

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

MONITORING WELL INSTALLATION REPORT

CHEVRON GASOLINE SERVICE STATION 3519 Castro Valley Boulevard Castro Valley, California

July 7, 2004

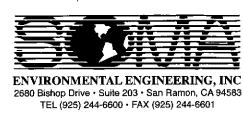
Project 2762

Prepared for

Mr. Mirazim Shakoori 3519 Castro Valley Boulevard Castro Valley, California

Prepared by

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



July 7, 2004

Mr. Robert Schultz Alameda County Health Care Services Agency 1131 Harbor Bay Parkway, Suite 250 Alameda, California 94502-6577

Subject: #RO0000346

Site Address: 3519 Castro Valley Boulevard, Castro Valley, CA

Castro Valley Gasoline Service Station

Dear Mr. Schultz:

Enclosed for your review is SOMA's "Monitoring Well Installation Report" for the subject site.

Thank you for your time in reviewing our report. If you have any questions or comments, please call me at (925) 244-6600.

Sincerely,

Mansour Sepehr, Ph.D., PE Principal Hydrogeologist

Enclosure

cc: Mr. Azim Shakoori w/enclosure

Mr. Michael D. Ahern w/enclosure Forrest & Louise Riley w/enclosure

CERTIFICATION

This report has been prepared by SOMA Environmental Engineering, Inc., (SOMA) on behalf of Mr. Mirazim Shakoori, the property owner of 3519 Castro Valley Boulevard, Castro Valley, California. This report includes details of the monitoring well installation as described in SOMA's workplan entitled, "Workplan for Monitoring Well Installation," dated March 8, 2004, and approved by the Alameda County Health Care Services in their letter, "Workplan Approval at 3519 Castro Valley Boulevard, Castro Valley, California," dated March 22, 2004.

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



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1.0 INTRODUCTION

This report has been prepared by SOMA Environmental Engineering, Inc., (SOMA) on behalf of Mr. Mirazim Shakoori, the property owner of 3519 Castro Valley Boulevard, Castro Valley, California (the "Site"). Field activities were performed in accordance with SOMA's workplan dated March 8, 2004. This report has been prepared to comply with the Alameda County Health Care Services' (ACHCS's) directive as described in their workplan approval letter dated March 22, 2004.

The previous consultant, URS Corporation (URS), provided relevant project documents with a Site Background and Document Transfer letter, dated July 14, 2003. The following background and previous activities sections are based on the information provided by URS.

2.0 BACKGROUND

Prior to 1989, the Site was a Mobil service station. In 1984, three single-walled fiberglass gasoline underground storage tanks (USTs) with capacities of 6,000, 8,000, and 10,000 gallons were installed in the southeast portion of the Site. In 1988, a 1,000-gallon double-walled waste oil tank (WOT) was also installed to replace a 380-gallon single-walled steel WOT.

In 1989, the subject property was transferred from Mobil to British Petroleum (BP). In March 1994, the subject property was transferred to Mr. Mirazim Shakoori who operated the Site as a Chevron station.

In September 2003, the three single-walled fiberglass USTs with volumes of 6,000, 8,000, and 10,000 gallons and the WOT with a volume of 1,000 gallons were removed from the southeast portion of the Site. The USTs were replaced

with one 12,000-gallon UST and one 20,000-gallon UST in the northwest portion of the Site.

As shown in Figure 1, the Site is an active Chevron station located within in a mixed commercial/residential area of Castro Valley, on the southeast corner of Castro Valley Boulevard and Redwood Road.

2.1 Previous Activities

In September 1988, Kaprealian Engineering, Inc. (KEI) removed the original 380-gallon WOT and observed holes in this UST. Confirmation soil samples from the bottom of the excavation pit, at 8.5 feet below ground surface (bgs), contained benzene at 6.8 micrograms per kilogram (µg/Kg or parts per billion) and toluene at 9.5 µg/Kg. The laboratory analysis did not detect total petroleum hydrocarbons (TPH) or total oil and grease (TOG). In March 1989, an Unauthorized Release Report (URR) was submitted to the ACHCS.

In September and October 1992, Environmental Science & Engineering, Inc. (ESE) drilled five soil boreholes and converted the boreholes into monitoring wells (ESE-1 through ESE-5) that ranged in depth from approximately 23 to 30 feet bgs. The maximum level of soil contamination was detected in monitoring well borehole ESE-5 at a depth of 10.5 feet bgs with 220,000 μ g/Kg total petroleum hydrocarbons as gasoline (TPH-g), 1,400 μ g/Kg benzene, 8,200 μ g/Kg toluene, 3,300 μ g/Kg ethylbenzene, and 18,000 μ g/Kg xylenes. ESE encountered petroleum hydrocarbon contaminants in all the monitoring wells with maximum levels detected in ESE-1, which is located west of, and adjacent to the three USTs. This well contained TPH-g at 2,300 μ g/L, benzene at 370 μ g/L, toluene at 160 μ g/L, ethylbenzene at 17 μ g/L, and xylenes at 110 μ g/L. A URR for this documented release was submitted to the ACHCS in March 1993.

In December 1994, ACC Environmental Consultants, Inc. (ACC) conducted an investigation along the western edge of the property for the Redwood Boulevard

road-widening project. ACC drilled five boreholes to a maximum depth of 10 feet bgs. The maximum level of petroleum hydrocarbon contaminants detected in the road-widening boreholes was 59,000 μg/Kg TPH-g, 5,890 μg/Kg benzene, 220,000 μg/Kg ethylbenzene, and 540,000 μg/Kg xylenes.

In July 1995, Alisto Engineering (AE) installed three additional monitoring wells. AE installed two of the wells, MW-6 and MW-8, on-site, and the third well, MW-7, on the adjacent property southeast of the Site. In February and March 1996, AE also advanced several hand-augered boreholes in the vicinity of the former western pump island and product lines. The boreholes were hand-augered to a maximum depth of 8.5 feet bgs. AE reported that petroleum hydrocarbon contamination increased with depth and the highest concentration was encountered at the capillary fringe. Subsequently, in April 1996, AE decommissioned well MW-8 on the western margin of the Site to accommodate the road-widening project along Redwood Boulevard.

Since 1992, quarterly monitoring has been conducted at the Site. In 1999, the sampling schedule was modified to include semi-annual sampling of ESE-5 and ESE-7. Prior to SOMA, URS Corporation, Cambria Environmental Technology, Inc., Blaine Technical Services, AE, and ESE conducted these monitoring and sampling events.

Based on joint monitoring events with the adjacent former Shell station to the west, the groundwater flow direction varied from north/northwest to south/southeast and primarily to the northeast. Based on the monitoring events since the cessation of the joint monitoring, the groundwater flow direction has usually been to the south and east. For the last four years, Methyl tertiary Butyl Ether (MtBE) has been detected in off-site well MW-7 at concentrations from 95 to 4,400 µg/L, however most of these detections were above 1,000 µg/L. Consistent with the on-site groundwater flow direction toward the southeast/south,

contaminated groundwater has been migrating off-site towards the adjacent commercial property, which is located south of the Site.

In December 2003, five temporary well boreholes were installed by SOMA to delineate the off-site groundwater plume extending from the Site. The results of SOMA's soil and groundwater investigation confirmed the existence of an off-site petroleum hydrocarbon plume. Based on the results of the investigation, groundwater contaminants appeared to have migrated off-site at least 150 feet to the south of the Site. SOMA recommended installing one on-site and three off-site monitoring wells to evaluate the off-site petroleum hydrocarbon plume migrating from the Site.

In a letter dated January 23, 2004, the ACHCS requested a workplan for installing off-site monitoring wells. The letter mentioned that the anomalously high contaminant levels in off-site borehole TWB-5 may have originated from a neighboring gas station, which is located at 3495 Castro Valley Boulevard. Due to the apparently complex hydrogeology, with possible perched groundwater, the ACHCS also strongly recommended a thorough file review of site investigation reports for adjacent sites. Based on SOMA's file review, the nearby Xtra Oil (Former Shell) gas station, located at 3495 Castro Valley Boulevard, is the nearest active gasoline station within the Site's vicinity. SOMA concluded that the anomalously high contaminant levels in TWB-5 originated from the Xtra Oil site. The letter also suggested that replacement wells for ESE-3 and ESE-4 might not be needed.

2.2 Regional Geology

The U.S. Geologic Survey (USGS) mapped the Site as weakly consolidated, slightly weathered, poorly sorted, irregular interbedded clay, silt, sand, and gravel. Based on the temporary well and monitoring well borehole logs, underlying sediments generally consists of soft to very stiff silty clay and clayey silt with intervening layers of medium dense silty sand and sandy silt.

In developed urban areas, such as the Bay Area, earthwork construction often involves the emplacement of artificial fill derived from nearby cuts or quarries. Artificial fill is emplaced over native earth materials to provide level building pads and base rock for roadways.

3.0 SCOPE OF WORK

In response to the ACHCS's request letter, dated January 23, 2004, and based on the ACHCS workplan approval letter, SOMA organized the scope of the proposed investigation into the following tasks:

Task 1: Field Preparation: Permit Acquisition, Off-Site Access

Arrangement, Preparation of a Health and Safety Plan and

Subsurface Utility Clearance

Task 2: Monitoring Well Installation

Task 3: Monitoring Well Development

Task 4: Monitoring Well Survey

4.0 INVESTIGATIVE ACTIVITIES

The following are descriptions of the above tasks.

4.1 Field Preparation

Prior to commencing field activities, SOMA obtained the necessary drilling permits from the ACHCS and arranged for off-site access. SOMA obtained an access agreement from each of the off-site property owners before fieldwork began. The permits issued by the ACHCS are attached as Appendix A.

A site-specific health and safety plan (HASP) was prepared by SOMA to address safety provisions during field activities. The HASP provided procedures to protect the field crew from physical and chemical hazards resulting from drilling. The

HASP established personnel responsibilities, general safe work practices, personal protective equipment standards, decontamination procedures, and emergency action plans.

SOMA contacted Underground Service Alert (USA) to clear the drilling areas of underground utilities. Following the USA clearance, a private utility locator surveyed the drilling areas and located additional subsurface conduits.

4.2 Monitoring Well Installation

To delineate the extent of the groundwater plume, SOMA oversaw the installation of four monitoring well boreholes: SOMA-1, SOMA-2, SOMA-3 and SOMA-4, as shown in Figure 2. On June 10, 2004, Gregg Drilling & Testing (Gregg) used a hollow stem auger drilling rig to drill four monitoring well boreholes 15 to 30 feet bgs. In order to clear the monitoring well boreholes of utilities, each borehole was hand-augered to a depth of approximately 5 feet bgs.

Under the direction of SOMA's field geologist, the monitoring wells were screened to span only the saturated zone observed in the soil cores to minimize screen lengths. Using factory-slotted schedule 40 PVC screen with 0.01" slots, the drilling crew screened SOMA-1 from 22 to 30 feet bgs, SOMA-2 from 10 to 15 feet bgs, SOMA-3 from 10 to 15 feet bgs and SOMA-4 from 16 to 23 feet bgs. The monitoring well boreholes were cased with threaded, blank and slotted schedule 40 PVC pipe. The drilling crew fitted a PVC cap on the bottom of the casing without adhesives or tape, and the top of the casing was fitted with a locking well plug.

After the casing was set into the borehole, the monitoring well filter pack was emplaced outside the casing by slowly pouring 2/12 kiln-dried sand material into the annular space from the bottom of the borehole to approximately 1 to 2 feet above the screened interval. To prevent grout from infiltrating down into the filter material, a one- or two-foot thick bentonite plug was placed above this filter

material. Approximately one to two gallons of distilled water was then added to hydrate the bentonite pellets. After thoroughly hydrating the bentonite seal, the well was sealed from the top of the bentonite layer to about one-foot bgs with neat cement containing approximately 5% bentonite. The well was completed by installing a traffic-rated well vault into concrete. Monitoring well construction details are attached as Appendix B.

4.3 Monitoring Well Development

On June 17, 2004, Gregg developed the monitoring wells. The field crew used a bailer to remove sediment-laden water from the wells until the turbidity had substantially decreased. The wells were then purged by pumping until the purgewater was moderately clear and groundwater quality parameters stabilized. Approximately 7 to 30 casing volumes were removed from the wells. Appendix C presents the well development logs.

In the third quarter of 2004, SOMA field personnel will sample the newly installed monitoring wells along with the pre-existing monitoring wells. The results of the groundwater sampling event will be presented in SOMA's Third Quarter 2004 Groundwater Monitoring Report.

4.4 Monitoring Well Surveying

On June 21, 2004, licensed surveyors from Kier & Wright surveyed the casing elevations of the monitoring wells. Kier & Wright performed a horizontal and vertical survey on the wells in accordance with the requirements set forth by the State for the GeoTracker database. Using NAD 83, all well casing elevations were surveyed to mean sea level with latitude and longitude to sub-meter accuracy. With the survey data, depths to groundwater will be converted into groundwater surface elevations to determine the groundwater flow direction beneath the Site. Monitoring well survey data is attached as Appendix D.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of SOMA's previous soil and groundwater investigation confirm the existence of an off-site petroleum hydrocarbon plume migrating from the Site. Based on this and SOMA's previous investigations, the plume exists along the south and southeastern half of the Site, and it appears that the groundwater contaminants have migrated off-site at least 150 feet. However, the full downgradient extent of the groundwater chemical plume has not yet been defined.

This investigation was performed to assess the downgradient extent of the gasoline contamination and to assess the need for remedial actions at the Site. Four groundwater monitoring wells were installed at the subject property, three off-site and one on-site. The wells were installed to verify the groundwater flow direction and to monitor the groundwater quality for an accurate assessment of the hydrogeologic conditions, and to verify the stability of the chemical plume and other attenuation parameters.

6.0 REFERENCES

Alameda County Health Care Services, October 3, 2003. A Letter in Connection with Request for Conducting Subsurface Investigation entitled, "Amended Workplan for BP Station #11105 at 3519 Castro Valley Blvd., Castro Valley, CA."

Alameda County Health Care Services, October 22, 2003. A Letter in Connection with Request for Conducting Subsurface Investigation entitled, "Workplan for BP Station #11105 at 3519 Castro Valley Blvd., Castro Valley, CA."

Alameda County Health Care Services, March 22, 2004. A Letter in Connection with Request for Conducting Subsurface Investigation entitled, "Workplan Approval for BP Station #11105 at 3519 Castro Valley Blvd., Castro Valley, CA."

Helley, E. J. and LaJoie, K. R., 1979. "Flatland Deposits of the San Francisco Bay Region, California". Geologic Survey Professional Paper 943.

SOMA Environmental Engineering, Inc., September 25, 2003. "Workplan to Conduct Off-Site Soil and Groundwater Investigation at Chevron Gasoline Service Station, 3519 Castro Valley Boulevard, Castro Valley, California."

SOMA Environmental Engineering, Inc., October 8, 2003. "Revised Workplan to Conduct Off-Site Soil and Groundwater Investigation at Chevron Gasoline Service Station, 3519 Castro Valley Boulevard, Castro Valley, California."

SOMA Environmental Engineering, Inc., March 8, 2004. "Workplan for Monitoring Well Installation at Chevron Gasoline Service Station, 3519 Castro Valley Boulevard, Castro Valley, California."

Figures

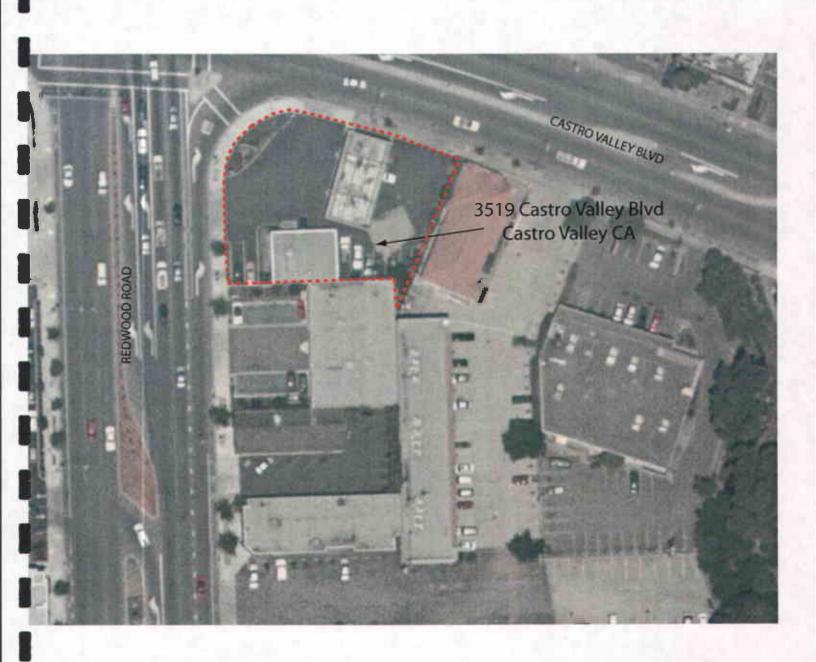
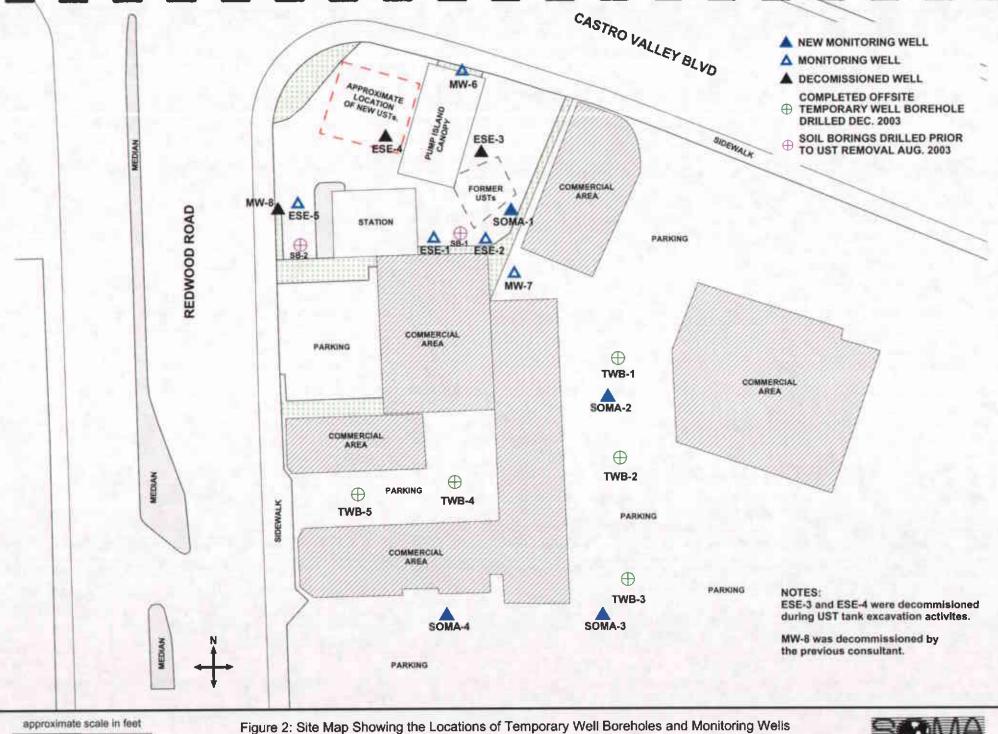


Figure 1: Site vicinity map.







Appendix A

Drilling Permits

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ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION

399 ELMHURST ST. HAYWARD CA. 94544-1395
PHONE (510) 670-6633 James Yuu
FAX (510) 782-1939
APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING FERMIT APPLICATIONS
DESTRUCTION OF WELLS OVER 45 EKET REQUIRES A SETARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

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Castro Valley		WELL NUMBER
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ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
399 RIMHURST ST. HAYWARD CA. 94544-1395
PHONE (510) 670-6633 James Yoo
FAX (510) 782-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRULING PERMIT APPLICATIONS DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERM	IT APPLICATION
FOR APPLICANT TO COMPLETE	FOR OFFICE USE
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	PERMIT CONDITIONS Circled Permit Requirements Apply
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PPLICANT SOMA Environmental Engineering	2) Subrast to ACPWA within 60 days after completion of permetted original Department of Water Resources
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ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION

399 ELMRURST ST. HAYWARD CA. 94544-1395
PHONE (510) 670-6633 James You
FAX (510) 782-1939
APPLICANTS: PLEASE ATTACH A SITE MAP PORALL DRILLING PERMIT APPLICATIONS
DESTRUCTION OF WELLS OVER 45 DEET REQUIRES A SEFARATE FERMIT APPLICATION

DRILLING PERMIT	APPLICATION		•
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ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
JP9 ELAHURST ST. HAYWARD CA. 94544-1395
PHONE [510] 670-6633 James You
FAX (510) 782-1939

Applicants: Mease attach a site map for all drilling permit applications destruction of wells over 44 feet requires a snyabate permit application

	DRILLING PE	RMIT APPLICATION
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Carredic Protection	Geosechnical Investigation Occurral	 Minimum seal depth is 50 feet for municipal and Industrial wells or 20 feet for domestic and irrigation
Water Supply	O Contamination D	wells unless a lesser depth is specially approved.
Monitoring	Well Destruction Q	CROUNDWATER MONITORING WELLS
THE CONTRACT OF SHAPE	r fupply well use	INCLUDING PIEZDMETERS
New Domestic		Minimum surface seal thickness is two inches of general group placed by fremic.
Municipal	O Irrigation 11	2. Minimum seal depth for manuscring wells is the
industria)	D Other D	meximum depth practicable or 20 feet.
DRILLING METHO	O.D.	D. GEOTECHNICAL
Med Romy	D Air Rotary D Auger 💇	Beckfill bore hole by tremic with cemera grout or cement grout/sand mixpure. Upper two-three feet replaced in kind
Cable	D Other D	to myll compacted critishes.
	Cross Drilling & Mostin	E CATROOM C
DRILLER'S NAME	Gregg Drilling & Testin	* THE MANUE STATES AND ASSESSMENT OF A STATES.
יים או זומני	SENO. 485165	P. WELL DESTRUCTION
ALTERNATION OF PROPERTY		Send a pump of work site. A separate permit is required for wells decree than 45 feet.
		G. Nescent conditions — 141 W # I
VELL PROJECTS		, , , , , , , , , , , , , , , , , , ,
Drill Hole Dismeter		NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable
Surface Seal Depti	in. Depth 30 R. SOMA-4	fur geotechnical and continuination investigations.
DEOTECHNICAL		
Number of Boring Hole Diameter	Maximumin. Depthft.	
		/
! IARTING DATE_	May 18, 2004	1/3) -0
POMPLETION NAT	E May 19, 2004	MAN 430-0
· OHE DELIGITED	101 101 2007	APPROVED NO DATE
Harrylon survey to some	order males will reconsistence make and state of the control of th	7 17
	ply with all requirements of this permit and Alemeda County of the DATE	
* PPLICANT'S SIGN		17ATELL COST
FLEASE PRINT NAM	ME ERIL PENNINUS	Rov.9-18-02
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \



ALAMEDA COUNTY PUBLIC WORKS AGENCY WATER RESOURCES SECTION 399 ELMHURST ST. HAYWARD, CA. 94544-1395 PHONE (510) 670-6633 James Yoo FAX (510) 782-1939

PERMIT NO. W04-0489-0492

WATER RESOURCES SECTION GROUNDWATER PROTECTION ORDINANCE MW#I-GENERAL CONDITIONS: MONITIORING WELL

- Prior to installation of any monitoring wells into any public right-of-ways, it shall be the applicants responsibilities to contact and coordinate a Underground Service Alert (USA), obtain eneroachment permit(s), excavation permit(s) or any other permits required for that City or to the County and follow all City or County Ordinances. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County a Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.
- 2. The minimum surface seal thickness two inches of cement grout placed by tremic.
- 3. All monitoring wells shall have a minimum surface coment seal depth of five (5) feet or the maximum depth practicable or twenty (20) feet.
- 4. Wells shall have a Christy box or similar structure with a locking cap or cover. Well(s) shall be kept locked at all times. Well(s) that become damaged by traffic or construction shall be repaired in a timely manner or destroyed immediately (through permit process). No well(s) shall be left in a manner to act as a conduit at any time.
- 5. Permitte, permittee's, contractors, consultants or agents shall be responsible to assure that all material or waters generated during drilling, boring destruction, and/or other activities associated with this Permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statues regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on-or off site storm sewers, dry wells, or waterways or be allowed to move off the property where work is being completed.
- 6. No changes in construction procedures or well type shall change, as described on this permit application. This permit may be voided if it contains incorrect information.
- 7. Drilling Permit(s) can be voided canceled only in writing. It is the applicants responsibilities to notify Alameda County Public Works Agency, Water Resources Section in writing for an extension or to cancel the drilling permit application. No drilling permit application(s) shall be extended beyond ninety (90) days from the original start date. Permit is valid from May 18 to May 19, 2004. Applicants may not cancel a drilling permit application after the completion date of the permit issued has passed.
- 8. Compliance with the above well-scaling specifications shall not exempt the well-scaling contractor from complying with appropriate State reporting-requirements related to well destruction (Sections 13750 through 13755 (Division 7, Chapter 10, Article 3) of the California Water Code). Contractor must complete State DWR Form 188 and mail original to the Alameda County Public Works Agency, Water Resources Section, within 60 days. Including: permit number and site map.
- 9. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.

Appendix B

Monitoring Well Borehole Logs

1	ENVIRONMENTAL ENGINEERING, INC.			GEOLOGIC LOG OF BOREHOLE SOMA-1			F	PAG	E 1 OF 2
E	30RIN	NG LOCA	ATION	PROJECT: 2762	DATE DR	LLED)։ Jւ	ıne '	10, 2004
				SITE LOCATION: 3519 Castro Valley Blvd Castro Valley, CA	CASING E	LEVA	ATIC	ON:	
	SE	E SITE N	MAP	-	DEPTH T	O 18	ΤG	W: 2	2'
				DRILLER: Gregg Drilling & Testing	APPROVI	ED BY	Y : M	l Se	pehr
				LOGGED BY: E Jennings					
PID ppm	DEРТН	GRAPHIC LOG	SOIL CLASS.	GEOLOGIC DESCRIPTION		split spoon SAMPLED core	GW LEVEL	BLOWCOUNTS	WELL DIAGRAM
П				4" concrete over 4-6" base rock		2			
	5— - -		CL	SILTY CLAY: dark brown, very soft, moist to very moist, high plasticity to high estimated permeability (MEK-HEK). No petroleum hydrocarbor odor.	; Medium (PHC)	HAND AUGERED TO		3 7 9	: Casing
	10— - - - 15—		CL/ML	SILTY CLAY/ CLAYEY SILT: gray mottled orange brown, med. stiff to slight plasticity; Low estimated permeability (LEK). No PHC odor.				7 11 13	2" Schedule 40 PVC C.
			CL/ML	As above. Becomes gray and slight bluish gray. Moderate to strong Pl	HC odor.			18 20	Benjanite
	 - - - 25-		ML/SM	SANDY SILT/SILTY SAND with some Clay: gray brown and slight orar med. dense and med. stiff, moist; 40-60% fine to med. sand; LEK-MEK odor.	ge brown, (. No PHC		\bigvee	11 16 8 10 10 5 6	2772 Sand Pack

	NVIRONM	ENTAL ENGIN	VEERING, INC	GEOLOGIC LOG OF BOREHOLE SOMA-1				PA	GE 2 OF 2
 	RORIN	G LOCA	ATION	PROJECT: 2762	DATE DRI	LLE	D: .	lune	10, 2004
) (III)	C 200,	(110)(SITE LOCATION: 3519 Castro Valley Blvd Castro Valley, CA	CASING E	LEV	ΆΤΙ	ON	:
	SE	SITE N	/AP	DRILLING METHOD: Hollow Stem Auger.	DEPTH TO	O 15	ST C	SW:	22'
				DRILLER: Gregg Drilling & Testing	APPROVE	ED E	3 Y :	мѕ	epehr
				LOGGED BY: E Jennings					
mdd Old	ОЕРТН	GRAPHIC LOG	SOIL CLASS.	GEOLOGIC DESCRIPTION		split spoon SAMPLED	CW LEVE	BLOWCOUNTS	WELL DIAGRAM
	_		SP/SM	SAND and SILTY SAND: gray brown and light orange brown, med. der saturated; 40-70% fine to med. sand; HEK. No PHC odor.					1111111111 1111111111
			ML/CL	CLAYEY SILT/ SILTY CLAY: dark brown, wet to saturated; HEK. No PI	HC odor.				272 Sand Pack
	-			SILTY CLAY: gray brown slightly mottled orange brown, med stiff, moimoist; LEK-MEK. No PHC odor.	st to very				2422
11	30-			TOTAL DEPTH 30'	-			1	
	_			Groundwater first encountered at 22' and stabilized at 11.56'					
	_			Groundwater first encountered at 22 and stabilized at 11.56					
	_								
	_								
	35—								
	_								
	_								
	_								
	_								
	40—								
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	_								
11									
	_								
	50-								
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	_								
	_								
	55								

	NVIRONM	ENTAL ENGIN	NEERING, INC	GEOLOGIC LOG OF BOREHOLE SOMA-2			F	PAG	E 1 OF 1
E	BORIN	IG LOCA	ATION						10, 2004
				Casilo Valley, CA	ASING E	LEVA	ATIC	ON:	
	SEI	E SITE N	/IAP	DRILLING METHOD: Hollow Stem Auger.	EPTH T	O 1S7	ΓG	W: A	Approx 12'
				DRILLER: Gregg Drilling & Testing	PPROVI	ED BY	/: M	1 Se	pehr
				LOGGED BY: E Jennings					
PID ppm	DEPTH	GRAPHIC LOG	SOIL CLASS.	GEOLOGIC DESCRIPTION		split spoon core	GW LEVEL	BLOWCOUNTS	WELL DIAGRAM
П			CL	4" concrete over 4-6" base rock		TO 5'			
	5— 10— 10— 1		CL	SILTY CLAY with some FINE SAND: dark brown and gray brown slightly orange brown, soft and med. stiff, moist, med. to high plasticity; <30% fir Low to medium estimated permeability (LEK-MEK). No petroleum hydror (PHC) odor. As above. Light gray and light gray brown and reddish orange brown with FINE SILTY SAND: reddish brown and light gray brown, med. dense, we	ne sand; carbon th depth.	HAND AUGERED	∇	2 7 8 10 13 26	21/12 Sand Pack 21/12 Sand Pack 2 T Schedule 40 PVC Casing 2 T Schedule 40 PVC Casing 2 T Schedule 40 PVC Casing 4 D PVC Casing 6 D M Stolted Screen Bentonite Plug Cement/Bentonite Grout
	15—	2000000 2000000 2000000 2000000 2000000 2000000	SM	40-60% fine sand; MEK to high estimated permeability (HEK). No PHC TOTAL DEPTH 15'	odor.	│ │ ■		7	
	-								
	20—			Groundwater first encountered at 12* and stabilized at 10.60	· 				

F	ENVIRONMENTAL ENGINEERING, INC.			GEOLOGIC LOG OF BOREHOLE SOMA-3			j	PAG	E 1 OF 1
E	30RIN	IG LOCA	ATION	PROJECT: 2762 DA	ATE DRI	LLEC): Ju	ıne	10, 2004
				SITE LOCATION: 3519 Castro Valley Blvd Castro Valley, CA CA	SING E	LEVA	ATK	DN:	
-	SE	E SITE N	/AP	DRILLING METHOD: Hollow Stem Auger. DR	EPTH T	0 15	ΤG	W: A	Approx 12'
				DRILLER: Gregg Drilling & Testing AF	PROVI	ED B	Y: N	1 Se	pehr
				LOGGED BY: E Jennings					
PID ppm	DEPTH	GRAPHIC LOG	SOIL CLASS.	GEOLOGIC DESCRIPTION		split spoon SAMPLED core	GW LEVEL	BLOWCOUNTS	WELL DIAGRAM
			CL	4" concrete over 4-6" base rock		TO 5'			
	5—		CL	SILTY CLAY with some FINE SAND: gray brown mottled orange brown, r	med. stiff	HAND AUGERED		7 7	2" Schedule 40 PVC Casing
	- - -			dense, moist slightly plastic; <30% fine sand; Low estimated permeability No petroleum hydrocarbon (PHC) odor.	(LEK).			8 989	1 Bentorite C
	- - -			As above. Reddish brown and moist with depth. FINE SILTY SAND: reddish brown slightly mottled gray, med. dense, ve to wet; 40-60% wery fine to fine sand; High estimated permeability (HEK	ry moist		∇	55	7:1/2" Sand Peck
	15—		CIVI	No PHC odor. TOTAL DEPTH 15'	·)·	│		6	
	-			Groundwater first encountered at 12' and stabilized at 9.90'					
	20-								
	25 —								

Laborator P.	ENVIRONA	MENTAL ENGI	NEERING, INC	GEOLOGIC LOG OF BOREHOLE SOMA-4			F	PAGI	E 1 OF 1
BORING LOCATION					DATE DRI	LLED	: Ju	ine 1	0, 2004
				SITE LOCATION: 3519 Castro Valley Blvd Castro Valley, CA	CASING E	LEVA	TIC	N:	
	SE	E SITE N	MAP	DRILLING METHOD: Hollow Stem Auger.	DEPTH TO) 1ST	G	V: A	pprox 16'-17'
				DRILLER: Gregg Drilling & Testing	APPROVE	ED BY	/: M	Sep	ehr
				LOGGED BY: E Jennings					
PID ppm	DEPTH	GRAPHIC LOG	SOIL CLASS.	GEOLOGIC DESCRIPTION		split spoon SAMPLED core	GW LEVEL	BLOWCOUNTS	WELL DIAGRAM
1				4" concrete over 4-6" base rock		10.5'			D0000 000001
	5—		3101	FINE SILTY SAND with some CLAY: gray to grayish brown mottled or med. dense, damp to moist; 40-60% fine sand; Low to med. estimated (LEK). No petroleum hydrocarbon (PHC) odor. SILTY SAND/ SILTY CLAY: reddish brown, dense and med. stiff, dam Slight PHC odor.	permeability	HAND AUGERED		26 50 11 14 23	2' Schedule 40 PVC Casing
	15—		CL	SILTY CLAY: brown, med. stiff to stiff, damp to moist, slightly plastic; No PHC odor.	LEK.		<u> </u> 	9	
	- - -		SM	SILTY SAND with some CLAY: gray and slight yellow brown, med. demoist to wet; <60% fine sand; MEK to high estimated permeability (HI PHC odor.	ense, very EK). No		∇	9	2.1/2" Sand Pack
	20 		SM/ML	SILTY SAND/ SANDY SILT: gray brown slightly mottled orange, med to saturated; 40-60% fine sand; MEK-HEK. No PHC odor.	. dense, wet			7 11 6 8 8	2.1/2. Sand Pack
	-			SILTY CLAY with some SAND: gray brown slightly mottled orange bro moist; LEK-MEK. No PHC odor.	wn, med. stiff				
	25-			TOTAL DEPTH 24.5' Groundwater first encountered at 16-17' and stabilized at 9.32'			<u> </u>		Bentonite Plug

Appendix C

Monitoring Well Development Logs

G	REGG
月	

Date

Client _____

Project_

Well Number 50M 1

6-17-04

SOMA

Time Start: 7:30 End: ____

Job Number ______

Installation Date _____

MONITORING WELL DEVELOPMENT LOG

29,47

11.56

Other

3.04

All measurements taken from: 💢 Top of Casing 🔲 Protective Casing 🔲 Ground Level

Borehole Diameter _____

Screen Length _____

Measured Depth (pre-development) ____

Measured Depth (post-development) ____

Standing Water Column (ft.) 17.91

One Annulus Vol. (gal.)

Static Water Level (ft.)

One Well Volume (gal.)

	Page of
Sample ID	
Qty. of Drilling Fluid	d Lost
Minimum Gal. to b	e Purged <u>3 /</u>
Development Meth	nod BAIL - SURGE - PUMP
Purging Eguipmen	t SS BALLER 2" PUM
	ment <u>Socialis</u>
pH/EC Meter	HORIBA U-10
Turbidity Meter	HORIBA 11-10

				Field P	arameters Me	easured				1
Time	Amount Purged (gal.)	рH	EC	Turbidity	D.O	€≈ ⊕. Temp.	SAL.	GPM W.L.	Comments	Field Tech
8:22	10	6.67	0.91	>999	anjurelitik-m.	18.8	0.04	1.25	CAUBRATE HORIBA AH 3,94	
8:26	15	6.78	0.93	<i>₹999</i>	1 2 X	19.8	0.04	l	CONQ 4,52 TURB O TEMP 19,1	
8:30	20	686	0.89	7999	- j.	, 195	0.03	1.25	BALLED 3 GAL - STAGE SURGE	7:45
8:35	_25	6.94	0.88	7999		19.6	0.03	1-25	570P 8:05 - BAIL 3GAL -612	~13.5
8:40	30	6.93	0.87	7999	-	196	0.03	1.25		
			T. T. Market	, , , , , , , , , , , , , , , , , , ,		<u></u>				
				San						
				Season of the second of the se	No. 50 of Anti-American ships and approximate an experience of	والمستروع والمست				
					. *					
						-				

G	REGG
	-

				MONITO	HING WE	LL DEVELO	PMENTL	OG.	Page of	
	 ■ All measureme	nts taken from:	Top of	Casing	rotective Ca	sing 🗌 Grou	und Level	8	Sample ID	
Date	ber <u>Sa</u> 6-17 t: 9 0	-0"		Screen Lengt	th	8 'r 5 '		<u> </u>	Oty. of Drilling Fluid Lost Minimum Gal. to be Purged Development Method Surge BAIL	
	SOMI			Measured De	epth (post-de	evelopment)	 		Purging Equipment <u>\$\$ BAILER</u> Water Level Equipment <u>\$0LIAS T</u>	
Installatio	ber n Date neter	a ::		One Well Volu	ume (gal.)	D.	7/	······································	OH/EC Meter HOR 18A V-10 Furbidity Meter Horis A V-10 Other	o
		[Field Pa	arameters M	leasured				*
Time	Amount Purged (gal.)	рН	EC	Turbidity	D.O.	₽₽. Temp.	SAL.	GPM W.L.	Comments	Field Tech
9:25	2	8. 03	1.87	7999	ATE PROPERTY.	19.3	0.08		NO SECIMENT ON BOTTOM	
9:29	4	7.92	1.80	>999		19,1	0.08		SURGED 15 MIN	
9:34	6	7.99	1.65	>999		19.0	0.07	W.L. 14.0	-LET RECHARGE 10 MILL	
0.47	The same of the sa	702	154	7990	<u></u>	18.9	0.07		<u> </u>	

FINAL FIELD PARAMETER MEASUREMENTS

G	REGG'
具	

MONITORING WELL DEVELOPMENT LOG

Page	 of	

100				MONITO	KING WE	LL DEVELO	PIVICINI LO	iG.		Page	_ of	
	 All measuremer	nts taken from:	▼ Тор о	f Casing 🔲 P			nd Level	c	ample ID	d Lost		
.Well Numb	er <i>So</i>	MA 3_		Borehole Dia	meter	- 8			Ainimum Gal. to b			
Date	6-17-	04		Screen Lengt					evelopment Met	hod <u>SURGE</u>	- BAIL	 -
Time Start:	10:05	End: 101.	55	Measured De	pth (pre-deve	elopment)	14,82					
Client Project Job Numb	<i>Soly</i> er Date eter	Ą		Measured De Static Water I Standing Wat One Well Volu	pth (post-de _evel (ft.) er Column (ft ume (gal.)	velopment)	2,90 4,92 84	F V P	Purging Equipment Vater Level Equip oH/EC Meter furbidity Meter Other	ment <u>SOLI</u> HORIBA HORIBA	NST U-10 U-10	
				Piald Sa	arameters M	loggirod						
Time	Amount Purged (gal.)	рН	EC	Turbidity	D.O.	easureu P. Temp.	SAL.	W.L.	*	Comments	*2.	Field Tech.
10:79	2	7.85	1,57	>999	**	20.6	0.07	11,40	No SEDIMEN	17 - SURGER	15 m	M
10-33	4	7.40	1,24	>999		20.7	0.05	11.60				
	1 7	1	1 7 7	\ C 0 -	I	l .		1	I			1

Time	Amount Purged (gal.)	рН	EC	Turbidity	D.O.	ego, Temp.	SAL.	W.L.	Comments	Tech.
10:79	2	7.85	1,57	>999	Management	20.6	0.07	11,40	NO SEDIMENT - SURGEU 15 M	M
10-33	4	7.40	1,24	>999		20.7	0.05	11.60		
10:37	6	7.29	1.09	7999	**	20:0	0.04	(1.76		
10:41	8	7.26	101	7999	ARCONOM.	19,8	0.04	11.80		
10:45	10	7.27	1.00	7999	-	19.8	0.04	11.80		
	- 10									ļ
										<u> </u>
		-								

FINAL FIELD PARAMETER MEASUREMENTS

GREGO	7

MONITORING WELL DEVELOPMENT LOG

	MONTORING WELL DEVELOP MENT EGG	Page of
All measurements taken from:	op of Casing	Sample ID
Well Number <u>50MA</u> 4 Date <u>6-17-04</u>	Borehole Diameter 8'' Screen Length 8'	Qty. of Drilling Fluid Lost
Time Start: # O() End:	Measured Depth (pre-development)	
Client SonnA	Measured Depth (post-development) 22.72	Purging Equipment SS BAILER 28 P. a.P.
Project	Static Water Level (ft.) 9.32	Water Level Equipment
Job Number	Standing Water Column (ft.) 13.40	pH/EC Meter HORIA (1-10
Installation Date	One Well Volume (gal.) 2, 28	Turbidity Meter HORIBA U-IO
Well Diameter	One Annulus Vol. (gal.)	Other

				Field Pa	arameters Me	easured			:	
Time	Amount Purged (gal.)	Нq	EC	Turbidity	D.O.	S∞2. Temp.	SAL.	GPM ™:Ľ.	Comments	Field Tech.
11:43	8	7.30	1.29	7999	Mary Agenta or Street	22,7	0.05	1,0	BAILED 3GAL, - STARTED SURGE!	1:10
11:47	17	7.06	1.17	>999	******	22,5	0.05	1 .	STOPPED-11-25/BAILED 3 GA	
11:51	16	7.03	1,14	>999		21.8	0.05	1.0	,	
11:56	_ 20	7.18	1,08	7999	Kinggapur ^a .	22.3	0.04	1.0		
12:00	ZY	7.20	1.12	>999	Academic Control	22.5	0,05	1.0		
·	:			5						
							-			
· ·				N. T.						
								2		
								X5.		
	·			EINAL	EIELD DADAI	METED MEAS	HIDEMENTS			

FINAL FIELD PARAMETER MEASUREMENTS

Appendix D

Monitoring Well Survey Data

DATE: 6/21/04 JOB# A0459

TABLE OF ELEVATIONS & COORDINATES ON MONITORING WELLS

SOMA ENVIRONMENTAL 3519 CASTRO VALLEY BLVD., CASTRO VALLEY

WELL ID	NORTHING (FT.)/	EASTING (FT.)/		
#	LATITUDE (D.M.S.)	LONGITUDE (D.M.S.)	ELEVATION (FT.)	
ESE-1	2079361.15	6106465.13	180.24	2" PVC, NOTVH N. SIDE
	N 37° 41' 42.07112"	W 122° 04' 24.07899"	180.71	SET PUNCH NORTH SIDE RIM
			180.69	PAVEMENT NORTH SIDE
ESE-2	2079361.30	6106501.97	180.79	2" PVC, NOTVH N. SIDE
E3E-2	N 37° 41' 42.07873"	W 122° 04' 23.62071"	181.16	SET PUNCH NORTH SIDE RIM
	N 37 41 42.07673	VV 122 U4 23.02U/1	181.14	CONC. NORTH SIDE
			101117	CONC. NORTH SIZE
ESE-5	2079381.46	6106387.63	178.80	2" PVC, NOTVH N. SIDE
2020	N 37° 41' 42.25902"	W 122° 04' 25.04739"	179.07	FELT X ON NORTH SIDE RIM
	TV OF TI ILIZOGOZ	VV 122 04 20104700	179.10	CONC. NORTH SIDE
NAVA C	0070454.04	0400400 77	101.00	2" PVC, NOTVH N. SIDE
MW-6	2079451.94	6106492.77	181.80	SET PUNCH NORTH SIDE RIM
	N 37° 41' 42.97323"	W 122° 04' 23.75412"	181.97 181.88	GROUND NORTH SIDE HIM
•			181.88	GROUND NORTH SIDE
MW-7	2079337.18	6106516.12	179.11	2" PVC, NOTVH N. SIDE
	N 37° 41' 41.84264"	W 122° 04' 23.43963"	179.55	SET PUNCH NORTH SIDE RIM
			179.49	CONC. NORTH SIDE
SOMA-1	2079370.39	6106506.79	180.95	2" PVC, NOTVH N. SIDE
SOIVIA-1	N 37° 41' 42.16939"	W 122° 04' 23.56265"	181.25	SET PUNCH NORTH SIDE RIM
	N 37 41 42.10939	W 122 04 23.36263	181.22	CONC. NORTH SIDE
			101.22	CONC. NORTH GIGE
SOMA-2	2079297.44	6106567.02	178.99	2" PVC, NOTVH N. SIDE
	N 37° 41' 41.45825"	W 122° 04' 22.79809"	179.29	SET PUNCH NORTH SIDE RIM
			179.28	CONC. NORTH SIDE
SOMA-3	2079130.83	6106567.48	176.81	2" PVC, NOTVH N. SIDE
JOHN	N 37° 41' 39.81129"	W 122° 04' 22.75752"	177.18	SET PUNCH NORTH SIDE RIM
		0	177.12	PAVEMENT NORTH SIDE
0014	0070444.57	040040400	470.04	OLDVC NOTVIAN SIDE
SOMA-4	2079141.57	6106464.22	176.94	2" PVC, NOTVH N. SIDE SET PUNCH NORTH SIDE RIM
	N 37° 41' 39.9003"	W 122° 04' 24.04438"	177.43	
<u>.</u>			177.44	PAVEMENT NORTH SIDE

DATE: 6/21/04 JOB# A0459

TABLE OF ELEVATIONS & COORDINATES ON MONITORING WELLS

SOMA ENVIRONMENTAL 3519 CASTRO VALLEY BLVD., CASTRO VALLEY

ADDITIONAL POINTS

ABBITTOTAL				
PT#	NORTHING (FT.)	EASTING (FT.)	ELEVATION (FT.)	DESCRIPTION
320	2079386.87	6106408.85	N/A	BL. INTX
321	2079387.18	6106455.22	N/A	BL. INTX
331	2079351.06	6106409.27	N/A	BL<
318	2079384.55	6106369.10	N/A	DWY
329	2079106.74	6106368.58	N/A	DWY
- 330	2079148.74	6106368.66	N/A	DWY
317	2079424.72	6106369.39	N/A	DWY E-C
315	2079481.34	6106432.38	N/A	DWY PCC
310	2079415.57	6106624.48	N/A	DWY POC
311	2079423.23	6106606.56	N/A	DWY POC
312	2079447.91	6106542.76	N/A	DWY POC
313	2079461.36	6106504.01	N/A	DWY POC
314	2079472.67	6106468.07	N/A	DWY POC
316	2079466.76	6106389.18	N/A	HCRMP POC
319	2079237.38	6106368.78	N/A	TC

BENCH MARK: NGS Bench mark No.PID# HT0223

THE STATION IS LOCATED IN THE CITY OF HAYWARD AT THE RAILROAD CROSSING OF THE SOUTHERN PACIFIC RAIL-ROAD AND BLOSSOM WAY, IN THE TOP OF THE NORTHWEST CURB OF BLOSSOM WAY.

TO REACH THE STATION FROM THE JUNCTION OF U S HIGHWAY 880 ON WEST A STREET, GO SOUTHEAST ON WEST A STREET FOR 0.2 MILES TO A CROSSROAD, HATHAWAY AVE ON THE LEFT, SANTA CLARA STREET ON THE RIGHT. TURN LEFT, NORTH, ON HATHAWAY AVENUE AND CONTINUE FOR 0.7 MILES TO WEST BLOSSOM WAY. TURN RIGHT, NORTH, ON WEST BLOSSSOM WAY AND CONTINUE FOR 0.25 MILES TO THE STATION ON THE LEFT, JUST PAST THE RAIL-ROAD TRACKS.

THE STATION IS 48.95 M (160.6 FT) NORTHEAST OF THE NORTHEAST RAIL, 7.01 M NORTHWEST OF THE CENTER OF BLOSSOM WAY, 0.24 M (0.8 FT) NORTH OF THE NORTH CORNER OF A STEEL GRATE IN THE STREET, 5.6 M (18.5 FT) SOUTHWEST OF A POWER POLE AND 0.12 M (0.4 FT) HIGHER THAN THE STREET.

Elevation =56.33 FEET NAVD88 Datum ADJUSTED

HORIZONTAL CONTROL:

PID - HT0223

NORTHING =2,072,670.26, EASTING = 6,095,650.79 FEET; EPOCH DATE = 1998.50

PID - HT 2583

NORTHING =2,082,510.30, EASTING = 6,116,892.13 FEET; EPOCH DATE = 1991.35

Coordinate values are based on the California Coordinate System, Zone III NAD 83 Datum.

Kier & Wright Engineers Surveyors, Inc.

7/7/2004 9:01 AM A04594-WELLS 1233 Quarry Lane, Suite 145, Pleasanton, CA 94566 Phone (925) 249-6555, Fax (925) 249-6563