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June 30, 2003

Ms. Eva Chu
Hazardous Materials Specialist
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

RE: Sensitive Receptor Survey and Conduit Study
The Bohannon Development Company Property
575 Paseo Grande, San Lorenzo, California
SECOR Project # 05OT.50063.02

Dear Ms. Chu:

SECOR International Incorporated (SECOR) has prepared this *Sensitive Receptor Survey and Conduit Study* for the property located at 575 Paseo Grande, San Lorenzo, California. The scope of work performed by SECOR and described in this document was requested by you in correspondence dated April 29, 2003.

This document is organized as follows: summary of the project background and previous work performed at the site; discussion of the known subsurface conditions; presentation and discussion of the findings of the receptor survey and conduit study; and our conclusions and recommendations regarding future work at the site.

PROJECT BACKGROUND

Over the last 25 years, the site has been used as an asphalt-paved parking area located in a C1 commercial zone. The site was a gasoline station prior to 1969. Little information is known about the site history related to its use as a gasoline service station.

Previous Work: 1995 - 2000

Initial subsurface characterization work performed by others in 1995 identified the former underground storage tank (UST) pit, approximately 110 feet of fuel delivery piping, and a grease sump. Field evidence and one soil sample indicated the potential for soil contamination along the piping runs, around the grease sump, and around the inferred location of the former UST. Characterization of the magnitude and extent of potential soil contamination was not performed during initial investigation activities.

In June 1995, SECOR performed additional activities at the site which included removal of the fuel delivery piping and grease sump, and characterization soil sampling along pipelines and around the grease sump and former tank pit areas. Based on data obtained during this investigation, SECOR subsequently removed the grease sump, performed overexcavation of the former UST pit, and installed three groundwater monitoring wells (MW-1, MW-2, and MW-3). In December 2000, SECOR installed four additional groundwater monitoring wells (MW-4 through MW-7) down- and cross-gradient of the site.

Recent Work: 2000 - Present

SECOR has performed periodic groundwater monitoring of the on-site wells (MW-1 through MW-3) since May 1996, and the off-site wells (MW-4 through MW-7) since December 2000. Historically, wells MW-2, MW-3, and MW-4 contain elevated concentrations of petroleum hydrocarbons. Wells further off-site to the west (MW-6 and MW-7) and south (MW-5) typically do not contain detectable levels of petroleum hydrocarbons.

In January 2003, SECOR performed an additional limited subsurface investigation which consisted of advancing six on-site soil borings for the collection of soil and grab groundwater samples. The objective of the investigation was to provide data on the extent and magnitude of residual petroleum hydrocarbons that may remain in the soil, especially below the groundwater table. Based on field observations, soil boring logs, and laboratory analytical results, SECOR concluded that, 1) subsurface materials consist primarily of fine-grained soils, and can be divided into 'A', 'B', and 'C' zones based on depth and the occurrence of water-bearing sandy layers within the fine-grained soils; 2) perched groundwater was encountered within fill materials at approximately 5 to 8 feet below ground surface (bgs), and water-bearing zones were encountered in silt and sand at depths of 13 to 15 feet bgs, in sand from 16 to 19 feet bgs, and in silty sand at 22.5 feet bgs; and 3) soil sample analytical results suggest that the majority of chemical impact exists in silty clay from approximately 8 to 13.5 feet bgs within and adjacent to the former UST and pump island excavation, although isolated deeper zones of impact exist to at least 23 feet bgs.

Based on these conclusions, SECOR recommended additional work to further characterize subsurface conditions in the vicinity of the site. SECOR presented the findings of the investigation and the recommended additional scope of work in the *Limited Subsurface Investigation Report and Work Plan for Additional Soil and Groundwater Assessment* dated February 19, 2003. In correspondence dated April 29, 2003, Ms. Chu of the Alameda County Health Care Services Agency (ACHCSA) requested that a receptor survey and conduit study be performed at the site prior to initiating additional subsurface investigation. This document has been prepared on behalf of Bohannon Development Company in response to this request.

HYDROGEOLOGIC CONDITIONS

Subsurface materials identified during soil boring and monitoring well installation activities conducted between 1995 and 2000 consist primarily of fine-grained soils as silty clay and clay with minor amounts of fine-grained sand. The first-encountered groundwater is typically found within a zone of clayey sand, sandy silt or silty clay at a depth of 12 to 14 feet bgs. The average depth to groundwater measured in wells MW-1 through MW-7 is 5.35 to 6.69 feet bgs, indicating at least partially confined conditions.

Subsurface data obtained during the January 2003 characterization further refined SECOR's understanding of the subsurface geology and hydrogeology. Based on the classification of materials encountered in soil borings advanced to a maximum depth of 24.5 feet bgs, SECOR divided the geology beneath the site into three zones, designated 'A', 'B', and 'C' from shallowest to deepest.

In five of the six 2003 soil boring locations, SECOR encountered a silty clay layer between approximately 6 and 12 feet bgs, which appears to be continuous across most of the site. Based on the historic groundwater monitoring data, this clay layer (where present) appears to act as a semi-confining layer for the underlying groundwater. The three zones, as described in SECOR's February 19, 2003 report, are summarized below:

- The 'A' zone extends from the ground surface to a depth of approximately 16 feet bgs. This zone includes fill materials associated with the former excavations. Native materials in the 'A' zone consist of clayey sand, sandy silt and clay, and includes the dominant silty clay layer found beneath much of the site between 6 and 12 feet bgs. Localized sand zones were encountered between 6 and 8 feet bgs in soil boring SB-1, and between 6 and 15 feet bgs in soil boring SB-2. Sand was reported at depths of approximately 5.5 feet to 10.5 feet in the boring log for well MW-3, installed in May 1996. Perched water seasonally occurs in the 'A' zone within coarse-grained fill materials at depths ranging from 5 to 8 feet bgs (soil borings SB-1, SB-2, and SB-3). The primary water-bearing zones were encountered in sandy silt lenses at depths of 13 to 14 feet bgs (soil borings SB-3, SB-4 and SB-5). The three on-site and four off-site groundwater monitoring wells are screened in the 'A' zone, and typically collect perched groundwater on top of the 6-to12 foot clay and semi-confined groundwater within the sandy silt below the clay. The exception is MW-3, where the clay appears to be absent and the well is screened across sand. The potentiometric surface of the 'A' zone groundwater, as measured in the wells, is consistently at a depth of approximately 5 to 7 feet bgs;

- The 'B' zone extends from approximately 16 to 21 feet bgs, and consists of silty clay and sandy silt with clay. Water-bearing silty sand was encountered from approximately 15 to 18.5 feet in SB-1, and may be vertically continuous with the 'A' zone silty sand in this area. The unit exists as a thinner lens (<2 feet thick) away from SB-1 an SB-2, and was encountered at depths ranging from 15.5 to 18 feet bgs in SB-3, SB-4 and SB-6; and

- The 'C' zone exists at depths of 21 feet and deeper, and was encountered in soil borings SB-5 and SB-6 advanced to 24 and 26 feet bgs, respectively. The 'C' zone is characterized by water-bearing silty sand with clay, and its lower boundary was not defined.

SENSITIVE RECEPTOR SURVEY

SECOR reviewed available records to identify any potential exposure to groundwater within 2,000 feet of the site. The survey included identification of groundwater wells and surface water bodies, and an evaluation of their potential to act as sensitive receptors for impacted groundwater. These potential receptors are discussed below.

Groundwater Wells

Prior to records review, SECOR performed a field reconnaissance of the residential block directly downgradient of the site (the block bounded by Pase Grande, Pase Larga Vista, and Via del Sol) to determine if any equipment associated with irrigation or domestic wells was visible. None was noted. SECOR subsequently reviewed drillers' logs at the Department of Water Resources in Sacramento, California to identify irrigation, domestic, and municipal production wells within 2,000

feet of the site. No domestic or municipal production wells were identified in these records. The study identified three irrigation wells within the specified radius. Based on field reconnaissance, none of the three wells appear to be used for significant agricultural purposes, but rather are likely used for landscape irrigation. These wells are summarized below, and illustrated on Figure 1:

- Well 1: 17127 Via Flores, San Lorenzo. Irrigation well, installed 1977, 25 feet total depth, screened 12 to 25 feet bgs, located in private single-family residence approximately 1,600 feet south of the site;

- Well 2: 945 Paseo Grande, San Lorenzo. Irrigation well, installed 1990, 100 feet total depth, screened 50 to 90 feet bgs, located in church approximately 1,900 feet west-southwest of the site; and

- Well 3: 745 Grant Avenue, San Lorenzo. Irrigation well, installed 1977, 30 feet total depth, screened 10.5 to 30 feet bgs, located in private single-family residence approximately 1,400 feet northwest of the site.

Surface Water Bodies

San Lorenzo Creek is located approximately 2,000 feet north of the site, on the edge of the study area. San Lorenzo Creek drains to San Francisco Bay to the west. Groundwater flow from the site has been historically measured as west to southwest, suggesting groundwater at the site does not flow toward San Lorenzo Creek. Groundwater likely flows toward San Francisco Bay, which is approximately two miles southwest of the site.

CONDUIT STUDY

SECOR performed a conduit study to determine the existence of subsurface conduits (i.e., utility trenches) in the vicinity of the site that may act as preferential pathways for the off-site migration of petroleum hydrocarbon-impacted groundwater and/or soil vapors.

Utility Survey

In performing the study, SECOR contracted with Cruz Brothers Locators, a subsurface utility locator, to identify and map all underground utilities in the vicinity of the site. The utilities identified are described below, and summarized graphically on Figures 2 and 3:

- Electrical power in the vicinity of the site is supplied by overhead power lines;

- Natural gas lines are located within easements adjacent to the right-of-way, with a lateral entering the site from Paseo Grande northeast of the former excavations. The depth of natural gas lines range from 28-inch to 48-inch bgs;

- Water lines are located within the right-of-way, with two laterals entering the site to the southeast of the former excavations. The depth of water lines range from 41-inch bgs adjacent to the site to 65-inch bgs downgradient from the site;

- A telephone line was traced northeast on Paseo Grande from a vault box between Paseo Larga Vista and Via del Sol. The depth of the telephone line could not be determined, but based on conversations with Cruz Brothers, communications lines are typically located within 36 inches of the ground surface;

- The inferred primary sanitary sewer system, identified on Figure 3 as the 'shallow sanitary sewer', is located within the right-of-way at depths of 54-inch to 72-inch;

- The inferred secondary sanitary sewer system, identified on Figure 3 as the 'deep sanitary sewer', is located within Paseo Grande at a depth of 9.5 feet bgs. A man way was identified near the intersection of Paseo Grande and Paseo Larga Vista, with an additional man way northeast on Paseo Grande towards Hesperian Boulevard. No additional man ways could be identified to the southwest on Paseo Grande; and

- A storm drain system was identified within the right-of-way in the vicinity of the site at depths ranging from 20-inch to 31-inch bgs.

DISCUSSION

Sensitive Receptor Survey

The objective of the receptor survey is to identify any potential sensitive receptors that could be adversely impacted by the off-site migration of petroleum hydrocarbon-impacted groundwater. The survey identified two wells in the downgradient direction and one in the crossgradient direction within 2,000 feet of the site. Groundwater usage rates for these wells were not available in the records reviewed by SECOR. Depending upon usage, it is possible that groundwater flow could be influenced by extraction at one or more of the three wells identified. However, based on their distance from the site (at least 1,200 feet) and the absence of petroleum hydrocarbons in wells MW-5, MW-6, and MW-7, it is unlikely that these wells have been or could be impacted by petroleum hydrocarbons in shallow groundwater originating from the site. Similarly, considering the distance of San Lorenzo Creek from the site and the historical groundwater flow direction at the site, it is unlikely that this surface water body has been or could be impacted petroleum hydrocarbons originating from the site. As requested by the ACHCSA, a rose diagram illustrating groundwater flow directions based on measurements taken from May 1996 to March 2003 is presented on Figure 4.

Conduit Study

The objective of the conduit study is to determine the locations and depths of subsurface conduits (i.e., utility trenches) in the vicinity of the site, and to evaluate the potential effect of these pathways on the off-site migration of petroleum hydrocarbon-impacted groundwater and/or soil vapors.

First-encountered groundwater is typically found at depths of 13 to 14 feet bgs. Results of previous investigations and groundwater measurements from the on- and off-site wells typically indicate the presence of a confining layer between 6 and 12 feet bgs. While the confining layer may be absent or very thin in some areas (i.e., SB-2 and MW-3), none of the utilities identified during the conduit study extend vertically below this confining layer. This suggests that utilities are not serving as preferential pathways for first-encountered groundwater.

As reported by SECOR (2003), perched groundwater may be encountered in some borings above the confining layer. During the January 2003 investigation, perched groundwater was found in soil borings SB-1, SB-2, and SB-3. During installation of onsite and offsite monitoring wells, perched groundwater was encountered in wells MW-3 and MW-7.

The depths of subsurface utilities identified during the conduit study suggest that perched groundwater could flow within coarse-grained backfill materials used for construction of the utilities. Downgradient wells MW-5, MW-6, and MW-7 are located along the utility corridors and are screened across the depths where perched groundwater could be present. Perched groundwater was noted during drilling of MW-7, but not MW-5 or MW-6. Petroleum hydrocarbons have typically not been detected at MW-5, MW-6, and MW-7, suggesting that utility corridors are not significant preferential pathways for contaminant migration in perched groundwater.

CONCLUSIONS

Based on the findings of this investigation, SECOR concludes the following:

- The three irrigation wells and one surface water body identified within 2,000 feet from the site have a low potential to be impacted by petroleum hydrocarbons in shallow groundwater originating from the site. The irrigation wells are a significant distance from the site, and likely have minimal use. San Lorenzo Creek is located a significant distance from the site in the cross-gradient direction; and

- Subsurface utility corridors have the potential to act as preferential pathways for perched groundwater flow (i.e., above 8 feet bgs). Downgradient wells MW-5, MW-6 and MW-7 suggest that contaminants are not migrating significantly in shallow groundwater within utility corridors; and

Should you have any questions or concerns regarding this proposal, please contact the undersigned at (925) 299-9300.

Sincerely,

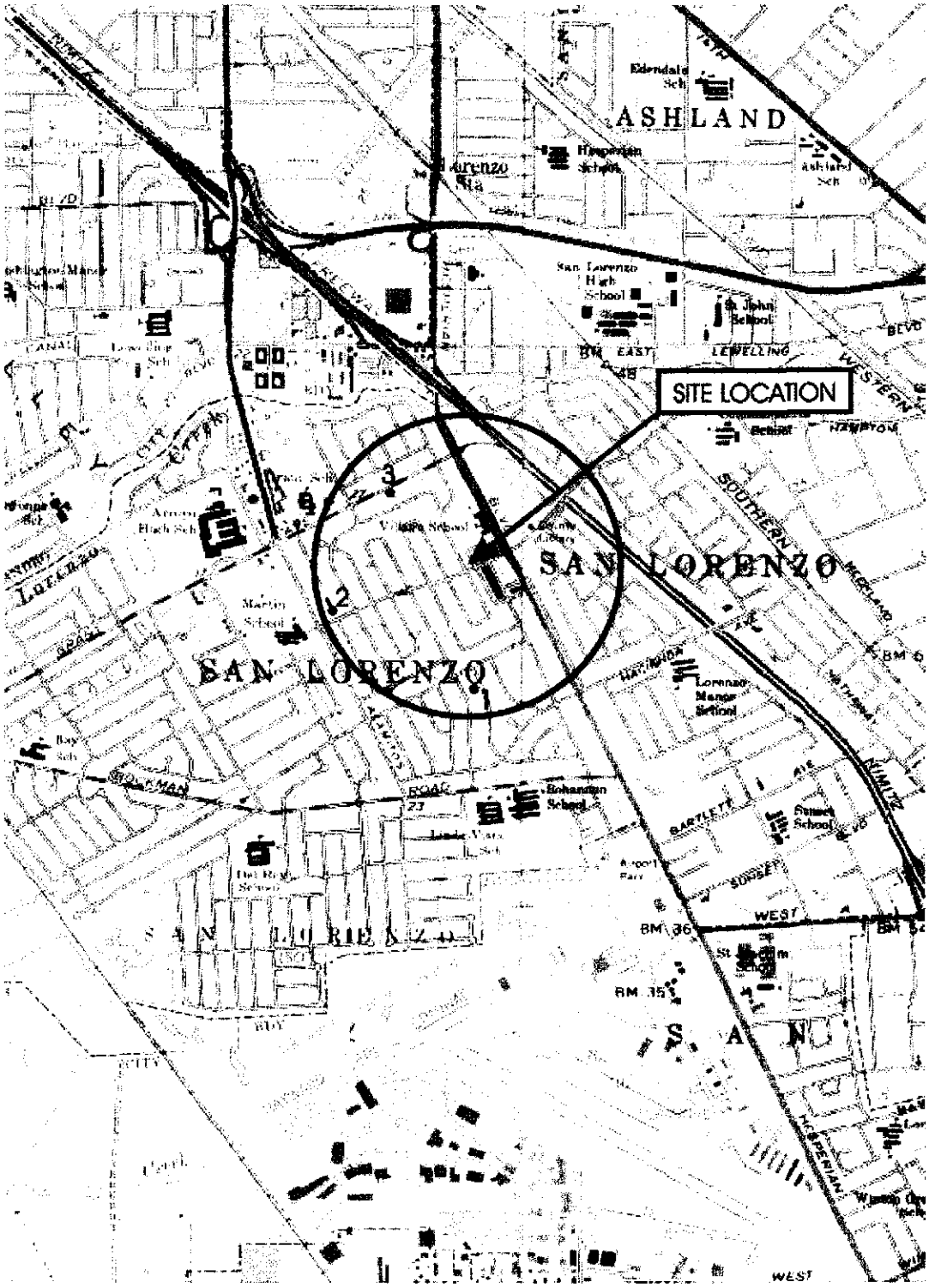
SECOR International Incorporated

Neil Doran
Project Geologist

Chris Maxwell, R.G.
Principal Project Geologist

cc: Mr. Mike Jepsen, Bohannon Development Company
Mr. Andrew Bassak, Steefel, Levitt & Weiss

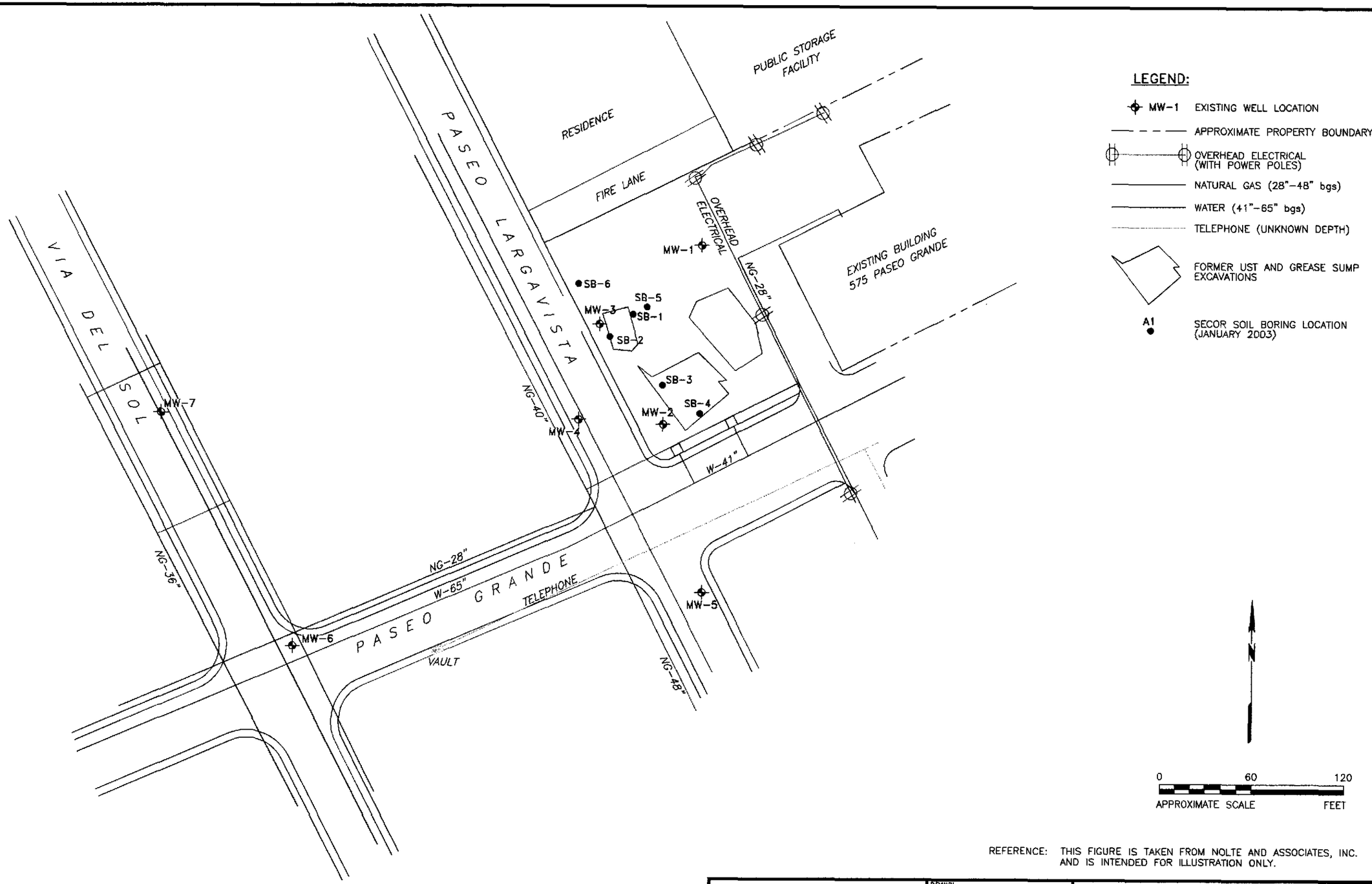
Attachments: Figure 1 – Radius Map and Well Locations
Figure 2 – Water, Natural Gas, Telephone and Overhead Electric Utilities Map
Figure 3 – Storm Drain and Sewer Utilities Map
Figure 4 – Groundwater Flow Direction (May 1996 to March 2003)



REFERENCE;
SAN LEANDRO AND HAYWARD QUADRANGLES
7.5-MINUTE SERIES (TOPOGRAPHIC)
SAN LEANDRO AND HAYWARD, CALIFORNIA, 1995
PHOTOREVISED 1980

0 2000 4000
APPROXIMATE SCALE FEET

DESIGNED BY ND DRAWN BY RRR CHECKED BY APPROVED BY DATE 13 JUNE 2003	SECOR 57 Lafayette Circle, 2ND Floor Lafayette, California 94549 Phone Number: (925) 299-9300 Fax Number: (925) 299-8302	DAVID D. BOHANNON ORGANIZATION 575 PASEO GRANDE SAN LORENZO, CALIFORNIA RADIUS MAP AND WELL LOCATIONS	SCALE 1"=2000' PROJECT NO 05OT.50063.02.0002 DRAWING FIGURE 1



REFERENCE: THIS FIGURE IS TAKEN FROM NOLTE AND ASSOCIATES, INC. AND IS INTENDED FOR ILLUSTRATION ONLY.

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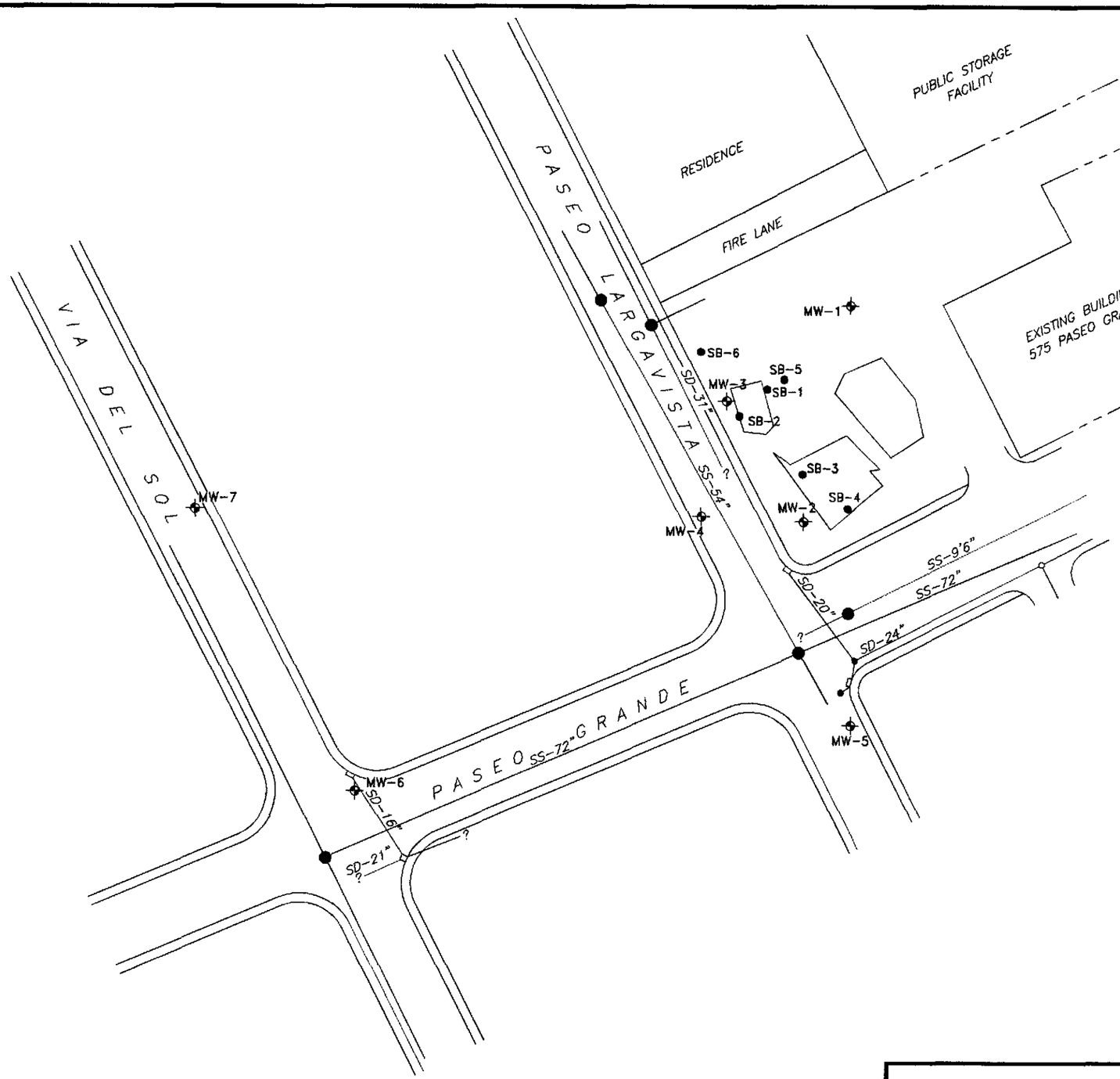
FIGURE 2
DAVID D. BOHANNON ORGANIZATION
575 PASEO GRANDE
SAN LORENZO, CALIFORNIA
WATER, NATURAL GAS, TELEPHONE AND OVERHEAD ELECTRIC UTILITIES MAP

20030618.11502669 K:\BOH\2003 work plan\BOH-SD and Sewer Figure 3.dwg



LEGEND:

- MW-1 EXISTING WELL LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- SHALLOW SANITARY SEWER (54"–72" bgs)
- DEEP SANITARY SEWER (9'6" bgs)
- STORM DRAIN (20"–31" bgs)
- MANWAY
- FORMER UST AND GREASE SUMP EXCAVATIONS
- SB-1 SECOR SOIL BORING LOCATION (JANUARY 2003)

N

0 60 120

APPROXIMATE SCALE FEET

REFERENCE: THIS FIGURE IS TAKEN FROM NOLTE AND ASSOCIATES, INC. AND IS INTENDED FOR ILLUSTRATION ONLY.

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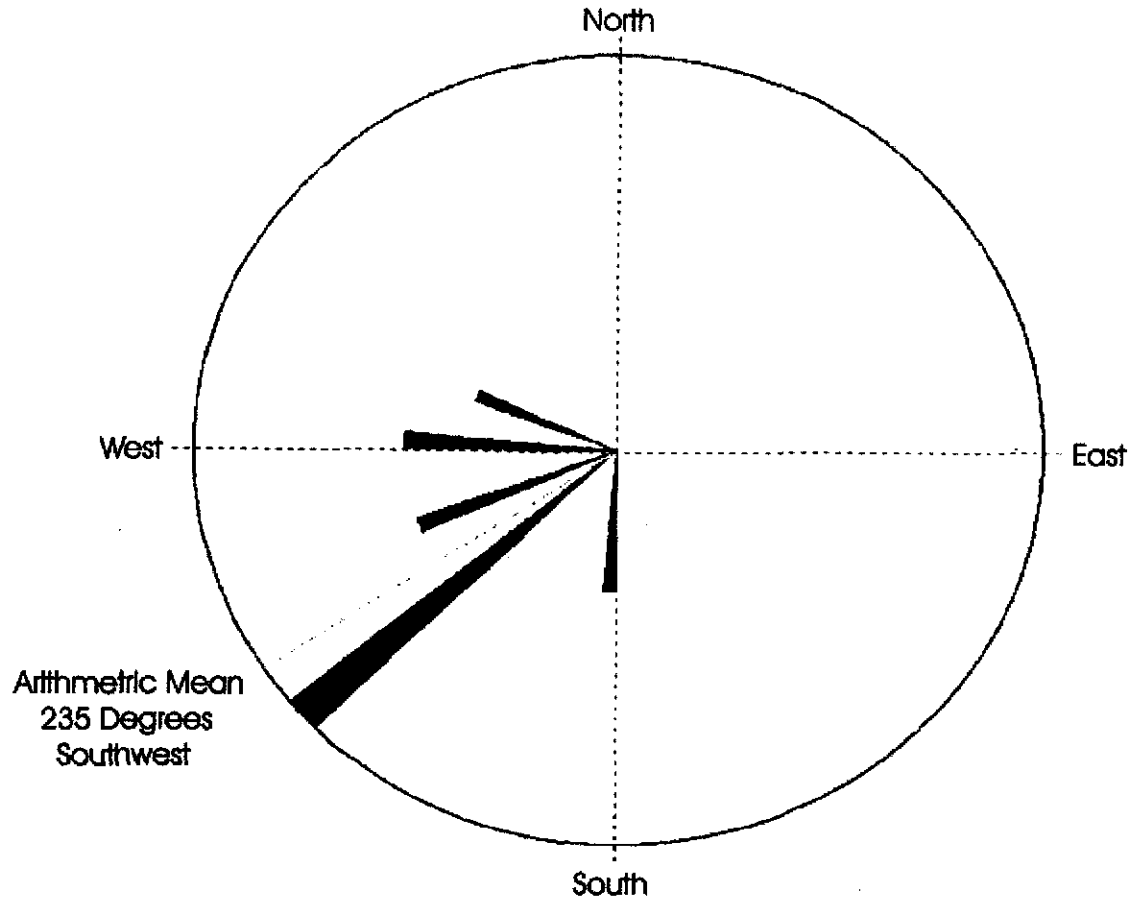
FIGURE 3
DAVID D. BOHANNON ORGANIZATION
575 PASEO GRANDE
SAN LORENZO, CALIFORNIA

STORM DRAIN AND SEWER UTILITIES MAP

20030618.1145248B K:\BOH\2003 work plan\BOH-SD and Sewer Figure 3.dwg



DESIGNED BY: ND DRAWN BY: RRR CHECKED BY: APPROVED BY: DATE: 13 JUNE 2003	SECOR 57 Lafayette Circle, 2ND Floor Lafayette, California 94549 Phone Number: (925) 299-9300 Fax Number: (925) 299-9302	DAVID D. BOHANNON ORGANIZATION 575 PASEO GRANDE SAN LORENZO, CALIFORNIA GROUNDWATER FLOW DIRECTION (MAY 1996 TO MARCH 2003)	SCALE: None PROJECT NO: 05OT.50063.02.0002 DRAWING: FIGURE 4