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SECOR

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Lafayette, CA 94549
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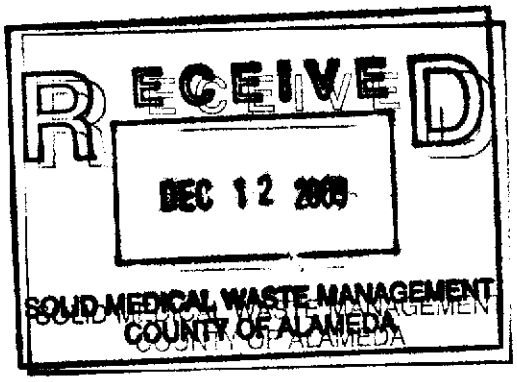
letter of transmittal

attention: Eva Chu
date: December 9, 2003

company: Alameda County Health Care Services Agency

address: 1131 Harbor Bay Parkway
Alameda, California 94502



project: 575 Paseo Grande, San Lorenzo

job no.:

re: Remedial Action Work Plan Addendum

enclosed:

( )	Proposal	( )	As Requested
( )	Contract	( )	Review
( )	Report	( )	Your Information
( )	Letter	( )	Approval
(X)	Other:	( )	Signature
		( )	Return
		( )	Other:

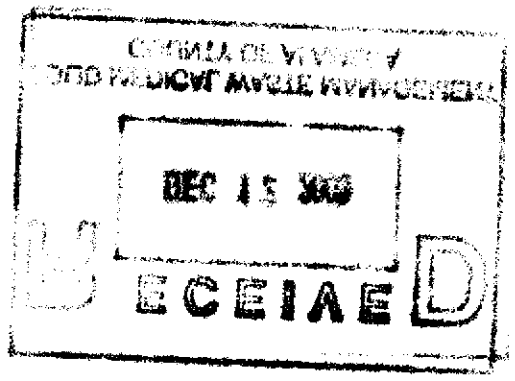
comments:

Eva,

The long-promised work plan addendum for 575 Paseo Grande. Please review and respond when your schedule permits.

Regards,

signator: Neil Doran
title: Project Geologist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December 9, 2003

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

RE: Remedial Action Work Plan Addendum
The Bohannon Development Property
575 Paseo Grande, San Lorenzo, California
SECOR PN: 05OT.50063.02

Dear Ms. Chu:

SECOR International Incorporated (SECOR) has prepared this *Remedial Action Work Plan Addendum* (Addendum) on behalf of Bohannon Development Company (Bohannon) for the property located at 575 Paseo Grande, San Lorenzo, California. This Addendum describes changes made to the nitrate injection pilot program outlined in the *Remedial Action Work Plan* (RAWP) prepared by SECOR and dated October 25, 2002. The overall remedial approach described herein was discussed with you during our November 5, 2003 meeting.

BACKGROUND

The Site is located in a mixed-use commercial and residential area (zoned commercial, C1) at the corner of Paseo Grande and Paseo Larga Vista in San Lorenzo, California (Figure 1). Prior to 1969, the site had been used as an automobile service station. In anticipation of property redevelopment, initial investigation activities were conducted in March 1995 to determine if out-of-service underground gasoline service station equipment remained on-site. In summary, the investigation identified what appeared to be the former tank pit, approximately 110 feet of fuel delivery system piping, and a grease sump and/or hydraulic lift pit in an area which may have been the former service garage.

Subsequent work included soil excavation and groundwater monitoring well installation and sampling, which indicated groundwater beneath the Site, is impacted by petroleum hydrocarbons. During telephone conversations with SECOR in June 2002, the Alameda County Health Care Services Agency (ACHCSA) requested remedial measures to reduce petroleum hydrocarbon concentrations in the groundwater.

In response to this request, SECOR prepared the October 2002 RAWP. The RAWP identified nitrate injection as a potentially effective method of decreasing concentrations of dissolved-phase petroleum hydrocarbons in groundwater beneath the Site. The RAWP also proposed the initial advancement of on-site soil borings to assess the presence of petroleum hydrocarbons in soil that could potentially decrease the effectiveness of the nitrate injection by providing an ongoing source of impact to

groundwater. A secondary goal of the soil boring investigation was to better define the subsurface lithology and water-bearing zones.

In January 2003, SECOR advanced six direct-push soil borings to a maximum depth of 26 feet below ground surface (bgs) for the collection of soil and grab groundwater samples. The following is a brief summary of the findings of the investigation, as reported in the *Limited Subsurface Investigation Report and Work Plan for Additional Soil and Groundwater Assessment* dated February 19, 2003:

- Based on the classification of materials encountered in the soil borings, SECOR divided the geology beneath the site into three zones, designated 'A' (from the ground surface to 16 feet bgs), 'B' (16 to 21 feet bgs), and 'C' (21 feet bgs and deeper);

- Perched groundwater was encountered within fill materials at approximately 5 to 8 feet 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;

- The majority of chemical impact to soil was identified in silty clay from approximately 8 to 13.5 feet bgs within and adjacent to the former underground storage tank (UST) and pump island excavation; and

- Grab groundwater sample analytical results indicated that groundwater in the 'B' and 'C' zones may be impacted with petroleum hydrocarbons.

Based on data obtained during the January 2003 investigation, SECOR has revised the remediation pilot program to include injection of hydrogen peroxide to address residual concentrations of petroleum hydrocarbons in soil. This approach, as well as minor revisions to the nitrate injection pilot program, is discussed below.

Nitrate Injection Pilot Test

SECOR proposes proceeding with the nitrate injection bench study and pilot test as described in the RAWP. As illustrated on Figure 2, SECOR proposes installing two 'A'-zone nitrate injection wells and one 'B'-zone injection well along the southwestern property line directly upgradient from MW-4. Concentrations of nitrate and petroleum hydrocarbon constituents in the 'A' zone will be monitored using MW-4, and SECOR will install one 'B'-zone observation well adjacent to MW-4. The injection wells will be located on approximate 10-foot centers, and the 'B'-zone observation well will be located approximately 10 feet from existing well MW-4 (see Figure 2). Well designations and construction details are summarized in the table below.

Well ID	Purpose	Casing Diameter (inches)	Screened Interval (feet bgs) / zone
NIW-A1	Injection	4	8-15 / 'A' zone
NIW-A2	Injection	4	8-15 / 'A' zone
NIW-B1	Injection	4	17-22 / 'B' zone
MW-4 (existing)	Observation	2	6-15 / 'A' zone
NOBS-B	Observation	2	17-22 / 'B' zone

The appropriate nitrate dosing will be determined by bench-scale testing as described in the RAWP. SECOR proposes an initial injection of 500 gallons of solution, prepared on-site in a polyethylene batch tank. The tank will be plumbed to the injection wells with an inline gate valve and flow meter. The solution will initially be introduced into the wells under gravity to the extent feasible. If this method proves too slow, SECOR will pump the solution into the wells using a centrifugal pump, at a pressure not to exceed 20 pounds per square inch (PSI). SECOR seeks to minimize pressurization of the solution to the extent feasible to avoid forming preferential flow pathways within the accepting formation. The nitrate injection system is represented schematically on Figure 3.

Following the initial injection, SECOR will monitor key parameters in the observation wells as outlined in the RAWP. Based on interpretation of these parameters, subsequent injections may be performed during the pilot test period to determine the appropriate dosing requirements and injection intervals for full-scale remediation.

Hydrogen Peroxide Injection Pilot Test

SECOR's January 2003 investigation identified elevated levels of petroleum hydrocarbons in soils beneath the Site. In order to prevent a 'rebound' effect whereby concentrations of petroleum hydrocarbons in groundwater initially decrease due to injection of nitrate, then increase due to the remaining source in soil, SECOR proposes a pilot study to chemically oxidize impacted soils by injecting hydrogen peroxide. Similar to the nitrate injection pilot study, SECOR proposes to introduce hydrogen peroxide solution into the subsurface via injection wells. The hydrogen peroxide will serve to rapidly oxidize free-phase petroleum hydrocarbons, and provide oxygen to stimulate the natural degradation of dissolved-phase petroleum hydrocarbons in groundwater.

Because the area of the former dispenser island (just east, or upgradient, of well MW-3) has been identified as containing the highest concentrations of petroleum hydrocarbons in soil, SECOR proposes this area for the pilot test. SECOR will install a total of eight injection wells; four each screened in the 'A' and 'B' zones for the injection of hydrogen peroxide. Each of the injection wells will be installed in a separate borehole. As illustrated on Figure 2, the wells will be installed on 10-foot centers. To monitor the effectiveness of the hydrogen peroxide injection in the source area, SECOR will install one dual-completion monitoring well, with casings screened in the 'A' and 'B'

zones, in the center of the injection cluster. Downgradient well MW-3 will also be utilized to monitor groundwater conditions. Injection and monitoring well locations are illustrated on Figure 2, and well designations and construction details are summarized in the table below.

Well ID	Purpose	Casing Diameter (inches)	Screened Interval (feet bgs) / zone
PIW-A1	Injection	4	6–10 / 'A' zone
PIW-A2	Injection	4	6-10 / 'A' zone
PIW-A3	Injection	4	6-10 / 'A' zone
PIW-A4	Injection	4	6-10 / 'A' zone
PIW-B1	Injection	4	10-22 / 'B' zone
PIW-B2	Injection	4	10-22 / 'B' zone
PIW-B3	Injection	4	10-22 / 'B' zone
PIW-B4	Injection	4	10-22 / 'B' zone
POBS-A/B	Observation	2 / 2	6-10 & 10-22 / 'A' & 'B' zone
MW-3 (existing)	Observation	2	6-15 / 'A' zone

Based on geochemical data obtained at the site to date, SECOR anticipates using a 5 percent hydrogen peroxide solution to be prepared on-site using a polyethylene batch tank. The tank will be plumbed to the injection wells with an inline gate valve and flow meter. SECOR proposes an initial injection of 500 gallons. The solution will initially be introduced into the wells under gravity to the extent feasible. If this method proves too slow, SECOR will pump the solution into the wells using a centrifugal pump, at a pressure not to exceed 20 pounds per square inch (PSI). SECOR seeks to minimize pressurization of the solution to the extent feasible to avoid forming preferential flow pathways within the accepting formation. The hydrogen peroxide injection system is represented schematically on Figure 4.

Subsequent monitoring of groundwater parameters including oxidation-reduction potential (ORP), pH, specific conductivity, hydrogen peroxide, dissolved oxygen, and ferrous iron concentrations will determine if additional injections are appropriate. Based on the geochemical data, subsequent injections may be performed during the pilot test period to determine the appropriate dosing requirements and injection intervals for full-scale remediation.

Select soil samples will be collected during well installation and analyzed for constituents of concern to provide additional data on baseline conditions. At the conclusion of the pilot test, additional soil borings may be advanced to collect data on the effectiveness of hydrogen peroxide injection.

General Considerations Regarding Nitrate and Hydrogen Peroxide Injections

Groundwater monitoring and injection wells will be permitted with the Alameda County Public Works Agency (ACPWA) and all drilling activities will be performed under the direction of a California Registered Geologist. Prior to injection of solutions, the work areas will be secured using lockable temporary fencing with privacy slats. All preparation of solutions will be performed on-site using secondary containment and appropriate personal protective equipment. The Alameda County Health Care Services Agency (ACHCSA) will be notified at the beginning and completion of injection activities.

Implementation Schedule

SECOR anticipates completing the installation of injection and observation wells within four weeks of approval of this Addendum. The nitrate and hydrogen peroxide injection pilot test will commence within four weeks of well installation, with a pilot test duration of approximately six months. SECOR will submit a complete summary report detailing the procedures and findings of the pilot test within six weeks of completion of the study.

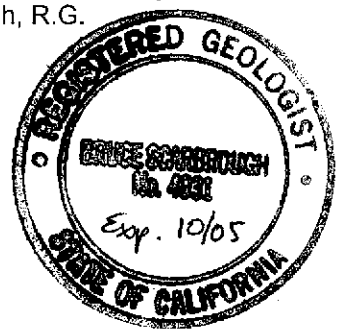
Should you have any questions or concerns regarding this Addendum or the proposed scope of work, please contact the undersigned at (925) 299-9300.

Sincerely,

SECOR International Incorporated

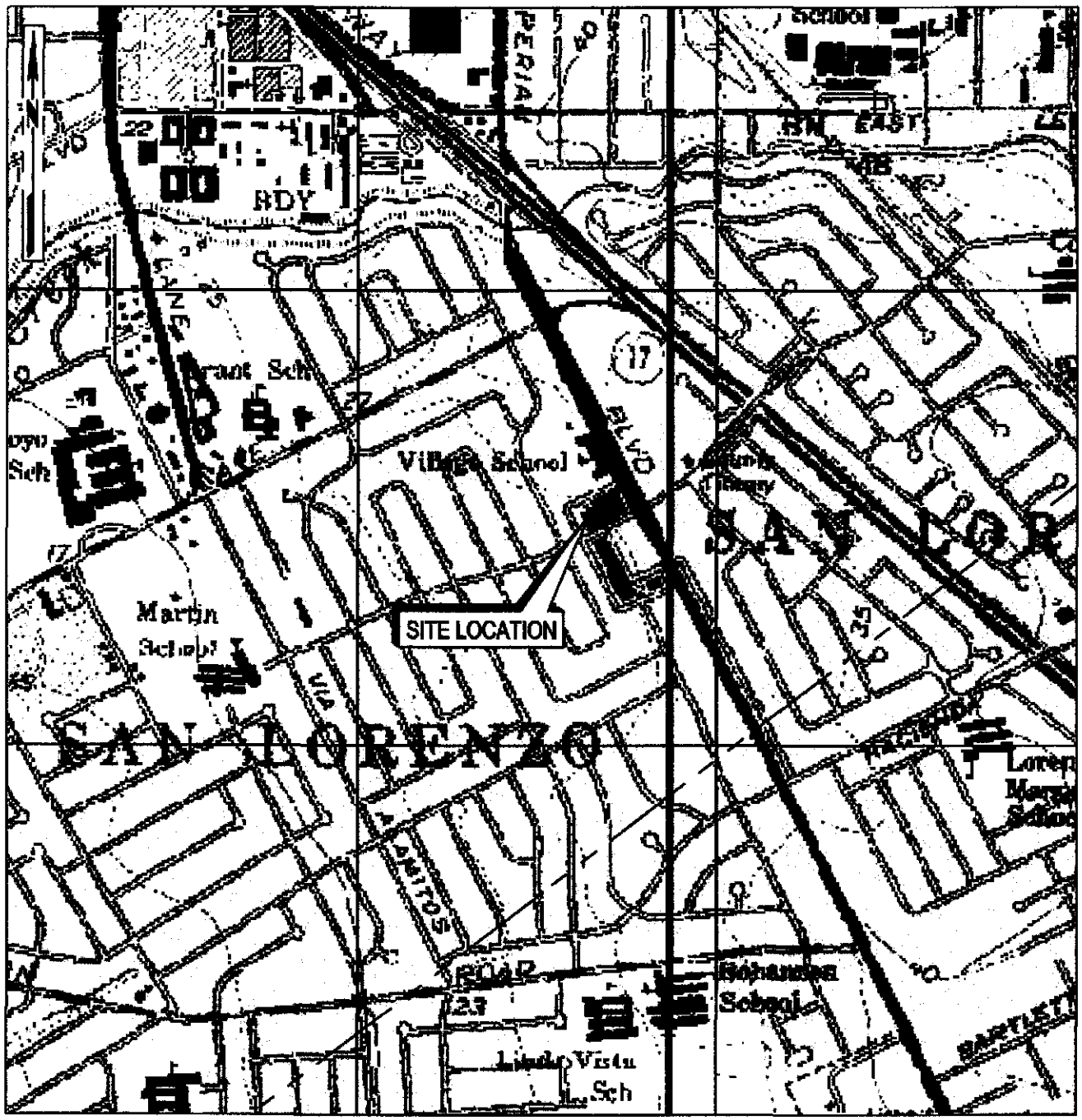
Neil Doran
Project Geologist

Bruce E. Scarbrough, R.G.
Principal Geologist



cc: Drew Bassak, Steefel, Levitt & Weiss
Bob Webster, Bohannon Development Company

Attachments: Figure 1 – Site Location Map
Figure 2 – Proposed Injection and Observation Well Locations
Figure 3 – Nitrate Injection and Observation Schematic
Figure 4 – Hydrogen Peroxide Injection and Observation Schematic



REFERENCE:

DeLORME 3-D TOPOQUADS

0 1000 2000

APPROXIMATE SCALE FEET

SECOR

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DATE	11 MAY 2002
JOB NO.	05OT.50063.01.0003

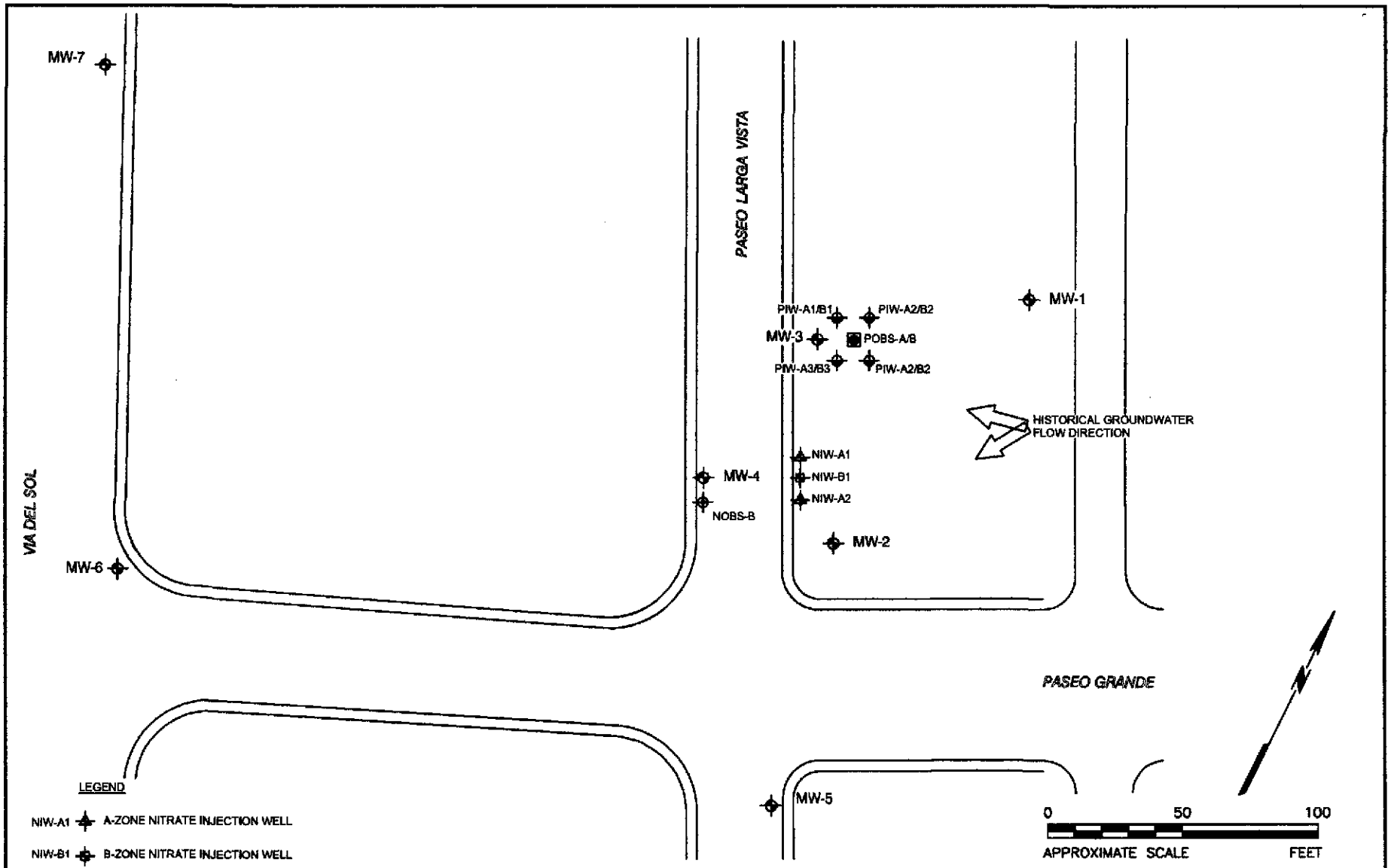
FIGURE 1

DAVID D. BOHANNON ORGANIZATION

575 PASEO GRANDE
SAN LORENZO, CALIFORNIA

SITE LOCATION MAP

20030723.080003939 K:\BOH\2003 work plan\BOH-SITE LOCATION MAP-FIGURE 1-JAN_2003.dwg



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PREPARED FOR:
BOHANNON DEVELOPMENT COMPANY
575 PASEO GRANDE
SAN LORENZO, CALIFORNIA

PROPOSED INJECTION & OBSERVATION WELL LOCATIONS

FIGURE: 2

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05OT.50063.01	S. SIMMONS			11/12/03

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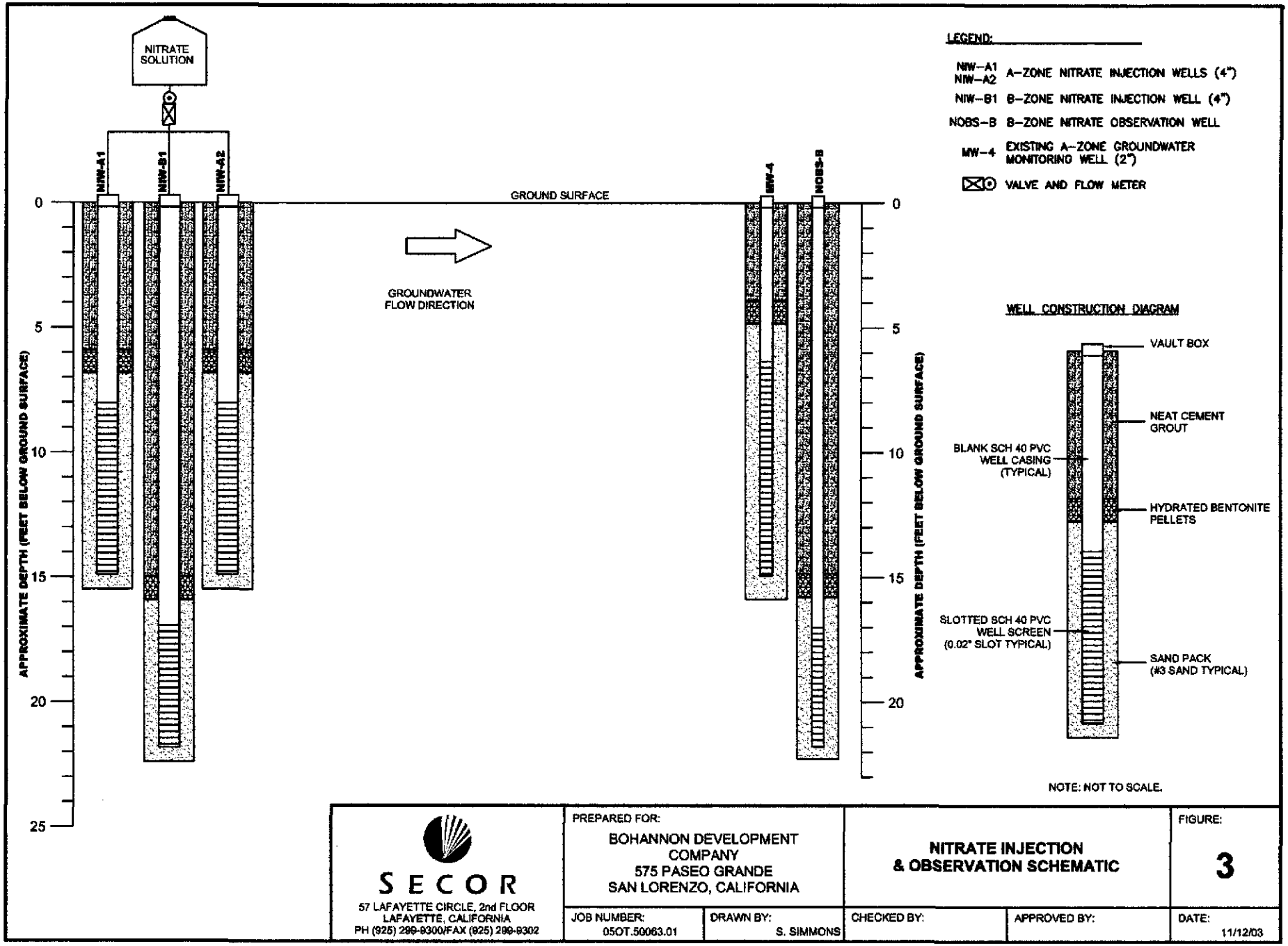

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NITRATE INJECTION & OBSERVATION SCHEMATIC

FIGURE: **3**

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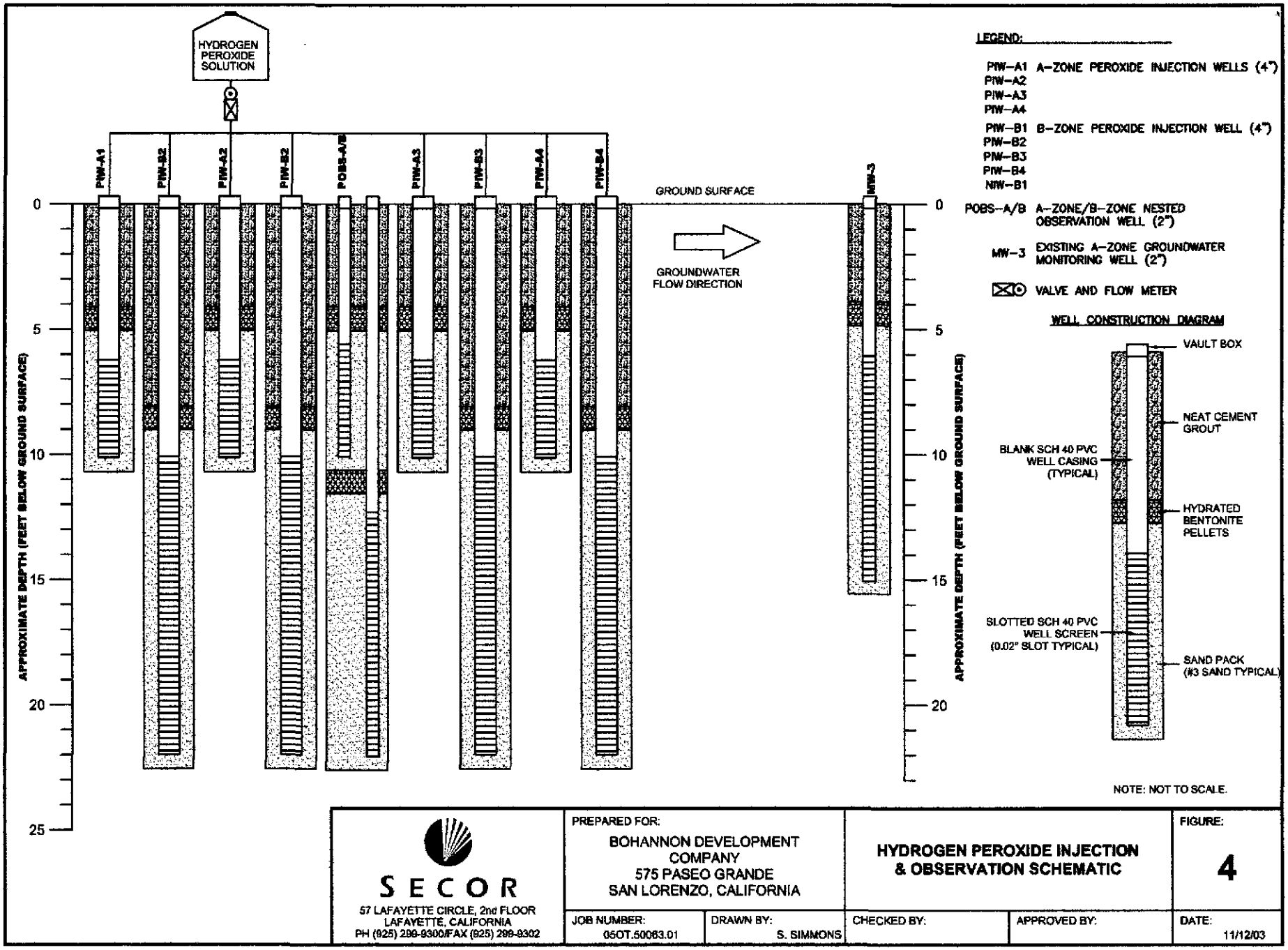

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HYDROGEN PEROXIDE INJECTION & OBSERVATION SCHEMATIC

FIGURE: **4**

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