the material by the inertial moment of the drill bit. Shearing takes place in dense silts, clay and shales, provided the amplitude of the drill bit is high enough to overcome the elasticity of the formation material. Displacement occurs when unconsolidated formation material is moved away by the vibrating drill bit. We have 3 drill basic drill bit face designs:

1) "Crowd in" - moves all the bit face material into the core barrel.
2) "Crowd out" - moves all the bit face material into the borehole wall.
3) "Neutral" - lets the bit face material seek the path of least resistance..

Very few, if any, drill cuttings are conveyed to the surface, except for the core sample itself. As a result the volume of drill cuttings generated during sonic drilling is in most cases only 10% to 20% of the volume created by hollow stem auger, rotary, or cable tool methods.

Operation: Optimum penetration rates are obtained when the vibration frequency and down-pressure work in harmony. Experienced drillers have a "feel" when this occurs, and it is monitored by watching the oil pressure gauges in the system. The driller watches the pressure gauges and modifies the frequency of the vibration being generated, the rotation, or the down pressure for the conditions encountered. Adjustments to the frequency are accomplished with a lever which controls two hydraulic motors that drive the counter-rotating rollers.

Several design features in addition to the use of vibration increases the speed and efficiency of the drilling process. The head, which combines rotation and vibration as previously discussed, is able to pivot 90 degrees. This allows rapid connection of flush-threaded drill pipe by rotating a male-threaded adapter on the head and aligning a length of female-threaded drill pipe directly to the adapter on the head. A fully automated, hydraulic, rotating wrench allows easy breakdown of the drill pipe connections. Once the connection is broken, the head and drill pipe are pivoted to the horizontal position, the rotation is reversed, and the drill pipe is "unscrewed" from the head.

Safety: Another feature of the sonic drill rig is a raised drilling platform. The drilling platform is approximately four feet above the ground surface, allowing a safer and cleaner work environment. Drilling operations are conducted without the inconvenience often caused by ground surface conditions (mud, snow, etc.). The drill pipe is stacked on racks on the platform, which increases the speed of adding and removing the drill string. Figure 2 on page 3 is a diagram which displays these features.

Drilling Equipment List:

- Roto-Sonic 150 Drill Rig
- Water Truck with jib arm hoist, 2,500 gallon capacity
- One Ton 4X4 pickup
- 8" Sonic casing (200')
- 2 3/8" Drill pipe (200')
- 6" x 10' Corebarrels (2)
- Drum lift
- High pressure stream cleaner
- 300 Amp welder, generator
- Moyno cement pump
- Cement batch mixer & tank
- Fishing tools for all in hole equipment
- Level "C" Safety Equipment (PPE)
- Level "D" Safety Equipment (PPE)
- Cellular telephone
- Hand tools required to perform maintenance & repairs
- First Aide Kit, inc. solar blanket and blood borne pathogens kit
- Rig pad liner
- Oil absorbent materials
- Cement and bentonite grout as required
- Hard hats, steel toe boots, gloves and other personal protective equipment

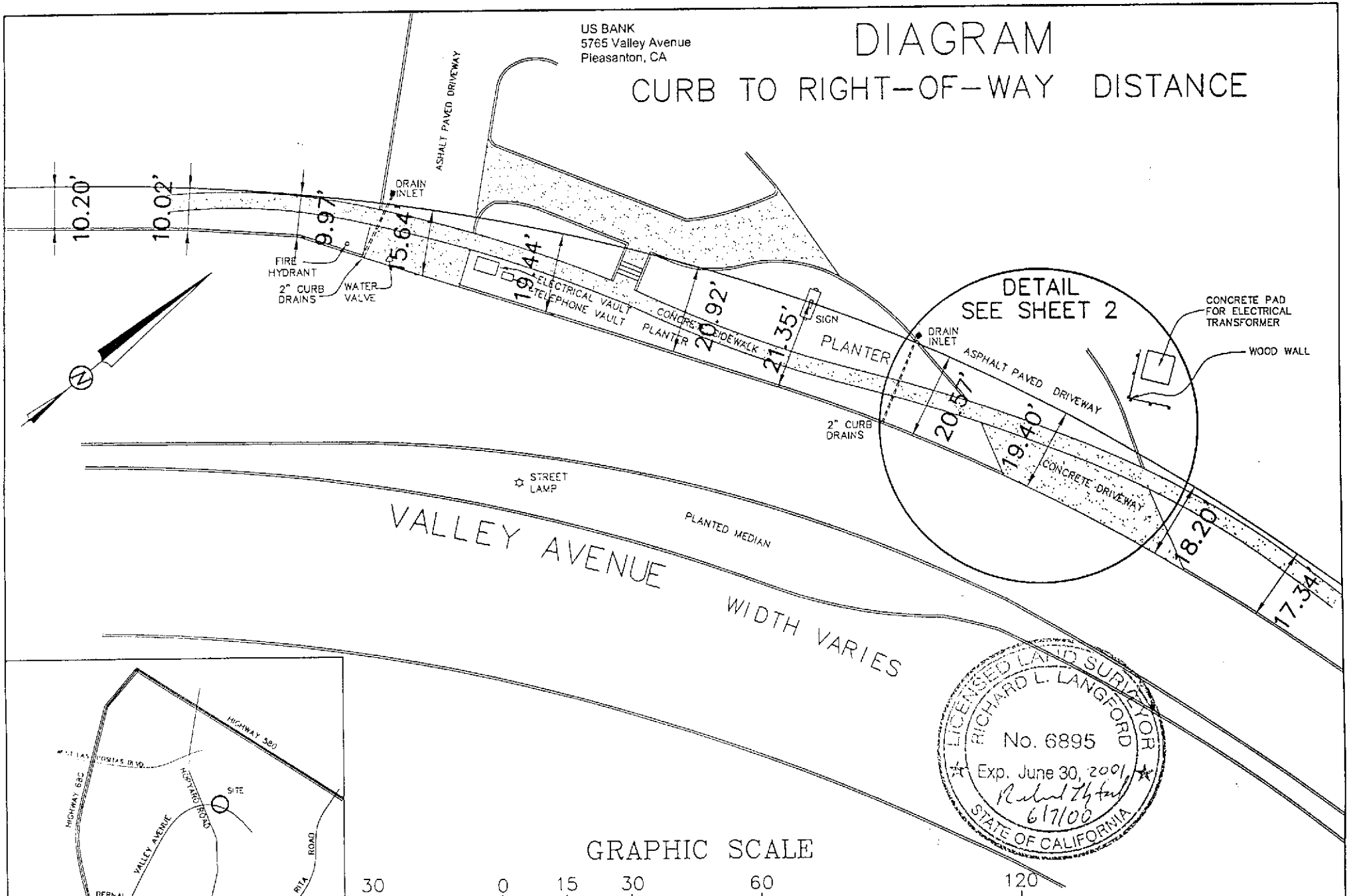
Appendix B

Modified Langford Land Surveying Maps

DIAGRAM

CURB TO RIGHT-OF-WAY DISTANCE

US BANK
5765 Valley Avenue
Pleasanton, CA



VICINITY MAP - NO SCALE

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 INCH = 30 FEET

LICENSED LAND SURVEYOR
RICHARD L. LANGFORD
No. 6895
Exp. June 30, 2001
6/7/00
STATE OF CALIFORNIA

LANGFORD LAND SURVEYING
11881 SKYLINE BOULEVARD, SUITE D
OAKLAND, CA 94619
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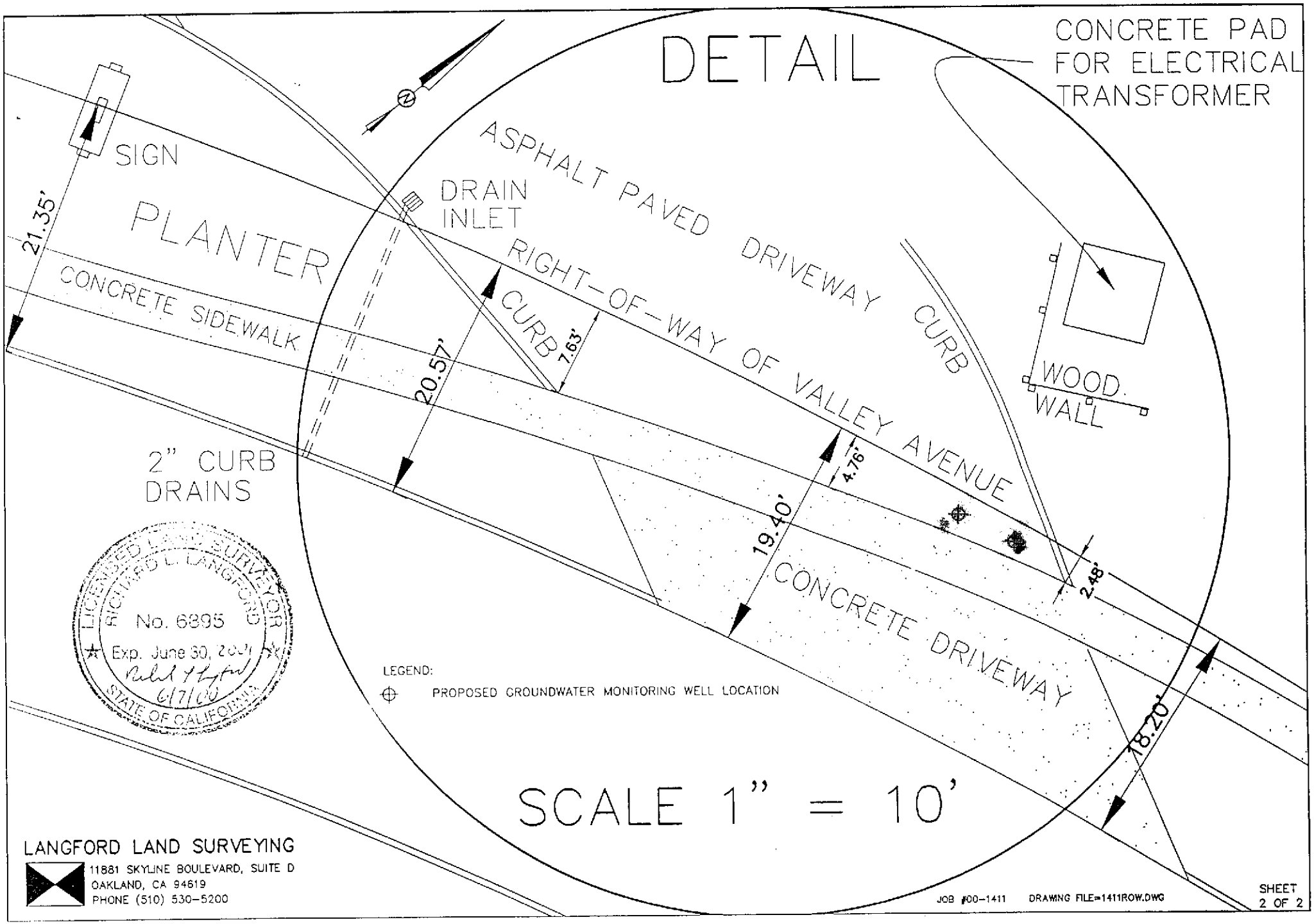

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