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A Report Prepared for

Van Waters & Rogers Inc.
6100 Carillon Point
Kirkland, Washington 98033

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DRAFT SOIL BORING SAMPLING AND ANALYSIS PLAN PRELIMINARY STUDY AREA ORDER BOISE, IDAHO

HLA Project No. 20783 0031

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by

S. Michelle Beekman
Senior Geologist

Christopher R. Smith, P.G. 736
Principal Hydrogeologist

Harding Lawson Associates
1655 Redwood Boulevard
P.O. Box 578
Novato, California 94948
415/892-0821

May 10, 1993

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1.0 INTRODUCTION

Harding Lawson Associates (HLA) has prepared this sampling and analysis plan (SAP) for Van Waters & Rogers Inc. (VW&R), Kirkland, Washington, to describe the soil boring and well installation activities planned in the Affected Area, Boise, Idaho (Plate 1). The Affected Area is defined as the geographic area of a western portion of Boise in which concentrations of tetrachloroethene (Perc) in groundwater exceed the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 5 micrograms per liter (μg/l). This SAP has been prepared to meet the requirements of the Preliminary Study Area (PSA) Consent Order dated October 9, 1992 (PSA Order), between VW&R and the Idaho Department of Health and Welfare, Division of Environmental Quality (Department).

The scope of work for the PSA was originally outlined in *Exhibit 1, Work Plan, Preliminary Study Area Investigation, Boise, Idaho (HLA, 1992a)*. The original scope consisted of drilling soil borings to (1) evaluate the extent and possible source of Perc Compounds (Perc and its degradation compounds), (2) characterize the geology and hydrogeology within the PSA, (3) provide data to assist in the selection and design of remedial measures, and (4) to assess apparently anomalous soil gas data. On the basis of results of groundwater sampling within the PSA *(HLA, 1992c)*, no soil gas survey was performed in the PSA. In a letter dated December 10, 1992 (*Department, 1992*), the Department concurred with VW&R's contention that a soil gas survey would provide little additional information regarding the spatial extent of the Perc plume within the PSA. Therefore, the purpose of this proposed investigation is to gather data to assist in the characterization of geologic and hydrogeologic conditions at the leading edge of the Affected Area and to provide information about the vertical distribution of Perc. The

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scope of work includes drilling a pilot boring and collecting groundwater samples to evaluate the vertical distribution of Perc at the northwest (downgradient) end of the Affected Area, completing the boring as a monitoring well, using the data from the pilot boring to complete two additional nearby monitoring wells, collecting groundwater samples from the wells, and analyzing the data. The monitoring wells will be constructed to allow for potential future use as extraction wells. Additional wells may be proposed in the future, as appropriate, based on ongoing quarterly monitoring analytical results.

The background and scope of work for this investigation are presented in Sections 2.0 and 3.0, respectively. A schedule for the proposed investigation is presented in Section 4.0, and references cited in this SAP are listed in Section 5.0. The field and laboratory procedures to be used for work activities outlined in this SAP are described in the Quality Assurance Project Plan (QAPP) *(HLA, 1992b)*.

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2.0 BACKGROUND

VW&R has conducted two rounds of groundwater sampling in the Preliminary Affected Area (PAA). The initial sampling round was conducted in August 1992. Results of the initial sampling were presented in HLA's *Initial Groundwater Sampling Report, Preliminary Affected Area, Water Supply Order, Boise Idaho* (*HLA, 1992c*). This report also contained the Resampling Plan and Supplemental Sampling Plan required by the January 3, 1992, Water Supply Order between VW&R and the Department. Results of the initial sampling indicated the presence of Perc in 11 of the 28 well samples at concentrations ranging from 1.6 to 750 μg/l. As described in the Resampling Plan, samples from 6 of the 28 wells contained Perc above the analytical detection limit but below the MCL of 5 μg/l. These 6 wells are to be sampled quarterly to verify and monitor perc concentrations. As described in the Supplemental Sampling Plan, an additional 5 wells along Maple Grove Road were identified for sampling to further define the Affected Area.

Supplemental sampling and resampling were conducted concurrently with sampling of Special Resource Management (SRM) and Chem-Northern monitoring wells in the PSA in February 1993 to obtain comparable data for all wells. Data from the August 1992 and February 1993 sampling events were collectively evaluated to aid in the identification of the Affected Area. A total of 49 data points were plotted on a map and the Affected Area boundary of 5 μg/l was defined (Plate 1). The results were presented in a letter to the Department dated March 24, 1993 (*HLA, 1993a*). In a letter dated April 6, 1993 (*Department, 1993*), the Department concurred with VW&R's interpretation of the Affected Area boundary.

VW&R recently completed a pilot boring program and geophysical seismic reflection pilot study at the Boise Towne Square Mall. The results of the geophysical

pilot study were presented in the *Geophysical Sampling and Analysis Plan* (*HLA, 1993b*). The seismic reflection pilot study was conducted during the week of April 12, 1993, at three locations (two at the Mall and one at 1941 Five Mile Road).

Data from test lines at the Mall indicate strong reflecting horizons are present at depths generally greater than 160 feet. A strong reflector may indicate the presence of a clay layer whereas a weak reflector may represent a more subtle change in lithology such as from a coarse sand to a fine sand. Data from the test line at 1941 Five Mile indicate a weak reflector at an approximate depth of 100 feet and stronger reflections beginning at an approximate depth of 150 feet.

The presence of a shallow, continuous clay or low permeability layer beneath the Mall was not indicated by data collected during the geophysical or pilot boring investigations. Chemical data obtained from groundwater samples collected during the drilling of the pilot borings for Wells MW-1 and MW-2 (located near the Olive Garden restaurant and Pier 1 Imports store, respectively), groundwater samples collected from the completed monitoring wells, and analytical data from previous groundwater sampling activities at the Mall suggest that the Perc is limited to the shallow portion of the aquifer. These data suggest that despite the absence of a shallow, continuous clay or low permeability layer beneath the Mall, migration of Perc to the deeper portion of the aquifer does not appear to have occurred. Migration of Perc to the deeper portions of the aquifer would likely require a downward hydraulic gradient, such as that generated during pumping of a deep well. Because the chemical data indicate that Perc is limited to the shallow portion of the aquifer, and because the geologic materials (i.e., medium- to coarse-grained sand and gravel) encountered during the pilot boring program indicate

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the absence of a shallow, low permeability confining layer, it appears that vertical (downward) groundwater flow within the aquifer is not significant.

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3.0 SCOPE OF WORK

3.1 Boring and Well Installation

To monitor chemical concentrations at the distal end of the Affected Area and between the Affected Area and the Bali Hai community well, three borings will be drilled and wells installed at the locations shown on Plate 2. Drilling and well installation will be conducted under the supervision of a VW&R representative and an HLA geologist. The vertical distribution of Perc will be assessed by collecting groundwater samples in the pilot boring at the northwest end of the Affected Area along Five Mile Road. Chemical data from the pilot boring will be used to determine target depths of the remaining two borings. Field activities will be conducted under the existing Job Safety Plan. If field conditions encountered during drilling prohibit use of the methods described below, the Department will be contacted and alternatives discussed.

The borings will be drilled using air casing hammer methods. They will be lithologically logged by an HLA geologist and detailed field logs prepared. Soil cutting samples will be collected at 5-foot intervals and/or at each observed change in lithology and will be classified using ASTM D 2488-90, which is based on the Unified Soil Classification System. An Idaho-registered professional geologist will review the field logs.

Target zones for groundwater samples collected in the pilot boring are anticipated to be at approximately 20-foot intervals throughout the boring. Groundwater samples will also be collected at significant changes in lithology, where possible. In situ groundwater samples will be collected during drilling using a Hydropunch II sampler. Drilling will proceed to slightly above the target zone, the sampler will be driven into the zone, and the sample inlet will be opened, allowing groundwater to flow into the

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sample chamber. If lithologic conditions (e.g., the presence of gravel) prevent collection of groundwater samples with the Hydropunch tool, samples will be collected by lowering a stainless steel bailer down the drill pipe to the bottom of the boring. The sampler or bailer will then be brought to the surface and the sample poured from the sample chamber into a laboratory-provided volatile organic analysis (VOA) vial.

Groundwater samples will be analyzed on an expedited 24-hour turnaround basis. When groundwater samples with Perc concentrations below 5 μg/l are obtained, drilling will cease. The boring will be backfilled to the depth at which the first groundwater sample with Perc concentrations below 5 μg/l was obtained. If no groundwater samples contain Perc below 5 μg/l, the boring will be drilled to the first encountered lower permeability unit or to a maximum depth of approximately 150 feet. The borehole will be completed as a monitoring well under the supervision of HLA and/or VW&R.

The wells will be constructed using a 6-inch-diameter wire-wrapped stainless steel casing and screen. A filter pack will be placed adjacent to and slightly above the screened interval; screen length, screen slot size and appropriate filter pack will be determined on the basis of results of the lithologic and chemical information obtained from the pilot boring.

After well completion, the well will be allowed to set for at least 24 hours and then developed. The wells will be developed by a combination of swabbing, surging, bailing, and/or pumping. Groundwater samples will then be collected from the wells in accordance with procedures described in the QAPP (*HLA, 1992b*).

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All drilling fluids, cuttings, and well development fluids will be contained and stored at the VW&R field office pending the results of chemical analyses. Disposal methods will depend on the analytical results, as discussed in the QAPP (*HLA, 1992b*).

3.2 Laboratory Analytical Program

The Hydropunch groundwater samples will be transported under chain of custody to Alchem Laboratory, Boise, Idaho, for expedited 24-hour analysis for halogenated volatile organic compounds (VOCs) using EPA Test Method 8010. The groundwater samples collected from the completed wells will be transported under chain of custody to Analytical Technologies, Inc. (ATI), Renton, Washington and analyzed for VOCs using EPA Test Method 8010.

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4.0 SCHEDULE

Field work is scheduled to begin within 14 calendar days of Department approval of the SAP. Actual drilling dates may vary due to the availability of drilling subcontractors, access negotiations, and/or permitting issues. Results will be submitted to the Department in the Phase I Investigation Report, currently scheduled for completion in the fall of 1993.

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5.0 REFERENCES

Harding Lawson Associates (HLA), 1992a. *Exhibit 1, Work Plan, Preliminary Study Area Investigation, Boise, Idaho.* September 8.

_____, 1992b. *Quality Assurance Project Plan. Former VW&R Facility, Boise, Idaho.* November 2.

_____, 1992c. *Initial Groundwater Sampling Report, Preliminary Affected Area, Water Supply Order, Boise, Idaho.* November 17.

_____, 1993a. Letter to Ron Lane, Idaho Department of Health and Welfare, Division of Environmental Quality. March 24.

_____, 1993b. *Geophysical Sampling and Analysis Plan, Boise Mall Order, Boise, Idaho.* Letter to Ron Lane, Idaho Department of Health and Welfare, Division of Environmental Quality. May 6.

Idaho Department of Health and Welfare, Division of Environmental Quality (Department), 1992. Letter to Gail Clement, Van Waters & Rogers, Inc. December 10.

_____, 1993. Letter to Mike Gaudette, Van Waters & Rogers, Inc. April 6.

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PLATES

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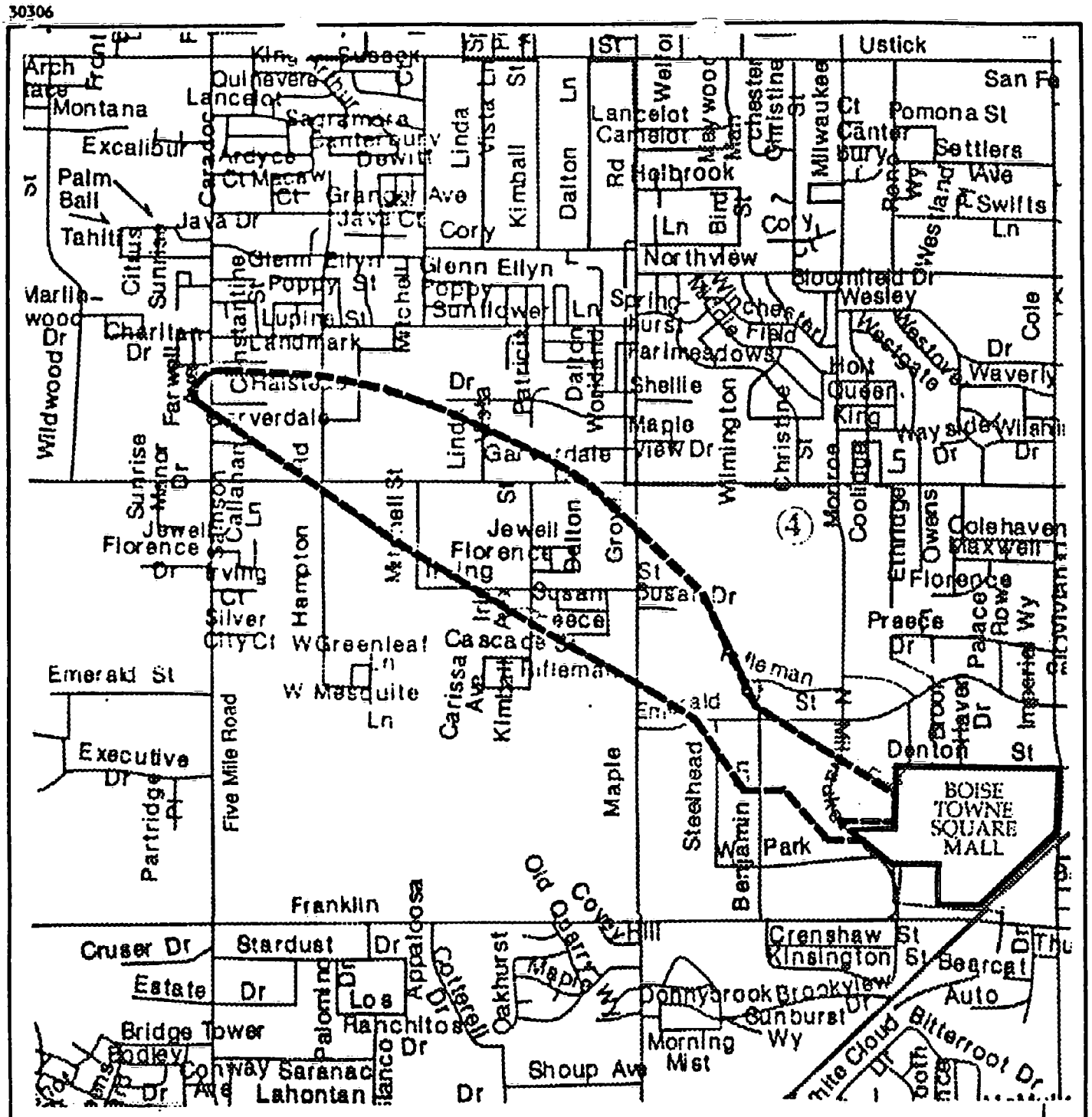

EXPLANATION

Mall Investigation Area

Affected Area

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0 0.5
APPROXIMATE SCALE IN MILES

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Reference: U.S. West Communications telephone book, Boise, Idaho, 1990-91.

Harding Lawson Associates
Engineering and Environmental Services

Affected Area
Soil Boring Sampling and Analysis Plan
Boise, Idaho

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
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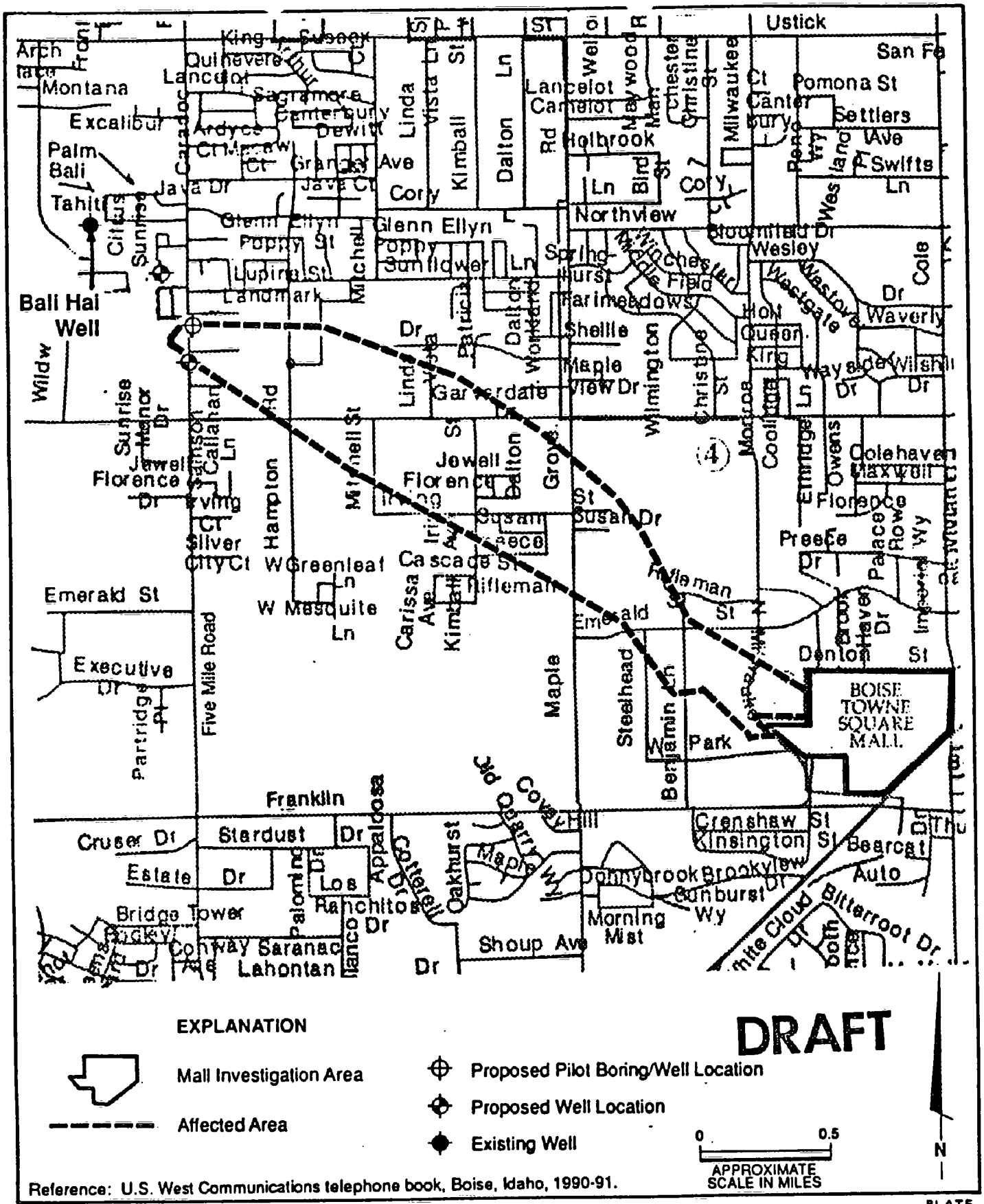
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Montana
Excalibur
Palm
Bali
Tahiti
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Well
Wildw
Sunrise
Manor
Dr
Jewel
Florence
Dr
Silver
City Ct
Emerald St
Executive
Dr
Partridge
Pl
Five Mile Road
Hampton
Rd
W Greenleaf
Ln
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Ln
Cascade St
Carissa
Ave
Kimball
Maple
Steelhead
Benjamin Ln
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Park
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Dr
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Conway
Saranac
Lahontan
Appaloosa
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Ranchitos
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Shoup Ave
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Mist
Crenshaw St
Kinsington St
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Canterbury
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Maywood
Rd
Wellington
Sheille
Maple
View Dr
Garnerdale
Jewell
Florence
Susan Dr
Preece
Dr
Fillerman
St
Owens
Colehaven
Maxwell
Florence
Wesley
Westgate
Westover
Hon
Queen
King
Waverly
Wayside
Wilshire
Dr
Cole
Dr
Bloomfield Dr
Springhurst
Farmedows
Field
Ln
Dr
Grove
St
Monroe
Coolidge
Emmage
Ln
Palace
Row
Wy
Haven
Dr
Brook
Cove
Hill
Old Oakhurst
Maple
Dr
Donnybrook
Sunburst
Wy
White Cloud
Dr
Oth
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BOISE, IDAHO
May 10, 1993

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Mark B. Hersh
Associate Hydrogeologist

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