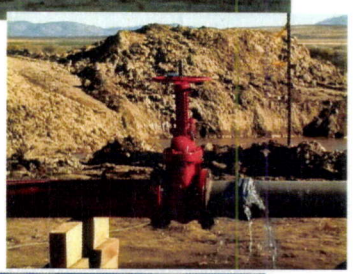
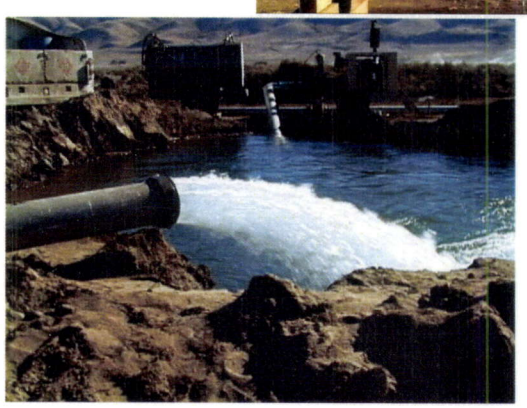
1506-00086

AquA Hydrogeologic Consulting LLC

Herlong Utilities Cooperative Test/Production Well No. 1

Pumping Test and Ground Water Modeling Report

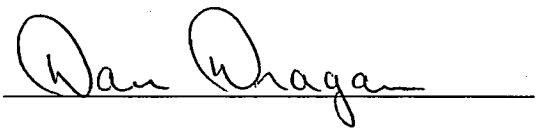




AquA Hydrogeologic Consulting

HERLONG UTILITIES COOPERATIVE
TEST/PRODUCTION WELL No. 1
PUMPING TEST AND
GROUNDWATER MODELING REPORT

Prepared for:
Herlong Utilities Cooperative
P.O. Box 515
Herlong, California 96113



Dan Dragan R.G.
(California No. 3809)

December 2001

P.O. Box 18793 • Reno Nevada 89511 • (775) 250-9700 • Fax (775) 841-0946 • DavidECarlson@msn.com

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 EXECUTIVE SUMMARY

1.1 Purpose. The purpose of this study and report is to provide an aquifer evaluation that supports decision making for locating, designing, and determining/minimizing the aquifer and related impacts associated with the proposed Herlong Utilities Cooperative (HUC) well field (Figure 1). This document presents the results of a 14-day pumping test that was conducted on the HUC Test/Production Well No. 1 (Well No. 1). Data collected during this testing program was incorporated into an area ground water model to model the aquifer, design a well field to meet projected HUC service demand, and minimize the impacts associated with the construction and operation of the well field. A summary of the findings, conclusions, and recommendations is contained within this Executive Summary and additional detail is contained in the body of the report. Detailed supporting data from the testing program and detailed modeling and analysis results are contained in the appendices.

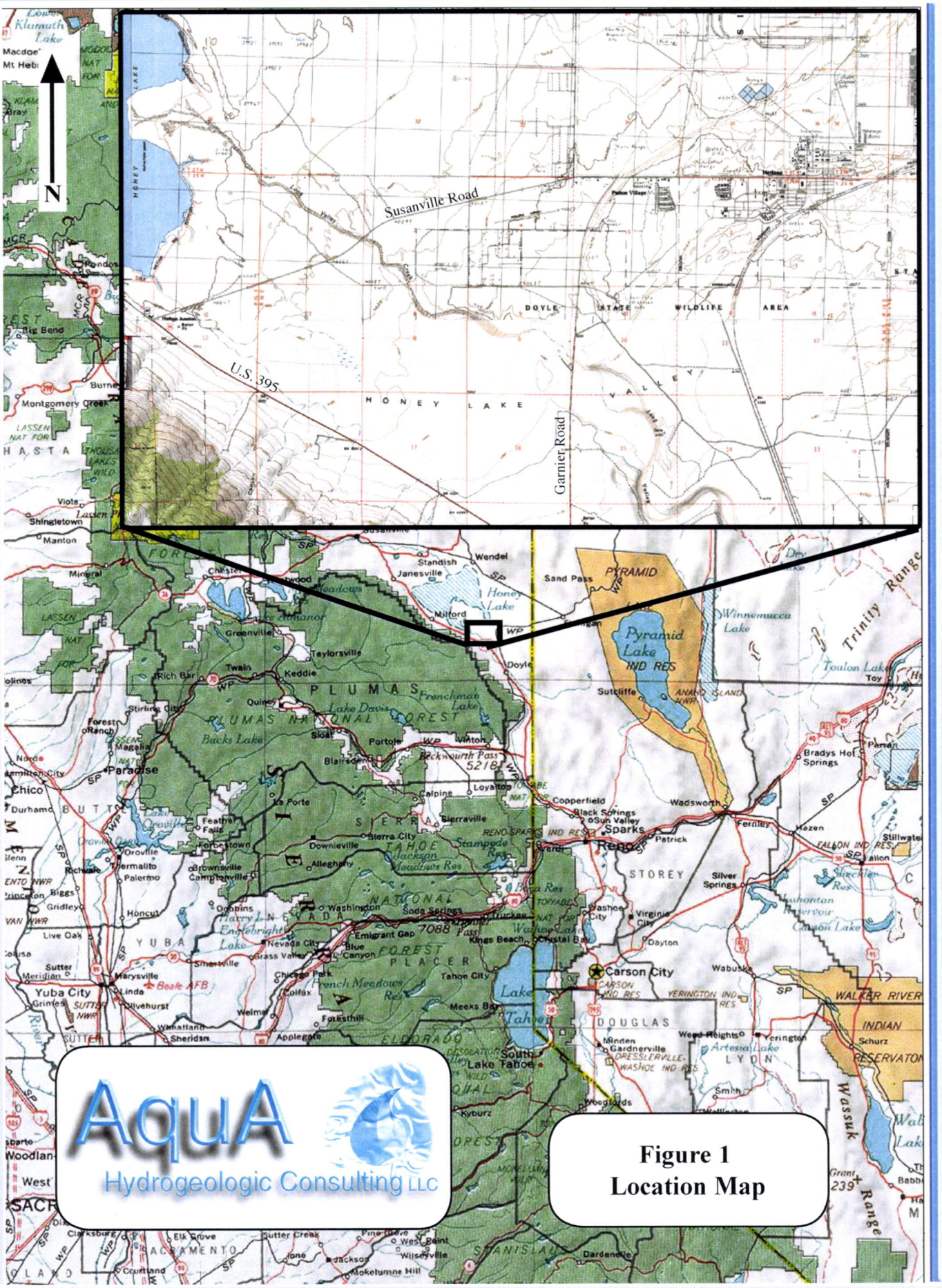
1.2 Findings

- During the 14-day pumping test, water levels were monitored at Well No. 1, four monitoring wells (which were drilled and constructed specifically for the testing program), and two idle production wells located nearby. The monitoring well locations are shown in Figure 2.

- The shallow monitoring well (50 feet below ground surface (bgs)), installed between Well No. 1 (600 feet deep) and Long Valley Creek, showed no water level change before, during, or after the 14-day pumping test.

- The other three monitoring wells, each installed to 300 feet bgs, showed water level changes reflective of production pumping and recovery.

- The two idle agricultural production wells that were monitored during the testing program did not show a water level change resulting from pumping of the HUC production well. They did, however, show a response to production pumping of other agricultural production wells located nearby.



AquA Hydrogeologic Consulting LLC

Figure 1
Location Map

- During the drilling of Well No. 1 and all four monitoring wells, a sticky black clay layer was noted in the geologic cuttings from approximately 30 to 50 feet bgs.

- The shallow monitoring well when completed had a static water level of 11.05 feet below top of casing. Well No. 1 and the three deep monitoring wells all had static water levels of 30 to 38 feet below top of casing.

- The initially targeted constant minimum pumping rate of 1,500 gallons per minute (gpm) was increased to 2,200 gpm based on conditions encountered during the construction and development of Well No. 1.

- During the three pumping tests that were conducted, sufficient data was collected to provide aquifer parameters and assess ground water impacts due to the proposed operation of the HUC well field.

- Three separate pumping tests were conducted on Well No. 1. Pumping at 2,200 gpm or higher was conducted for a total of 17 days.

- Drawdown and recovery data were collected at Well No. 1 and the four monitoring wells using downhole data loggers and manually. Additional water level data were collected manually at two idle agricultural production wells nearby.

- Analysis of the pumping and recovery data for Well No. 1 indicates an aquifer transmissivity value of approximately 75,000 gpd/ft.dd. and a storage coefficient of 0.005.

- Using data gathered during the well drilling and pumping tests, a numerical groundwater model was developed. The model was calibrated to mirror historical and recorded data.

- Several pumping scenarios were analyzed using the model. The results of these analyses indicate that there would be no significant decline in water levels at area agricultural or

domestic wells resulting from pumping the HUC well field at a rate of 2,200 gallons per minute (gpm) continuously year-round.

- A decline in ground water levels of approximately three to five feet 1,600 feet of Well No. 1 is predicted with pumping the HUC well field at 2,200 gpm year-round.

1.3 Conclusions

The methodology used to derive the following conclusions was based on the use of GMS 3.1 ground water modeling software, the aquifer parameters developed from the pumping test program, and an understanding of the geology and geohydrology of the project area.

- Well No. 1 is capable of a sustained yield of 2,200 gpm.

- Continuous year-round pumping of Well No. 1 or the HUC well field at 2,200 gpm would have no impact on the shallow ground water system in the vicinity of the production well, and no impact on the Long Valley Creek surface flow system.

- Existing area agricultural production wells operating for up to six months a year would see no significant impact from Well No. 1 or the HUC well field.

- At the HUC wellfield property boundary, the decline in water level at the end of five years of continuous pumping of HUC Well No.1 or the HUC well field was projected to be less than five feet.

- Operation of HUC Well No. 2 at its proposed location (approximately 1,700 feet east of Well No. 1) would result in no significant impact to the existing area wells.

- Based on the distance between the SIAD and the HUC well field, and the differences in hydraulic gradient, there is little to no possibility that water underlying SIAD would be drawn towards the HUC well field.

1.4 Recommendations

- Well No. 1 should be equipped with a production pump capable of producing 2,200 gpm from a pump setting of 200 feet bgs. Over the long-term a total dynamic head of approximately 160 feet will be required to lift the water to the surface.

- Well No. 2, a second 14-inch diameter production well drilled to 600 feet bgs, should be located approximately 50 feet from the existing monitoring well (designated MW-4). MW-4 is located east of Long Valley Creek, approximately 1,730 feet from Well No. 1. During the drilling of the monitoring well at this location favorable water producing geologic material was encountered down to a depth of 300 feet. Similar material is expected to the proposed total depth of 600 feet. It is predicted that this well would also be capable of a sustained yield of 2,200 gpm.

2.0 INTRODUCTION

This report presents the results of an aquifer pumping test conducted on HUC Well No. 1, the subsequent development of a three-dimensional ground water flow model, and the results of analyses based on the model.

2.1 Study Purpose

The purpose of this study and report is to provide an aquifer evaluation sufficient to support decision making for locating designing, and determining/minimizing the aquifer and related impacts associated with the proposed HUC well field.

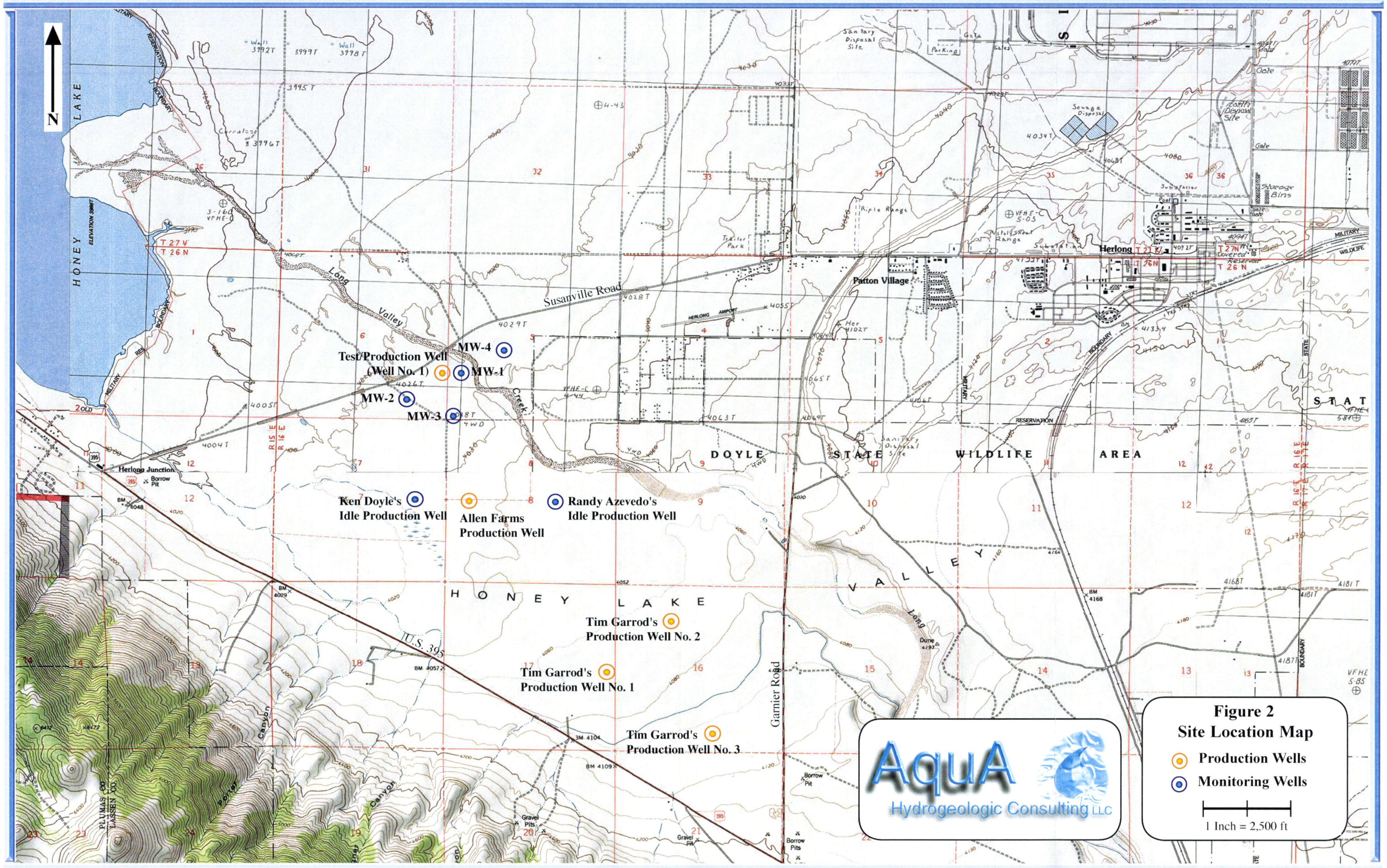
2.2 Study Objectives

- To determine the project study area
- To characterize the geology of the study area
- To characterize the hydrogeology of the study area
- To develop data sufficient to construct a ground water flow model through the drilling, construction, and testing of Well No. 1
- To construct a ground water flow model that simulates existing geologic and hydrogeologic conditions in the study area
- To predict and minimize impacts to the study area aquifer associated with the HUC wellfield, and
- To prepare and support recommendations for wellfield location and design

2.2 Study Methodology

The methodology used to accomplish the objectives of this study/report is as follows:

- Defining the study area. Using existing topographic, geologic, and aerial photo coverage maps and photos, a study area was defined. The study area covered approximately 20,000 acres, or 30 square miles. Figure 3 shows the boundaries of the study area with respect to the Long Valley Creek sub-basin of the Honey Lake hydrographic basin.


N
HONEY LAKE
Susanville Road
Long Valley Creek
Patton Village
Herlong
Herlong Junction
MW-4
Test/Production Well
(Well No. 1)
MW-1
MW-2
MW-3
Ken Doyle's
Idle Production Well
Allen Farms
Production Well
Randy Azevedo's
Idle Production Well
Tim Garrod's
Production Well No. 2
Tim Garrod's
Production Well No. 1
Tim Garrod's
Production Well No. 3
DOYLE STATE WILDLIFE AREA
VALLEY
Garnier Road
U.S. 395
Figure 2
Site Location Map
Production Wells
Monitoring Wells
1 Inch = 2,500 ft
AquA
Hydrogeologic Consulting LLC

- Locating the Test/Production Well. After reviewing existing geologic and hydrogeologic data for the Long Valley Creek sub-basin, the location for a test/production well site was selected and a 14-inch diameter cased test/production well was drilled and constructed to a depth 600 feet bgs. This well is known as Well No. 1.

- Four new (four-inch) monitoring wells were installed at strategic locations to monitor water levels before, during, and after the pumping test. One monitoring well (MW-1) was drilled to a depth of 50 feet bgs between Well No. 1 and Long Valley Creek. The three remaining monitoring wells were completed to 300 feet bgs: one (MW-2) was located 1,600 feet west of Well No. 1, a second (MW-3) was located 1,000 feet south of Well No. 1, and a third (MW-4) was located 1,800 feet east of Well No. 1. MW-4 was located east of and near Long Valley Creek.

- In addition to these four monitoring wells, water levels in two nearby idle agricultural pumping wells were also monitored before, during, and after the pumping test program. Based on data gathered from these six wells, a scientifically sound and accurate regional aquifer profile was developed.

- After construction of Well No. 1, the well was developed until no sediment was produced during pumping. A six-hour step drawdown pumping test was then completed. Based on the results of the step test, a nominal discharge rate of 2,200 gpm was selected for the pumping test.

- Water level data were collected and discharge rates were measured at the Well No. 1 during the pumping and recovery phases. These data were evaluated and aquifer parameters were calculated.

- Using the previously developed aquifer parameters for Well No. 1 and regionally, a three-dimensional ground water flow model was developed.

- Using data gathered from the conditions encountered during the drilling of Well No. 1, the ground water flow model was constructed with three layers. The layers and model depict the geologic conditions encountered during and after review of the geologic logs for Well No. 1.

- After constructing the model, the model was calibrated to reflect historical water level data obtained from well logs and field measurements. Area agricultural wells were then simulated in the model along with their historic production pumping rates. Historic production pumping rates for these well were determined from well logs and discussions with well owners/operators.

- Finally, projected HUC wellfield pumping scenarios were modeled and the pumping scenarios were extended out for five years. Based on this, pumping impacts were predicted throughout the study area.

- Based on the predicted results of the pumping scenarios, the HUC well field was designed such that impacts to the Long Valley Creek sub-basin ground water aquifer and existing agricultural and domestic wells would be less than significant.

3.0 GEOLOGIC SETTING

Honey Lake Valley is a topographically closed basin that was formed through the horizontal and vertical movement of a series of faulting activities. The valley, which trends generally northwest is approximately 45 miles long and 15 miles wide. The principal geologic units which outcrop in the southwest portion of the basin are Cretaceous granites of the Diamond and Fort Sage Mountains, which form the western, southwestern, and southern boundary of the basin. A geologic map of the study area is shown in Figure 3. As shown, extensive faulting has occurred. As a result of this faulting, the central portion of the basin (where Long Valley Creek flows towards the northwest and into Honey Lake) has been displaced downward and a thick sequence of alluvial material has filled the downward displaced bedrock material.

Based on field investigations, review of well drillers logs, and aerial photo analysis, a buried fault has been identified in the western portion of the study area. Aerial photos of the area reveal traces of a buried fault striking northwest-southeast approximately 4,000 feet west of Well No. 1. Geologic information reviewed in well driller's logs indicates that the thickness of alluvial material west of this buried fault is relatively thin. Water wells completed in this area produce only 100 to 200 gpm, due to the lack of significant thickness of alluvial material. East of this buried fault, the depth to bedrock is much greater and there is sufficient thickness of alluvial material to yield production wells capable of producing 1,500 to 2,500 gpm or more.

In the general area of the proposed HUC well field, the alluvial material is comprised mostly of interbedded layers of sand, clay, and gravel of varying sizes. During the drilling of Well No. 1, a significant amount of coarse sand was encountered between 400 and 600 feet bgs.

During the drilling of Well No. 1 and the four monitoring wells a 20-foot thick layer of sticky black clay was encountered at a depth of approximately 30 to 50 feet bgs. This 20-foot zone represents an impermeable zone that separates the shallow, near surface ground water aquifer from the deeper ground water aquifer. This is especially significant because of the presence of this layer provides geologic evidence to support the conclusion that there would be no or very

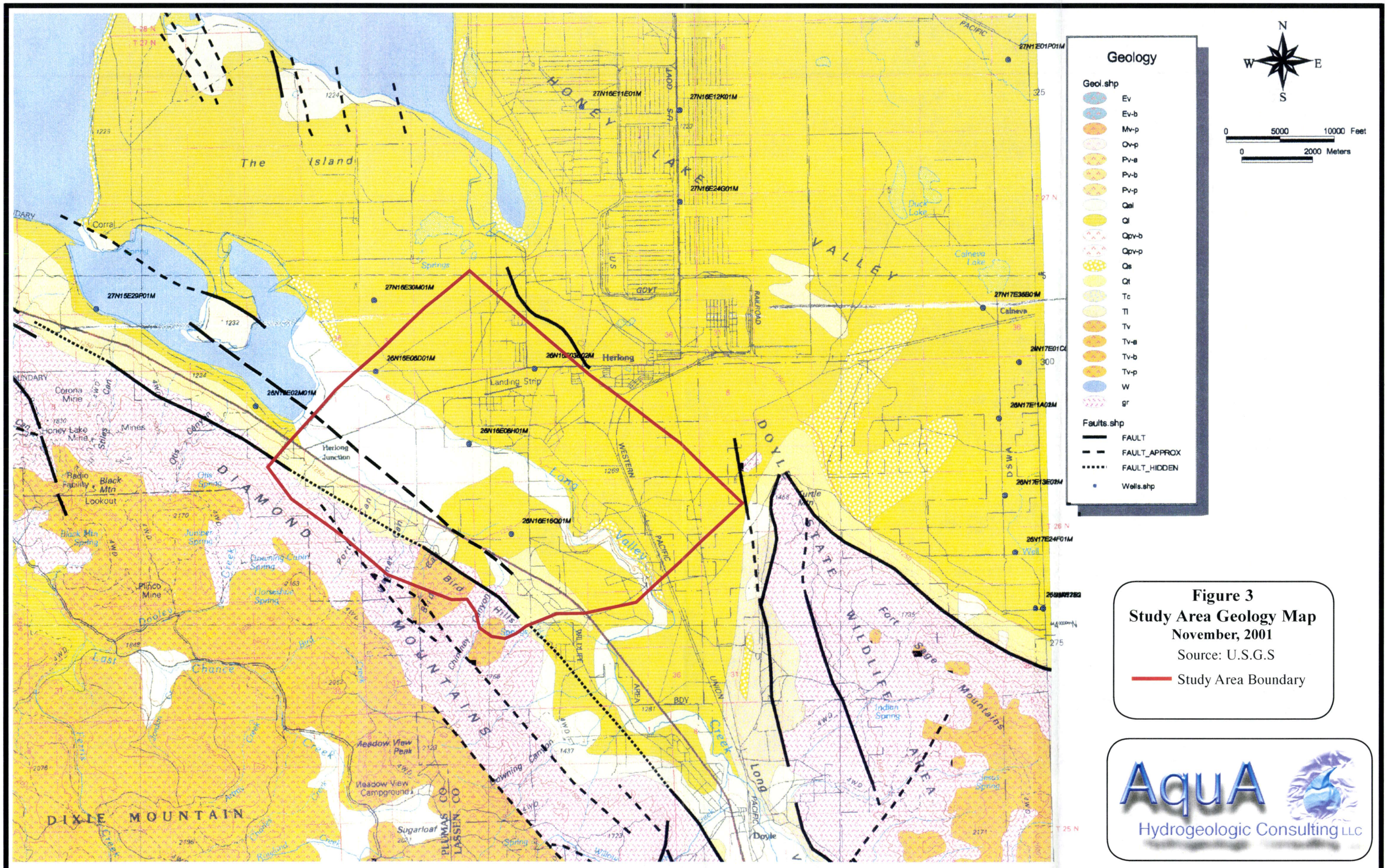


Figure 3
Study Area Geology Map
November, 2001
Source: U.S.G.S
Study Area Boundary

AquA Hydrogeologic Consulting LLC

limited impact on the Long Valley Creek system due to the operation of the proposed HUC well field. A review of area well driller's report indicates that this layer of sticky black clay thins out south of HUC Well No. 1. In the area between Randy Azevedo's well and Tim Garrod's three production wells the sticky black clay layer is not found.

Geologic information obtained from field investigations, the well driller's report, geologic maps and reports, and data obtained during the Well No. 1 drilling and monitoring well drilling program was used in the development of the ground water flow model. A summary of the information follows:

- From the ground surface to 30 feet bgs is comprised of alluvial material made up of sand and silt material. This material was classified as being very permeable.

- Between 30 feet and 50 feet bgs a nearly impermeable layer comprised of thick, sticky, black clay was encountered and entered into the model.

- From the 50-foot bgs layer down to the total depth of the alluvial material a highly permeable zone was encountered and entered into the model. It is from this zone that nearly all of the water in the model is derived.

- A northwest-southeast trending fault located approximately 4,000 west of the Well No. 1 was entered into the model.

- The consolidated bedrock unit that outcrops in the western portion of the model study area and underlies the alluvial material throughout the model study area was entered into the model as a nearly impermeable zone. This bedrock unit has a very low porosity and permeability, and transmits ground water only along faults and fractures, which produces a small degree of secondary permeability. For purposes of the model, the consolidated bedrock unit was considered a no flow boundary.

4.0 HYDROGEOLOGY

For this report and the groundwater flow model, the area southwest and west of Herlong (as shown in Figure 2) was evaluated and modeled. This area was selected based on evidence collected during the test/production well drilling, construction, and testing, and from previous studies of this area, which indicate that a significant amount of ground water can be developed from this local area. Results of the pumping tests conducted on Well No. 1 and water level and quality data collected during the program confirm the presence of large amounts of ground water in this area suitable for a community water supply. See Appendix B for water quality information.

4.1 Groundwater System

Nearly all of the groundwater movement within the study area basin occurs within the alluvial material (the lower aquifer that extends from a depth of approximately 50 feet bgs to depths exceeding 600 feet). Although this study did not confirm the total depth of the alluvial material for this portion of the valley, for modeling purposes a 600-foot depth was used. This depth is a very conservative assumption because numerous reports and studies conducted on the Honey Lake Valley have reported that the alluvial material extends to depths of 2,000 to 3,000 feet or more.

The geologic material within the lower aquifer is composed of medium to coarse-grained sands, small gravels, and some interbedded layers of clay. During the drilling of Well No. 1, below approximately 200 feet bgs only two 20-foot zones of clay material were encountered. The rest of the material encountered during drilling was sand and small gravels, with minor amounts of clay contained within very thin interbedded layers.

The general groundwater flow direction for the deeper aquifer in the Long Valley Creek sub-basin and the study area is north to northwest towards Honey Lake. Based on the distance between the SIAD and the HUC well field, and the differences in hydraulic gradient, there is little to no possibility that water underlying SIAD would be drawn towards the HUC well field. This is important because of the need to avoid drawing poor quality ground water from the SIAD area towards the proposed HUC wellfield.

5.0 WELL DRILLING, CONSTRUCTION, AND DEVELOPMENT

This section presents the results of the drilling, construction, and development of HUC Well No. 1 and the four monitoring wells installed for the purpose of developing an understanding of the groundwater aquifer in the Long Valley Creek area of Honey Lake Valley. This information was necessary for development of the ground water flow model and for prediction of the impact of the HUC well field on the aquifer and area wells. For Well No. 1, Lang Exploratory Drilling of Elko, Nevada, conducted construction, development, and testing activities under the direct supervision of AquA Hydrogeologic Consulting, Reno, Nevada. Well drilling, construction, and development of Well No. 1 took place from September 20 through September 28, 2001. Beckett Drilling, Doyle, California, completed the drilling and construction of the four monitoring wells during the September 25 through September 29, 2001 time period. During both construction periods, AquA personnel were on-site to document activities. Figure 2 shows the location of Well No. 1 as well as the four monitoring wells. The following sub-sections describe the field activities in detail.

5.1 Test/Production Well (Well No. 1)

As stated above, drilling and construction of Well No. 1 commenced on September 20 and was completed on September 28, 2001. Highlights of the drilling, construction, and development program follow:

- A nominal 26-inch diameter borehole was drilled to 38 feet bgs followed by the installation of 20-inch diameter blank steel casing, which was cemented into place.

- Following the installation of the surface casing, a nominal 19-inch diameter borehole was drilled to a total depth of 606 feet bgs. The earlier design of the production well casing was followed and completed by installing:

    - 14-inch diameter wall blank steel casing from ground surface to 220 feet bgs,
    - 14-inch diameter 80-slot wire-wrapped screen from 220 to 300 feet bgs,
    - 14-inch diameter x 0.25-inch wall blank casing from 300 to 320 feet bgs,
    - 14-inch diameter 80-slot wire-wrapped screen from 320 to 380 feet bgs,

- 14-inch diameter x 0.25-inch wall blank casing from 380 to 400 feet bgs,
- 14-inch diameter 80-slot wire-wrapped screen from 400 to 600 feet bgs, and
- 14-inch diameter blank casing bull-nose from 600 to 601 feet bgs.

- Following the installation of the production casing, 1/8-inch by 1/4-inch gravel pack was installed in the annular space from 606 feet to 200 feet bgs. From 200 feet bgs to ground surface the annular space was filled with neat cement.

After drilling and installation of the production casing and gravel pack, the air-lift development program commenced with the well being air-lifted from total depth. This initial airlift phase removed drilling fluid contained within the well casing and from the borehole wall, as water was drawn into the well casing area. After this initial phase, a drilling fluid dispersant product (Aqua Clear) was jetted and swabbed into place opposite the screen sections of the well. The Aqua Clear was allowed to work on the borehole mud cake for six hours, after which it was airlifted from the well. Each 40-foot section of screen was airlifted, until the water being discharged from the well was nearly sand free.

Well development continued with the installation of a test pump capable of producing up to 2,700 gpm being installed at a depth of 200 feet bgs. The pump development program commenced with an aggressive surging of the well at an initial discharge rate of 1,000 gpm. The surging program and water discharge from the well was increased incrementally over time, until a maximum discharge from the well in excess of 3,000 gpm was reached. During each stage of development the sand content within the water being discharged (as recorded by the Rossum Sand Tester) was below one part per million (ppm). At the end of the pump development program, ground water from the well contained virtually no sand.

5.2 Monitoring Wells

As stated previously, the drilling and construction of the four monitoring wells commenced on September 25, and was completed on September 29, 2001. At the completion of drilling and construction, each monitoring well was water developed until clean.

The first monitoring well to be drilled and constructed (MW-1) was located 341 feet east of Well No. 1 about mid-way between Well No. 1 and Long Valley Creek. MW-1 was drilled to a depth of 50 feet bgs and completed with 80-slot, 4-inch, schedule 40 PVC pipe. The well is screened from 40 to 50 feet bgs and has blank 4-inch, schedule 40 pipe extending from 40 feet bgs to one foot above ground surface. A bentonite cement seal was installed in the annular space from 20 feet bgs to ground surface.

Monitoring wells MW-2, MW-3, and MW-4 were each drilled and completed to 300 feet bgs. Each well contains 100 feet of 80-slot screen, 4-inch schedule 40 PVC pipe from 300 feet to 200 feet bgs. The upper 200 feet of each well was completed with blank schedule 80 PVC pipe. A bentonite cement seal was installed in the annular space from 20 feet bgs to ground surface. Monitoring wells MW-2, MW-3, and MW-4 are located 1,677 feet west, 900 feet south, and 1,728 feet east of Well No. 1 respectively.

All four monitoring wells were equipped with electronic pressure transducers (data loggers) and water levels were monitored for the entire pumping and recovery periods of the well testing program. Initial static water levels for each well are shown in Table 2.

6.0 AQUIFER TESTING

The aquifer testing program for Well No. 1 included a three-step drawdown test, with each incremental step lasting 120 minutes. The discharge rates for the three steps, in order, were 800, 1,650, and 2,350 gpm. The pre-pumping water level recorded in Well No. 1 was 31.75 feet from the top of sounding tube. Results of the three-step drawdown test are summarized in Table 1. Based on drawdown data provided by the step test, a pumping rate of 2,200 gpm was chosen for the duration of the pumping test.

Table 1. Well No. 1 Step Test Drawdown Data

Step	Duration (minutes)	Discharge rate (gpm)	Drawdown After Step (feet)	Specific Capacity (gpm/ft.dd)
1	120	800	15.35	52.11
2	120	1,650	36.95	44.65
3	120	2,350	52.90	44.42

Following the step test, a series of long-term pumping tests were conducted on Well No. 1. The purpose of the long term pumping tests was to monitor the impacts of the tests on the regional aquifer. An initial 14-day pumping test began at 0900 hrs on October 2, 2001 and was completed at 0900 hrs on October 16, 2001. A pre-pumping water level in Well No. 1 was recorded at 31.70 feet from the top of sounding tube. During both the pumping and recovery periods, depth to water levels were measured using both a downhole data logger and (manually) by use of a water level probe. Discharge measurements were taken for nine days using an in-line flow meter and for five days using an orifice plate and manometer because nine days into the 14-day test, the in-line flow meter ceased to function. Depth to water at the end of the 14-day pumping period was 83.68 feet below top of sounding tube, which equates to a drawdown of 51.98 feet. This indicated a specific capacity of 42.32 gpm/ft.dd. Following the 14-days of pumping, recovery water levels were collected for 48 hours, by which time the water level had recovered to 95% of its pre-pumping level.

In addition to measuring water levels in Well No. 1, during all pumping test periods water levels were also measured in the four constructed monitoring wells (MW-1 through MW-4) and two local

idle agricultural production wells located nearby. The locations of all these wells are shown in Figure 2. The distances from the monitoring wells to Well No. 1 are shown in Table 2 along with initial static water level elevations.

Table 2. Monitoring Well Data (from field measurements)

Well No.	Distance to Well No. 1 (feet)	Total Depth of Well (feet bgs)	Initial Static Water Level Elevation (feet)	Depth to Water (feet)
1	341	50	4,018.52	10.85
2	1,677	300	3,994.61	31.15
3	900	300	3,998.92	30.85
4	1,728	300	3,993.25	38.20

After completing the 14-day pumping test and the follow-on two days of recovery readings, a second constant-discharge test commenced at 0900 hrs on October 18, 2001. The pumping rate during this test was maintained at 2,200 gpm. After 54 hours of continuous pumping at 2,200 gpm, the pump line-shaft sheared causing the test to be terminated. Recovery readings were taken during the three days it took to repair the line-shaft. After the three-day interruption, a third pumping test commenced. After pumping at a rate of 2,200 gpm for 25 hours, the test was stopped. The reason was because that the pumping contractor was of the opinion that the pump would probably not be able to perform for the entire 14 days. Since this would have meant another delay to replace the pump, because the test would have been conducted in a very late portion of the agricultural season, and because sufficient data had been gathered, the testing program was ended.

During the pumping of Well No. 1, the three deep monitoring wells (MW-2, -3, and -4, 300 feet bgs) showed a decline in water level when Well No. 1 was being pumped and a rise in water level when pumping ceased. A change in water level in each of the three deep monitoring wells was also measured when the nearby Allen Farms production well pump started and stopped.

Water levels in the shallow monitoring well (MW-1, 50 feet bgs) between Well No. 1 and Long Valley Creek did not show any change as a result of pumping of Well No. 1. This well was drilled

and constructed to monitor upper water level changes, which may result from pumping of Well No. 1 and related potential effects on Long Valley Creek. Because the monitoring of water levels in MW-1 showed no drop in upper water levels as a result of pumping Well No. 1, it is reasonable to assume that there would be no impacts, or at worst only minimal impacts to Long Valley Creek as a result of pumping the proposed HUC well field at 2,200 gpm continuously.

Data collected during the three pumping tests on Well No. 1 produced the transmissivity and storage coefficient values shown in Table 3, below. Both pumping and recovery values were calculated. The strong correlation of the values indicates that sufficient and accurate data were collected during the pumping and recovery programs.

Table 3. Well No. 1 Pumping and Recovery Aquifer Values

Pumping Period	Duration (hours)	Transmissivity (Drawdown)	Transmissivity (Recovery)	Storage Coefficient	Specific Capacity
1	336	71,305	68,720	---	42.32
2	54	81,537	---	0.00436	46.99
3	25	---	---	---	44.80

Analysis of the drawdown and recovery data was undertaken using the Theis analysis method for confined aquifers (drawdown data) and the Theis/Cooper-Jacob recovery method for confined aquifers (recovery data). Plots of the data graphs and data are included in Appendix A.

During the pumping of Well No. 1, water level data was collected at all four monitoring wells (MW-1 through MW-4). In addition, as mentioned previously, water levels were measured at the idle production wells nearby (Ken Doyle and Randy Azevedo). Water level changes both downward and upward were recorded as a result of the pumping/non-pumping cycle of Well No. 1. In addition, water level fluctuations were recorded due to pumping of Well No. 1 in the Allen Farms and Tim Garrod production wells. Also, the influence of these wells on each other was measured.

Minor fluctuations of a few inches in water levels were recorded at MW-1. These changes are minor and not likely to be related to the well pumping.

7.0 NUMERICAL MODEL

A three-dimensional finite-difference ground water flow model was developed for the study area utilizing the GMS (version 3.1) ground water flow modeling software. The GMS software allows for complete interface with the U.S.G.S. MODFLOW model. Models can be defined and edited at the conceptual model level or on a cell-by-cell basis at the grid level. The model results are presented in tabular form and 2D and 3D fashion. The following sections describe the construction of the ground water model.

7.1 Model Construction

The finite difference grid and aquifer properties were developed using the aquifer testing data and GMS conceptual model. This allowed for input of topographic elevations and assignment of layers and geologic fault boundaries based on geologic and hydrogeologic evidence.

The ground water model that was developed was designed to accommodate the three distinct and separate geologic layers that were found in the field during the drilling program. The geologic fault system observed from aerial photos was also placed in the model. No flow boundary conditions were assigned to the eastern and western boundaries of the model. The northern and southern boundaries were allowed to be constant head boundaries. It was assumed that recharge into the basin and model was predominantly recharge through the Long Valley Creek system. A minor amount was also assumed to recharge the ground water system from a combination of precipitation onto the Diamond Mountains, agricultural recharge, and direct precipitation recharge onto the study area. Separate recharge values for each of these recharge areas were entered into the model.

7.2 Aquifer Parameters

The aquifer parameters (Hydraulic Conductivity and Storage Coefficient) that have been placed into the model were based on analysis of the pumping tests data collected during the October 2001 testing program. As a result, the three-layered model basin was set up with individual hydraulic conductivity values assigned to each of the layers. The following sections describe the modifications that were made to the model and the values that were assigned to each of the layers.

7.3 Storage Coefficients

During the initial stage of developing the model, different storage coefficient values were assigned to each of the layers. From the testing program results, the storage coefficient value for layer three (the lowest layer) was calculated. Storage coefficient values for the upper two layers were arrived at by initially estimating the values and calibrating the results. During the calibration process, these values were modified to correlate with field water levels observed. The uppermost layer (comprised of alluvial material, mostly sands and silts) was assigned a storage coefficient value of 0.01. This value was used as a staring point because of the unconfined nature of the ground water. The middle layer, which is made up of low permeability clays, was assigned a value of 0.0001 because the clay layer is confined. The lower layer was assigned a storage coefficient value of 0.001 because the layer is mostly semi-confined and data from the pumping tests support the value used.

7.4 Hydraulic Conductivity

Hydraulic conductivity is a function of transmissivity divided by aquifer thickness and reflects the ability of ground water to move through geologic material. As with storage coefficients, hydraulic conductivity values assigned to areas of the model were separated into three layers. Each of the three layers was initially assigned both a horizontal and a vertical conductivity value. The uppermost zone was assigned a horizontal value of 10.0 ft/day and a vertical value of 1.0 ft/day; the middle layer a horizontal value of 0.01 ft/day and a vertical value of 0.001 ft/day; and the lower layer was given a horizontal value of 140 ft/day and a vertical value of 10 ft/day. These values, after calibration, remained the same for the upper two layers, while the lower level values were adjusted during calibration.

7.5 Boundary Conditions and Recharge

Boundary conditions are used to define how an aquifer system interacts with sources and sinks for groundwater flows that are on the boundary or within the model domain. Conditions are specified for all layers of the model and are based on the conceptual hydrogeology of the area. For this model the eastern and western sides of the model were given no flow boundaries, while the northern and southern boundaries were given constant-head boundaries. It was assumed that nearly all of the recharge that entered the model was from the south as underflow from the Long Valley Creek system. A minor amount of precipitation recharge was assumed in the model to be coming from the

Diamond Mountains, through agricultural recharge, and through direct precipitation recharge onto the modeled area.

7.6 Precipitation Recharge

Three different rainfall (precipitation) recharge values were assigned in the model covering the areas shown in Figure 4. For simplicity, mountain range recharge was assumed in the model to be 0.0007 ft/day from January 1 through June 30 and zero for the rest of the year; precipitation recharge was assumed to be 0.0002 ft/day from January 1 through June 30 and zero for the rest of the year; and agricultural recharge was assumed to be 0.0061 ft/day only from April 1 through Sept 30 of each year.

7.7 Long Valley Creek Recharge

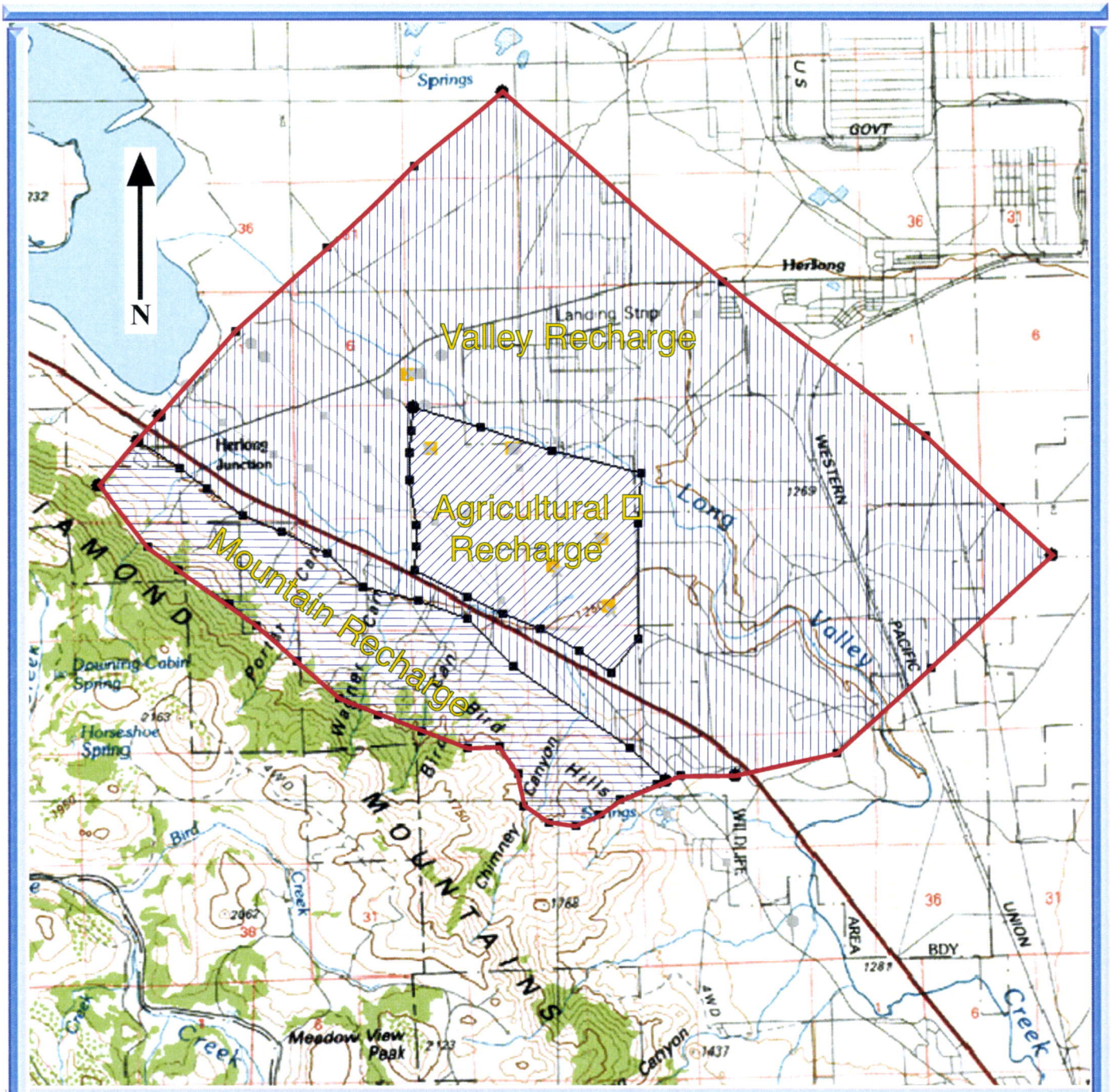
Long Valley Creek recharge to the ground water system was assumed to be the largest source of recharge into the model area. Historically, surface water flow from the creek only makes it to Honey Lake during the late winter and early spring. The rest of the year the surface water infiltrates through the creek bottom as it flows northward towards Honey Lake. With these historical trends in mind, a constant-recharge boundary was assigned in the model for groundwater to enter the model area from the south. The model calculates the recharge value as historical water level data is calibrated into the model. The constant-recharge boundary will then correspondingly alter the inflow of water to the other recharge values and discharge (pumping) values that were also entered into the model.

7.8 Grid Refinement

The initial grid (cell) nominal width of 300 by 300 feet was retained after calibration. This cell spacing was found to be sufficient to provide acceptable correlation with field data as well as sufficient to predict pumping impacts.

Because MODFLOW calculates the water level across the entire cell width to get a predicted water level at the well (located in the center of the cell), a projection must be made based on the water level that is predicted by the model for the cell that contains the well. A cone of depression contour extrapolation is then performed for the cell water levels at the actual well location. For this initial

modeling effort a water level head contour map was developed. After the head contour map was developed, drawdown contours were developed.



AquA Hydrogeologic Consulting LLC

Figure 4
Study and Recharge Area
December 2001

- Mountain Recharge
- Valley Recharge
- Agricultural Recharge
- Study Area Boundary

1 Inch = 7,000 ft

7.9 Transient Calibrations

The primary method used to calibrate the model was transient (as opposed to steady-state) calibration. Transient calibration is used to assign the storage components (specific yield and storage coefficient) of the model, and to further refine hydraulic conductivity and boundary conditions. The following table summarizes the final aquifer properties that were determined from the transient calibration.

Table 4. Calibrated Aquifer Parameters

Layer	Hydraulic Conductivity (Horizontal) ft/day	Hydraulic Conductivity (Vertical) ft/day	Specific Yield	Specific Storage
1	10.0	1.0	0.1	0.0001
2	0.01	0.001	0.03	0.0001
3	100.0	10.0	0.08	0.01

This transient calibration is adequate based on the characteristics of the finite difference mesh and the hydrogeologic data being modeled.

Using the above described aquifer parameters, the model was used to predict water levels in Well No. 1 and Wells MW-1 through MW-4. The projected values were within one or two feet of the recorded values, considered to be excellent correlation. Based on this correlation, the model was considered to be properly calibrated, and ready to be used to design the wellfield and minimize impacts to the aquifer and wells nearby.

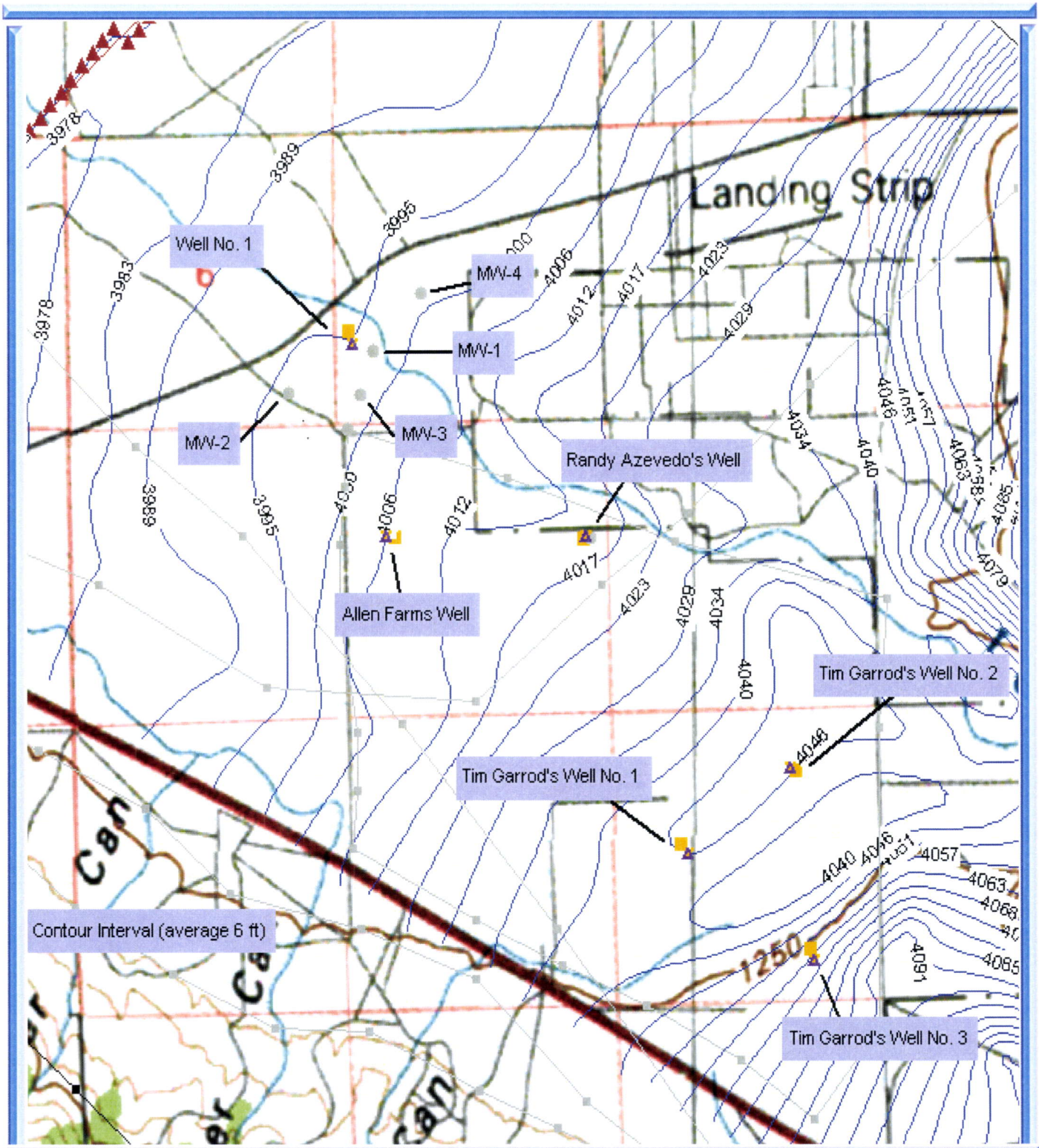
8.0 MODEL PROJECTIONS

After the ground water flow model was developed and calibrated for the study area, it was used to support decision making regarding locating, designing, and determining the aquifer and related impacts associated with the proposed HUC well field. This section presents a summary of the scenarios simulated and the results obtained for the time steps used in the model.

In reviewing the projected drawdown values for each well, it must be remembered that because of the model cell size (nominal 300 feet by 300 feet) the drawdown values or water level elevations that are shown in the figures or listed in the tables are the same value across the entire cell width. In reality, the drawdowns that are measured at the wellhead would be two or three times greater than the values that are calculated for the edge of the cell located 150 feet from the wellhead. For example, if the model indicates a projected drawdown of 10 feet for a particular cell, which contains a production well in its center, the actual drawdown at the wellhead would be estimated to range from 30 to 40 feet.

Well drawdown projections are presented in Table 5 and 6. Table 5 contains the drawdown projections with Well No. 1 pumping, while Table 6 contains drawdown projections without Well No. 1 pumping. Figures 6 through 12 contain water elevation contours showing pumping and non-pumping impacts from both HUC Well No. 1 and the four local agricultural production wells included in the model. A summary of the three time periods (one, five and ten years) and calculated drawdowns at each well for the corresponding time period are contained in Tables 5 and 6.

Time period scenarios are presented to evaluate aquifer pumping impacts not only for the HUC Test/Production Well No. 1 but also the four large agricultural production wells (Allen Farms and Tim Garrod's No. 1, No. 2, and No. 3). These four wells are normally in operation during the agricultural growing season (April through September). A fifth agricultural production well (Randy Azevedo's), idle in 2001, was placed in the model to be activated in the future, if required. Although not used in 2001, may be used for agricultural purposes as early as 2002.

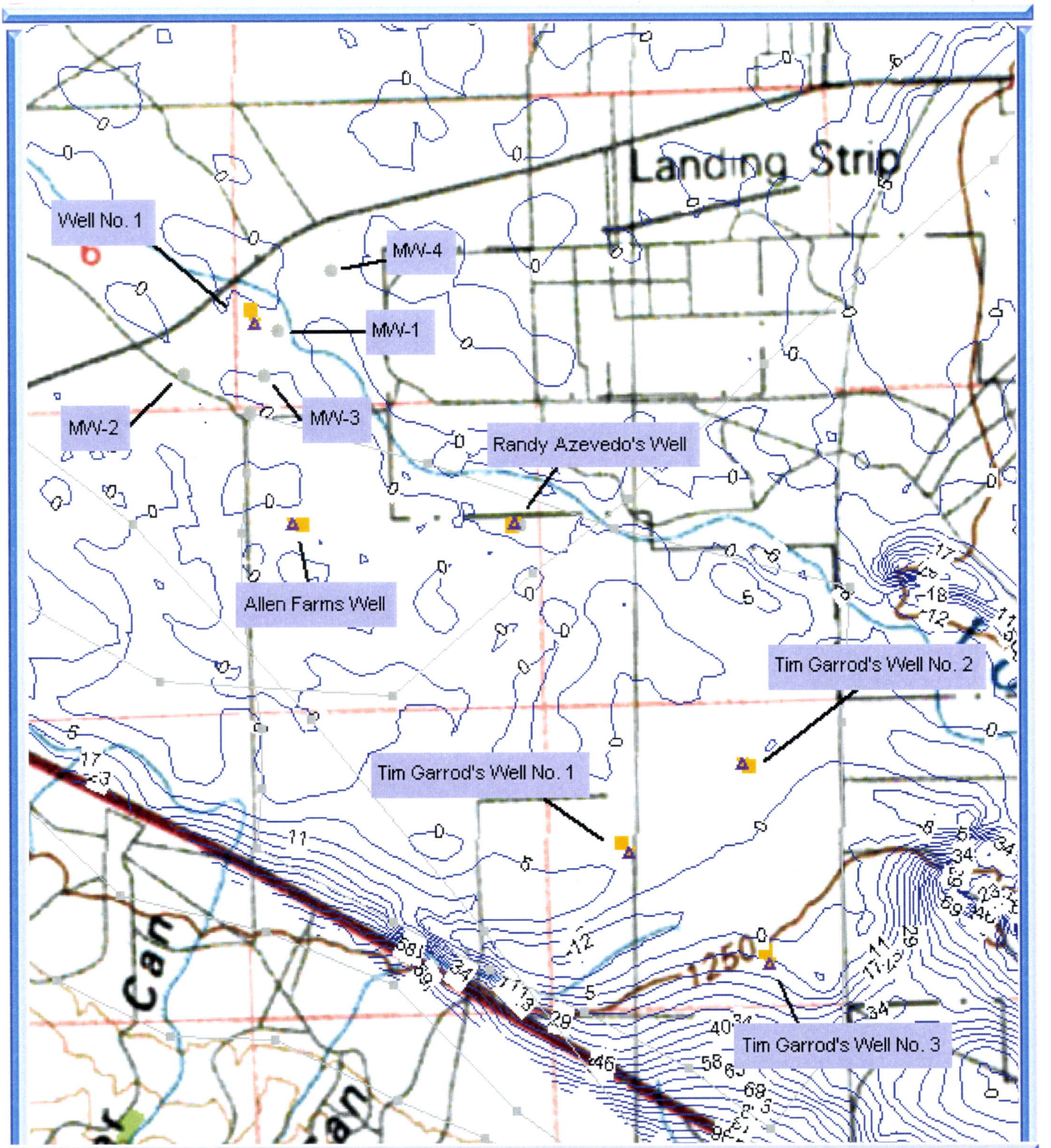


AquA Hydrogeologic Consulting LLC

Figure 5
Pre-pumping Water Elevation Contour Map
December 2001

Contours in feet 1 Inch = 2,100 ft

N

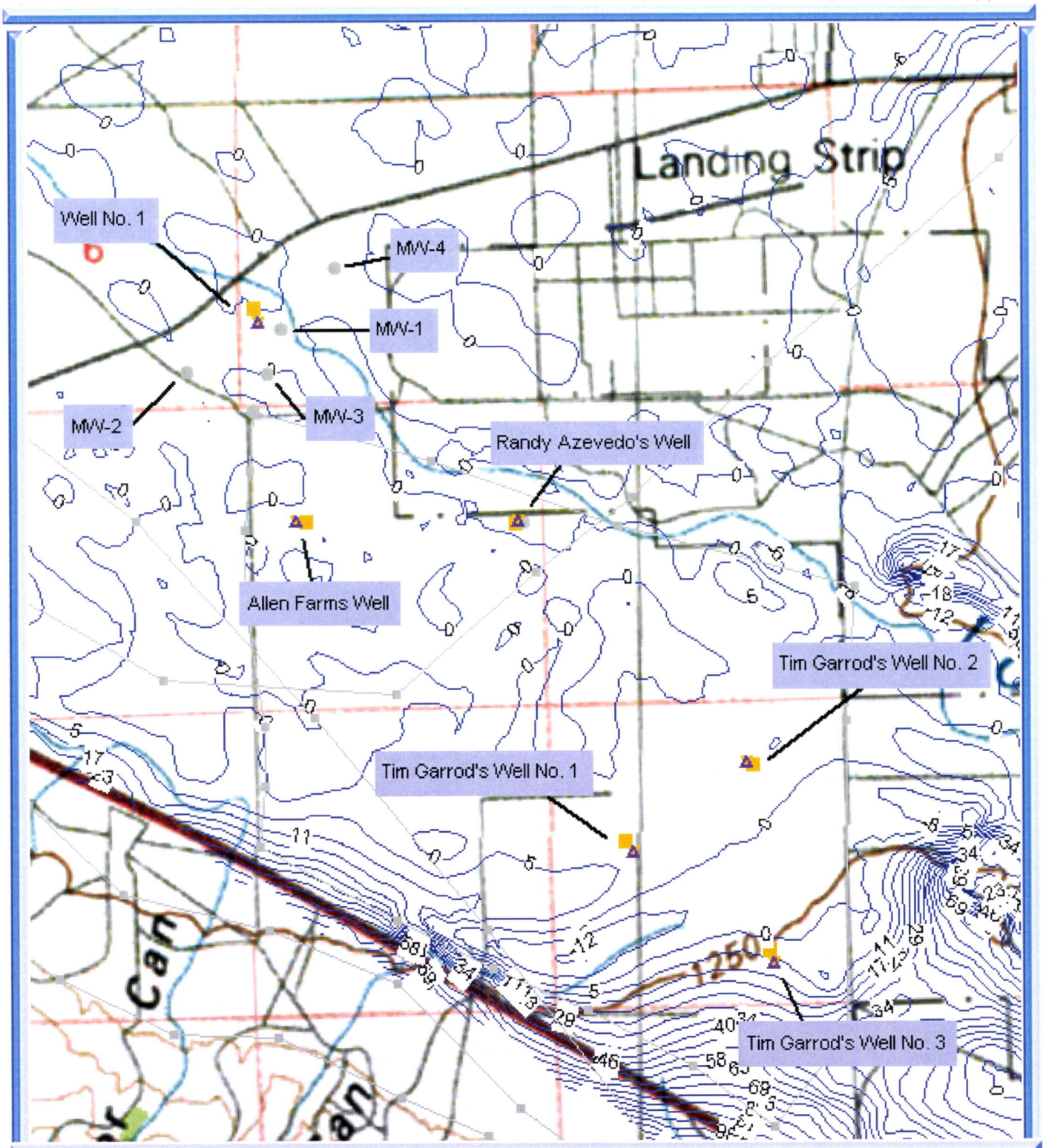


AquA Hydrogeologic Consulting LLC

Figure 6
Year One Drawdown Contour Map
With HUC Well No.1
December 2001

Contours in feet 1 Inch = 2,100 ft

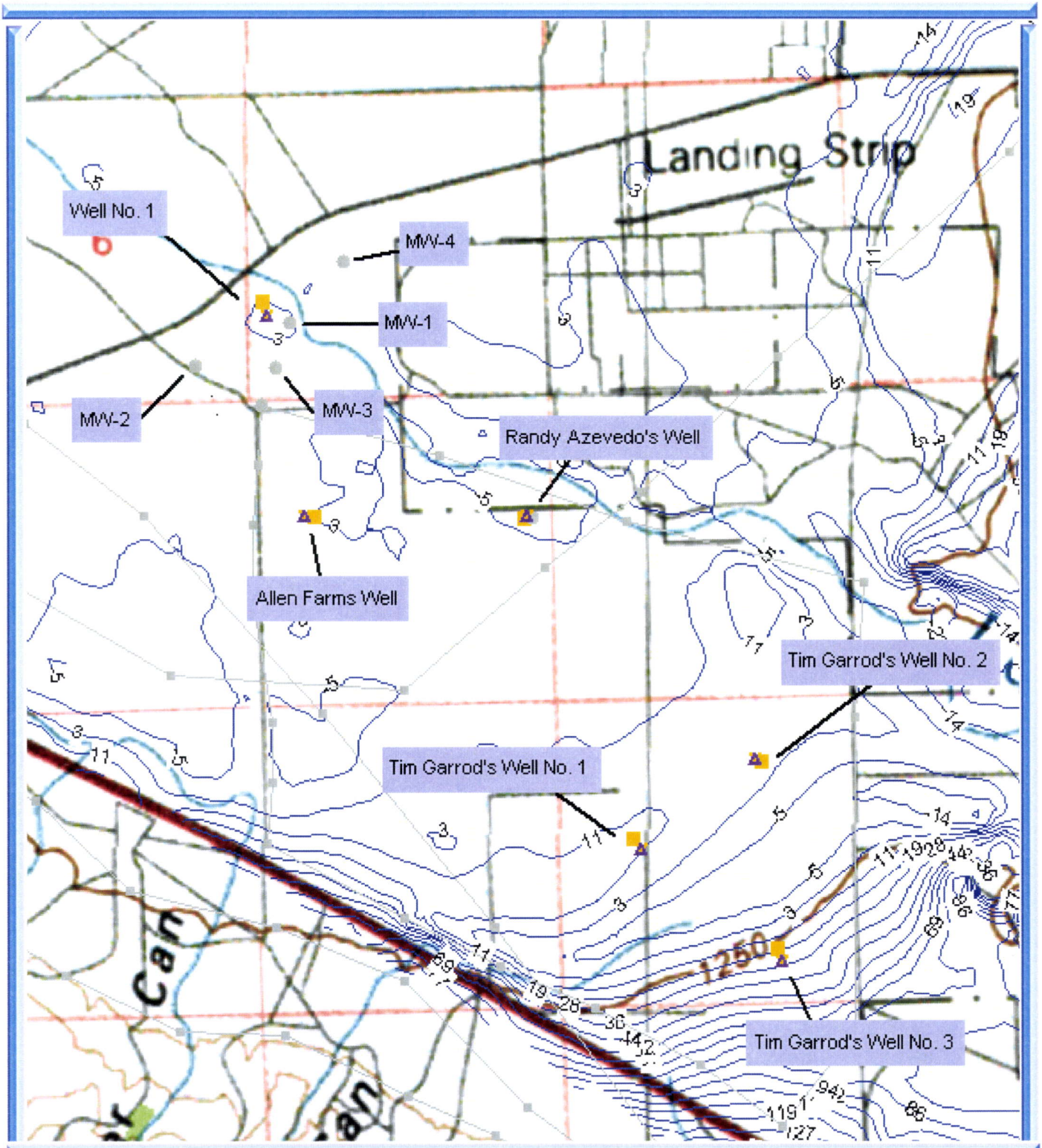
N



AquA Hydrogeologic Consulting LLC

Figure 7
Year One Drawdown Contour Map
Without HUC Well No.1
December 2001

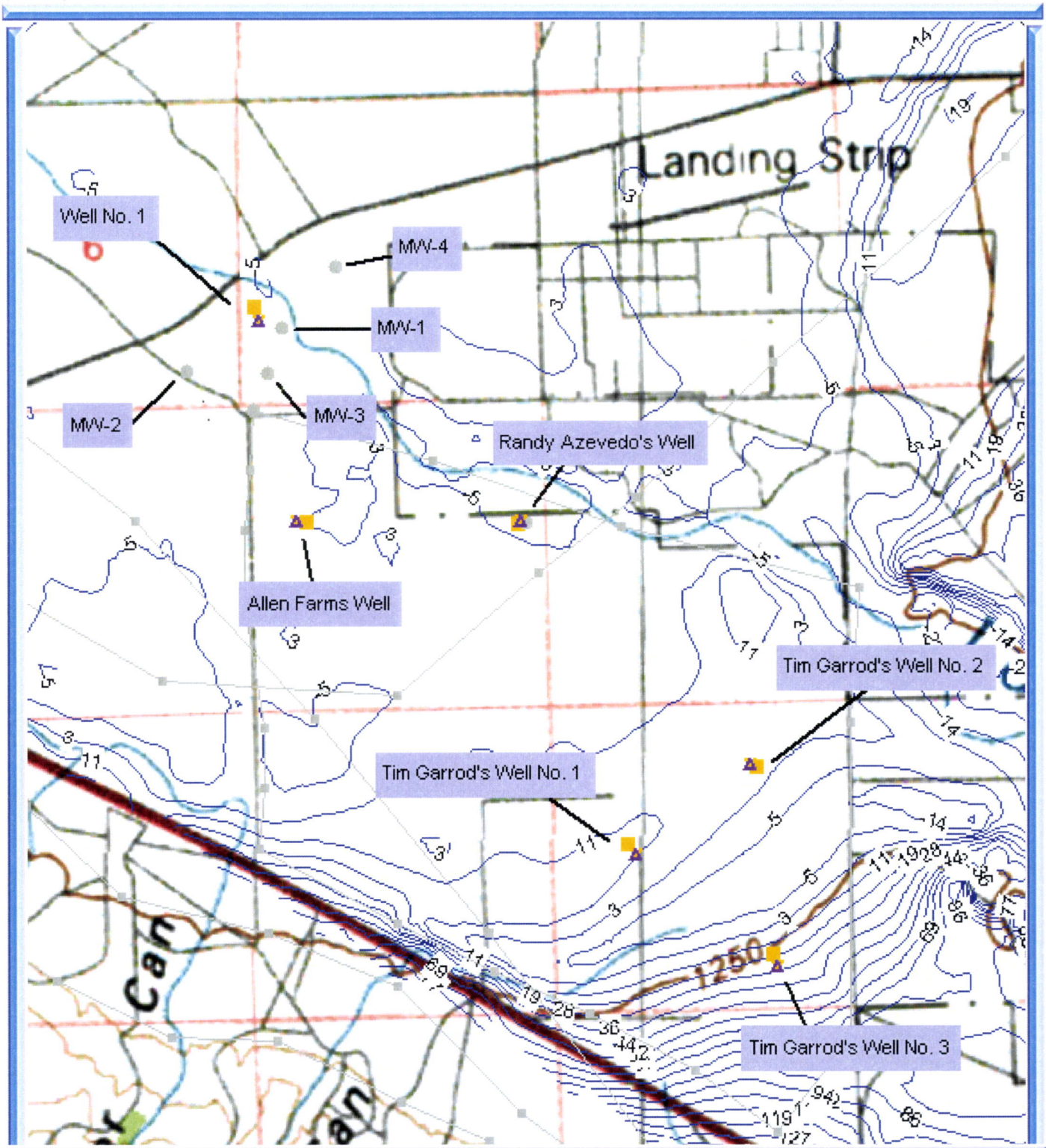
Contours in feet 1 Inch = 2,100 ft



AquA Hydrogeologic Consulting LLC

Figure 8
Year Five Drawdown Contour Map
With HUC Well No. 1
December 2001

Contours in feet 1 Inch = 2,100 ft

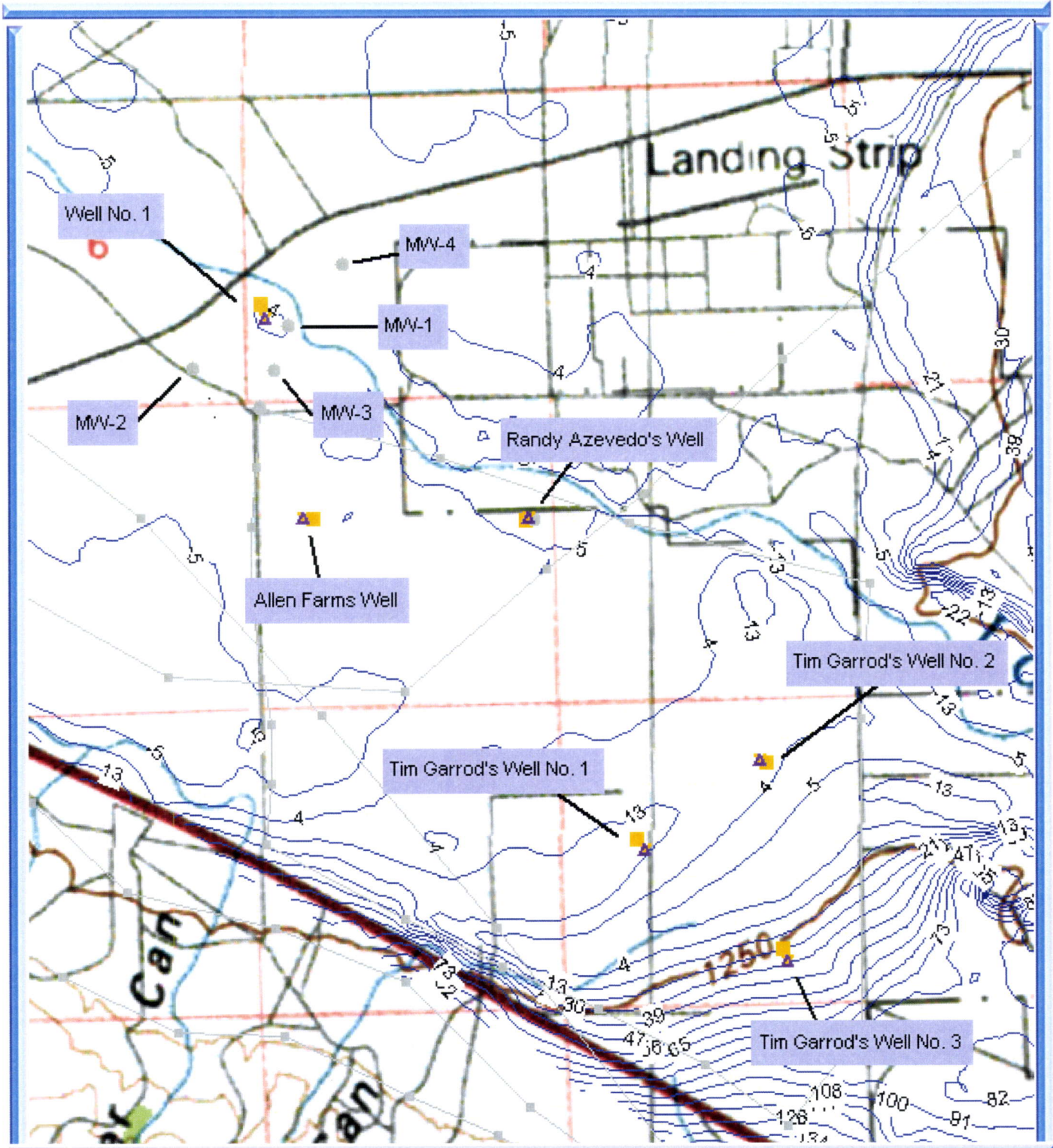


AquA Hydrogeologic Consulting LLC

Figure 9
Year Five Drawdown Contour Map
Without HUC Well No.1
December 2001

Contours in feet 1 Inch = 2,100 ft

N

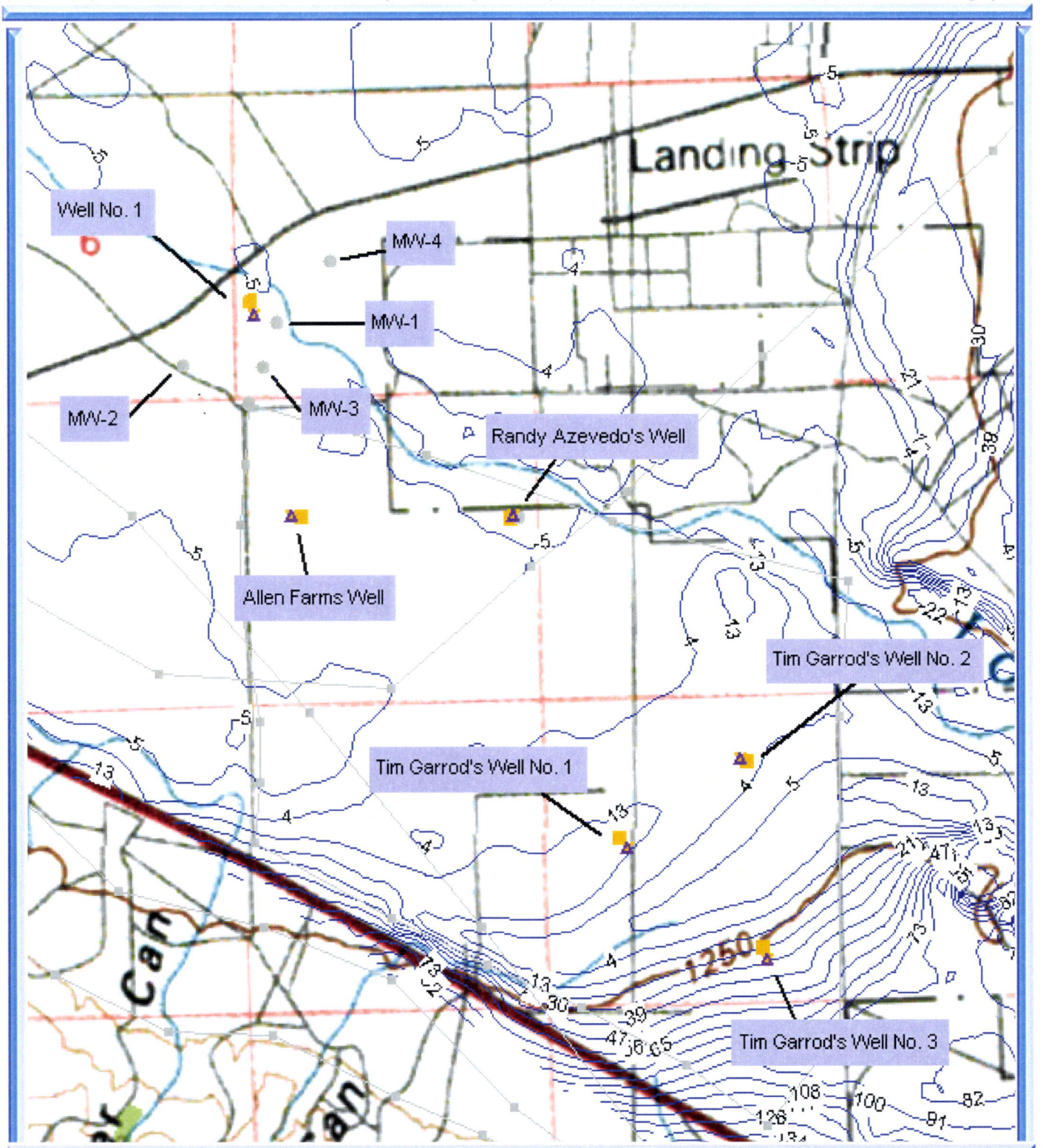


AquA Hydrogeologic Consulting LLC

Figure 10
Year Ten Drawdown Contour Map
With HUC Well No.1
December 2001

Contours in feet 1 Inch = 2,100 ft

N



AquA Hydrogeologic Consulting LLC

Figure 11
Year Ten Drawdown Contour Map
Without HUC Well No. 1
December 2001

Contours in feet 1 Inch = 2,100 ft

N

Table 5. Projected Drawdowns with HUC No. 1 Pumping

Well	Initial Water Elevation (ft)	One Year Drawdown (ft)	Five Year Drawdown (ft)	Ten Year Drawdown (ft)
Allen Farms	4,007	2	3	3
Randy Azevedo	4,014	+4	+7	+8
Tim Garrod's No. 1	4,045	8	12	14
Tim Garrod's No. 2	4,045	3	5	6
Tim Garrod's No. 3	4,060	18	19	22

Table 6. Projected Drawdowns without HUC No. 1 Pumping

Well	Initial Water Elevation (ft)	One Year Drawdown (ft)	Five Year Drawdown (ft)	Ten Year Drawdown (ft)
Allen Farms	4,007	1	3	3
Randy Azevedo	4,014	+2	+7	+8
Tim Garrod's No. 1	4,045	12	12	14
Tim Garrod's No. 2	4,045	1	5	6
Tim Garrod's No. 3	4,060	8	19	22

As illustrated in Tables 5 and 6 and the supporting map figures, the projected drawdowns and pumping impacts developed from the ground water flow model indicate the following:

- Minimal impact to the ground water aquifer or agricultural ground water users as the result of pumping HUC Well No. 1 at the proposed pumping rate of 2,200 gpm around round.
- No impact to the domestic wells located approximately 5,000 to 7,000 feet east of Well No. 1.
- No impact to the Long Valley Creek system.
- No impact to the study area aquifer from the Sierra Army Depot aquifer.

9.0 REFERENCES

AquA Hydrogeologic Consulting, Pumping Tests and Ground Water Evaluation, Herlong Utilities Cooperative, June 18, 2001

California Department of Water Resources, 2001, Groundwater Level Data and Well Logs

California Department of Natural Resources, Division of Mines, Geologic Map of California, Westwood Sheet, 1976

Driscoll, Fletcher G., Groundwater and Wells, Second Edition, 1986

Kruseman, G.P. and de Ridder, N.A., Analysis and Evaluation of Pumping Test Data, Second Edition, International Institute for Land Reclamation and Improvement, P.O. Box 45, 6700 AA Wageningen, The Netherlands, 1991

Lawrence Livermore National Laboratory, 1997, Environmental Isotope Investigation of Ground Water Flow in the Honey Lake Basin, California and Nevada, July 1997

Lohman, S.W., Ground-Water Hydraulics, U.S. Department of the Interior, Geological Survey Professional Paper 708

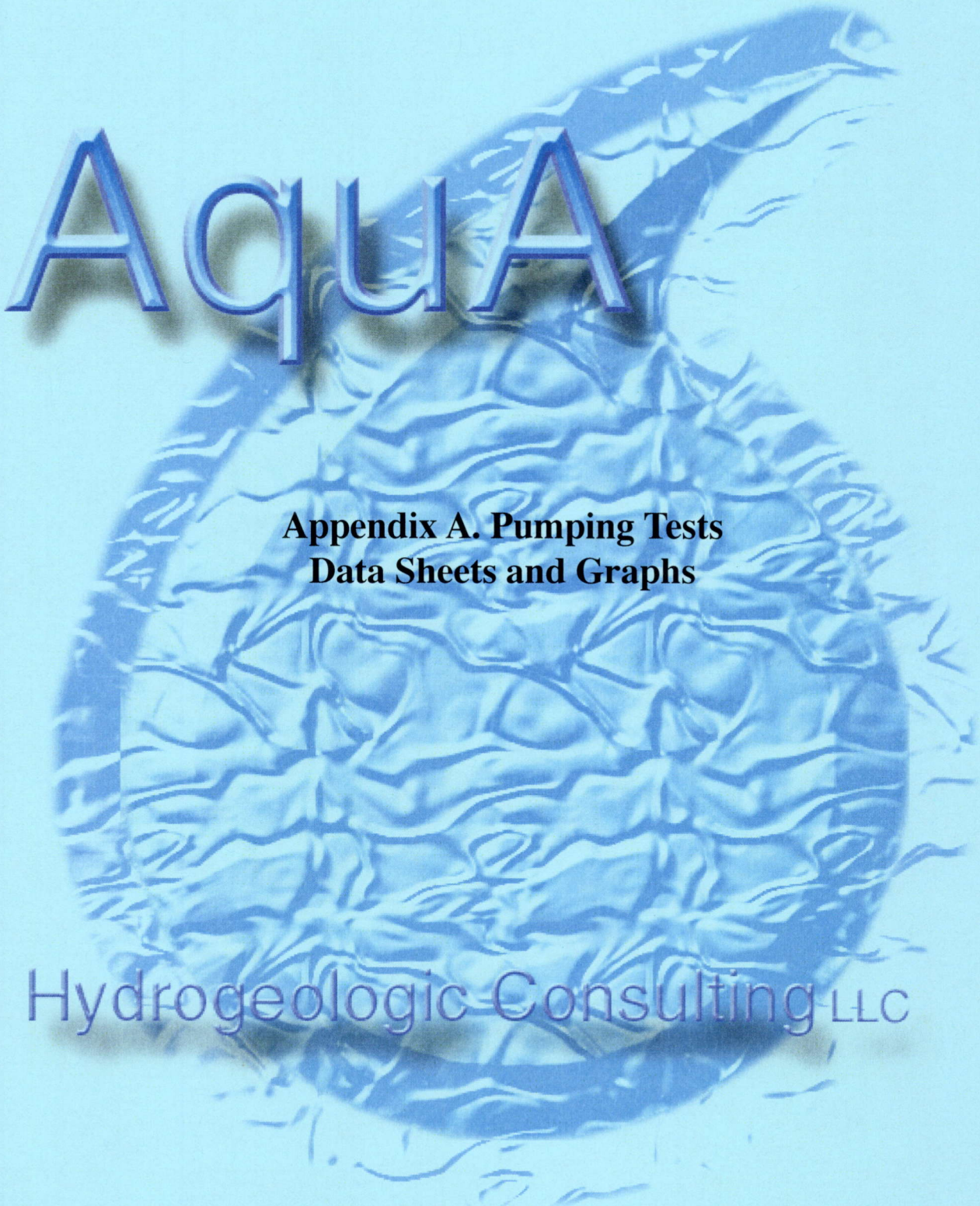
Lumos and Associates, Inc. 2001, Amendment to Lassen County Herlong Water and Sewer System Infrastructure Feasibility Study, February 2001

Personal communication, Beckett Drilling, 2001

Personal communication, Dave Lindsey, 2001

Nimbus Engineers, 2001, Herlong Wellfield Evaluation, January 2001

Slosson and Associates, Preliminary Analysis of the Hydrogeology of the Honey Lake Basin, California-Nevada, and Analysis of the Effects on the Sierra Army Depot of Ground Water Withdrawal and Exportation for the Proposed Truckee Meadows Project, December 14, 1990

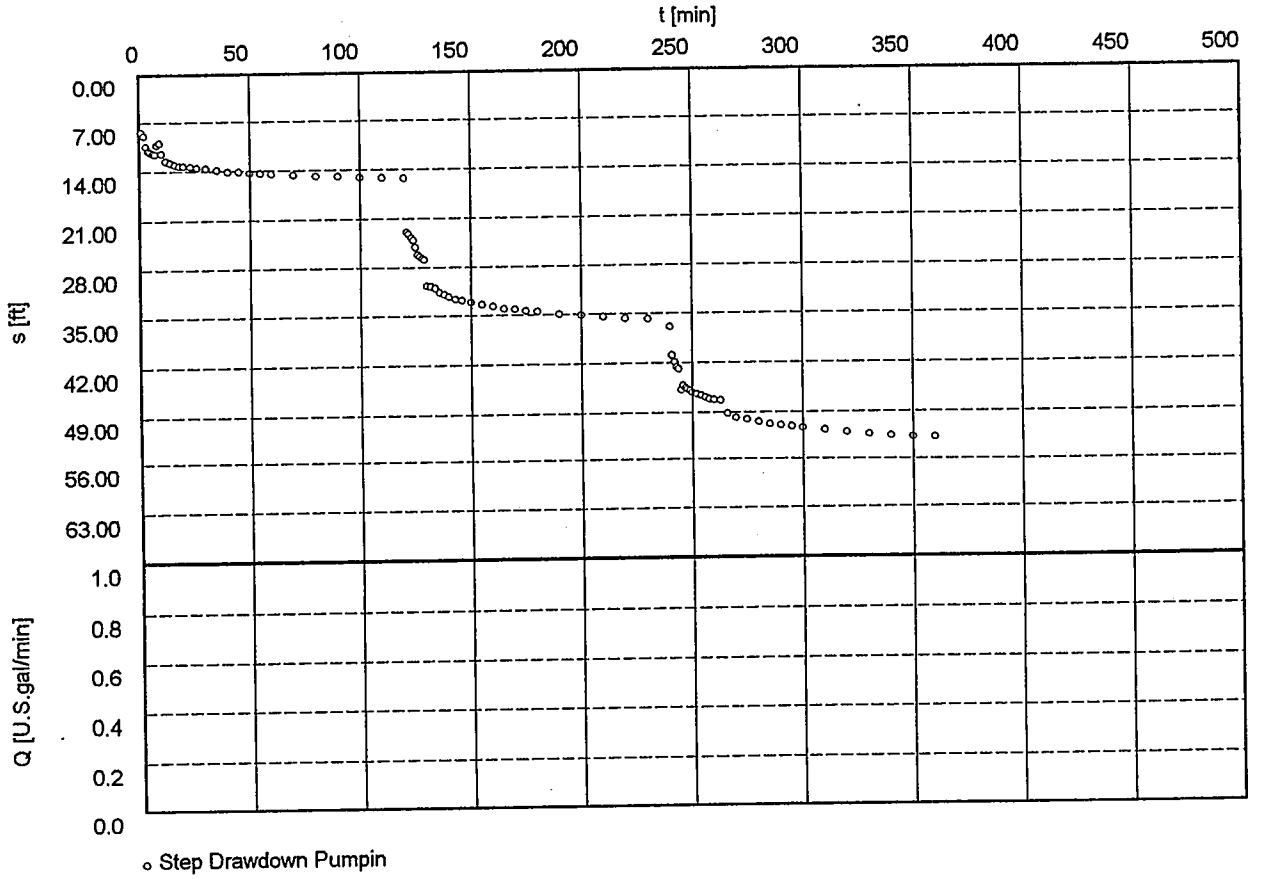


Appendix A. Pumping Tests
Data Sheets and Graphs

Hydrogeologic Consulting LLC

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: 10.27.2001 | Page 1 Project: HUC Test/Production Well Evaluated by: David Carlson

Pumping Test No. Step-Drawdown (800/1650/2350 gpm)	Test conducted on: October 1, 2001
Production Well No. 1	



Step Drawdown Pumping Rates were conducted at 800, 1,600 and 2,350 gallons per minute

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: 10.27.2001	Page 2
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Step-Drawdown (800/1650/2350 gpm)	Test conducted on: October 1, 2001
Production Well No. 1	Step Drawdown Pumping Test

Static water level: 31.75 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	1.00	40.10	8.35	
2	2.00	40.70	8.95	
3	3.00	42.15	10.40	
4	4.00	42.90	11.15	
5	5.00	43.05	11.30	
6	6.00	43.28	11.53	
7	7.00	43.37	11.62	
8	8.00	42.00	10.25	
9	9.00	41.75	10.00	
10	10.00	43.25	11.50	
11	12.00	44.30	12.55	
12	14.00	44.58	12.83	
13	16.00	44.85	13.10	
14	18.00	45.00	13.25	
15	20.00	45.08	13.33	
16	23.00	45.10	13.35	
17	26.00	45.28	13.53	
18	30.00	45.40	13.65	
19	35.00	45.70	13.95	
20	40.00	45.90	14.15	
21	45.00	45.95	14.20	
22	50.00	46.12	14.37	
23	55.00	46.20	14.45	
24	60.00	46.30	14.55	
25	70.00	46.42	14.67	
26	80.00	46.60	14.85	
27	90.00	46.70	14.95	
28	100.00	46.88	15.13	
29	110.00	47.00	15.25	
30	120.00	47.10	15.35	
31	121.00	54.75	23.00	
32	122.00	55.00	23.25	
33	123.00	55.60	23.85	
34	124.00	55.90	24.15	
35	125.00	56.90	25.15	
36	126.00	58.00	26.25	
37	127.00	58.20	26.45	
38	128.00	58.50	26.75	
39	129.00	58.70	26.95	
40	130.00	62.40	30.65	
41	132.00	62.50	30.75	
42	134.00	62.80	31.05	
43	136.00	63.40	31.65	
44	138.00	63.70	31.95	
45	140.00	64.00	32.25	
46	143.00	64.40	32.65	
47	146.00	64.55	32.80	
48	150.00	64.85	33.10	
49	155.00	65.15	33.40	
50	160.00	65.48	33.73	

AquA Hydrogeologic Consulting
P.O. Box 18793
Reno, Nevada 89511
ph.(775) 250-9700

Pumping test analysis
Time-Drawdown plot
with discharge

Project: HUC Test/Production Well

Evaluated by: David Carlson

Pumping Test No. Step-Drawdown (800/1650/2350 gpm)

Test conducted on: October 1, 2001

Production Well No. 1

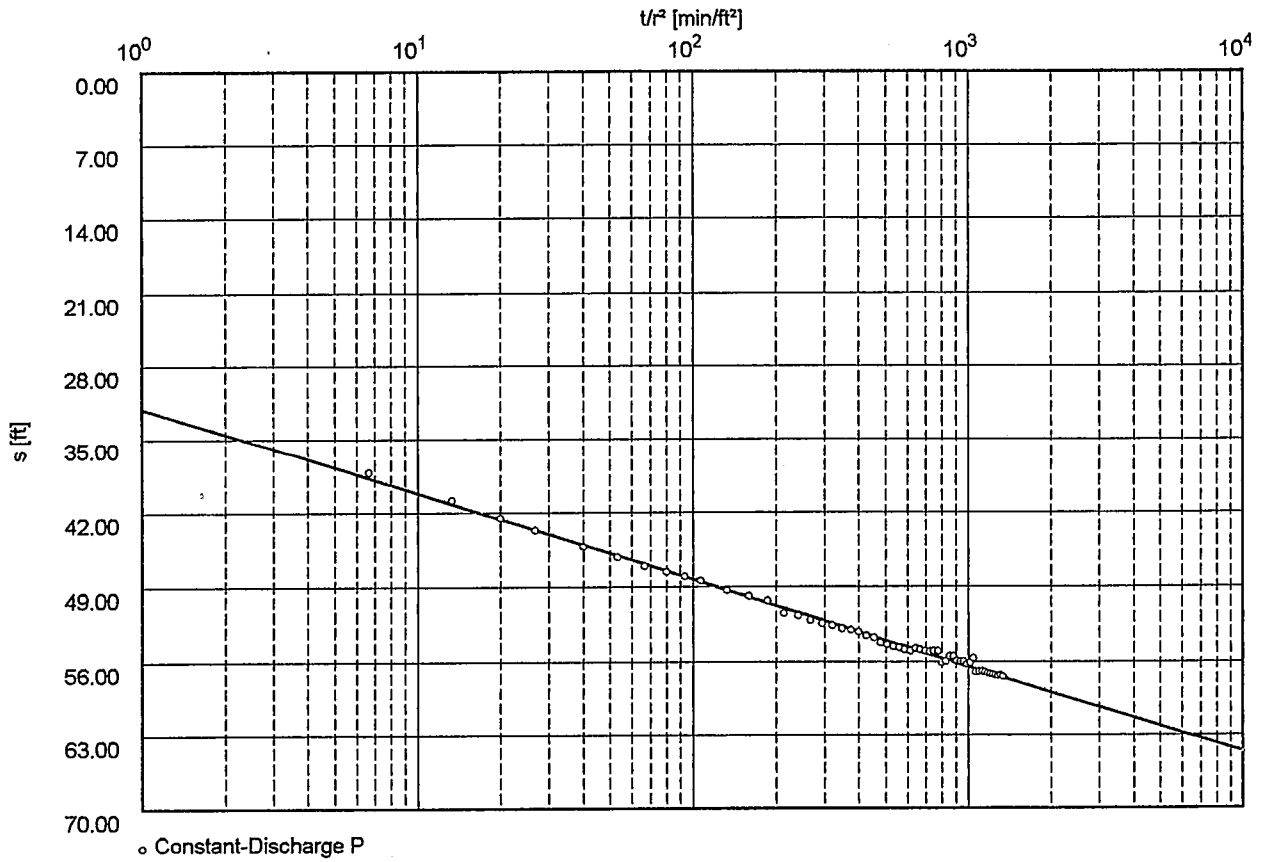
Step Drawdown Pumping Test

Static water level: 31.75 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]
51	165.00	65.82	34.07
52	170.00	65.87	34.12
53	175.00	66.15	34.40
54	180.00	66.30	34.55
55	190.00	66.67	34.92
56	200.00	66.90	35.15
57	210.00	67.17	35.42
58	220.00	67.45	35.70
59	230.00	67.55	35.80
60	240.00	68.70	36.95
61	241.00	72.70	40.95
62	242.00	73.70	41.95
63	243.00	74.40	42.65
64	244.00	74.62	42.87
65	245.00	77.60	45.85
66	246.00	77.00	45.25
67	247.00	77.28	45.53
68	248.00	77.50	45.75
69	249.00	77.70	45.95
70	250.00	77.92	46.17
71	252.00	78.25	46.50
72	254.00	78.40	46.65
73	256.00	78.65	46.90
74	258.00	78.90	47.15
75	260.00	79.05	47.30
76	263.00	79.12	47.37
77	266.00	81.00	49.25
78	270.00	81.60	49.85
79	275.00	81.90	50.15
80	280.00	82.20	50.45
81	285.00	82.60	50.85
82	290.00	82.75	51.00
83	295.00	82.95	51.20
84	300.00	83.15	51.40
85	310.00	83.50	51.75
86	320.00	83.80	52.05
87	330.00	84.10	52.35
88	340.00	84.35	52.60
89	350.00	84.50	52.75
90	360.00	84.65	52.90

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 10-27-2001	Page 1
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Constant-Discharge 2,500/2,200 gpm	Test conducted on: October 2-16, 2001
Production Well No. 1	
Discharge 2200.00 U.S.gal/min	



Transmissivity [ft²/min]: 6.62×10^{0}

Hydraulic conductivity [ft/min]: 1.20×10^{-2}

Aquifer thickness [ft]: 550.00

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 10-27-2001	Page 2
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Constant-Discharge 2,500/2,200 gpm	Test conducted on: October 2-16, 2001
Production Well No. 1	Constant-Discharge Pumping Test
Discharge 2200.00 U.S.gal/min	Distance from the pumping well 1.50 ft
Static water level: 31.70 ft below datum	

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	15.00	69.98	38.28	
2	30.00	72.60	40.90	
3	45.00	74.25	42.55	
4	60.00	75.45	43.75	
5	90.00	77.00	45.30	
6	120.00	77.97	46.27	
7	150.00	78.80	47.10	
8	180.00	79.35	47.65	
9	210.00	79.75	48.05	
10	240.00	80.20	48.50	
11	300.00	81.11	49.41	
12	360.00	81.60	49.90	
13	420.00	82.02	50.32	
14	480.00	83.22	51.52	
15	540.00	83.45	51.75	
16	600.00	83.85	52.15	
17	660.00	84.20	52.50	
18	720.00	84.35	52.65	
19	780.00	84.62	52.92	
20	840.00	84.78	53.08	
21	900.00	84.97	53.27	
22	960.00	85.30	53.60	
23	1020.00	85.50	53.80	
24	1080.00	85.95	54.25	
25	1140.00	86.15	54.45	
26	1200.00	86.30	54.60	
27	1260.00	86.45	54.75	
28	1320.00	86.60	54.90	
29	1380.00	86.75	55.05	
30	1440.00	86.50	54.80	
31	1500.00	86.60	54.90	
32	1560.00	86.70	55.00	
33	1620.00	86.79	55.09	
34	1680.00	86.70	55.00	
35	1740.00	86.70	55.00	
36	1800.00	87.82	56.12	
37	1860.00	87.70	56.00	
38	1920.00	87.20	55.50	
39	1980.00	87.20	55.50	
40	2040.00	87.60	55.90	
41	2100.00	87.70	56.00	
42	2160.00	87.70	56.00	
43	2220.00	87.90	56.20	
44	2280.00	87.80	56.10	
45	2340.00	87.40	55.70	
46	2400.00	88.70	57.00	
47	2460.00	88.65	56.95	
48	2520.00	88.60	56.90	
49	2580.00	88.70	57.00	
50	2640.00	88.80	57.10	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 10-27-2001	Page 3
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

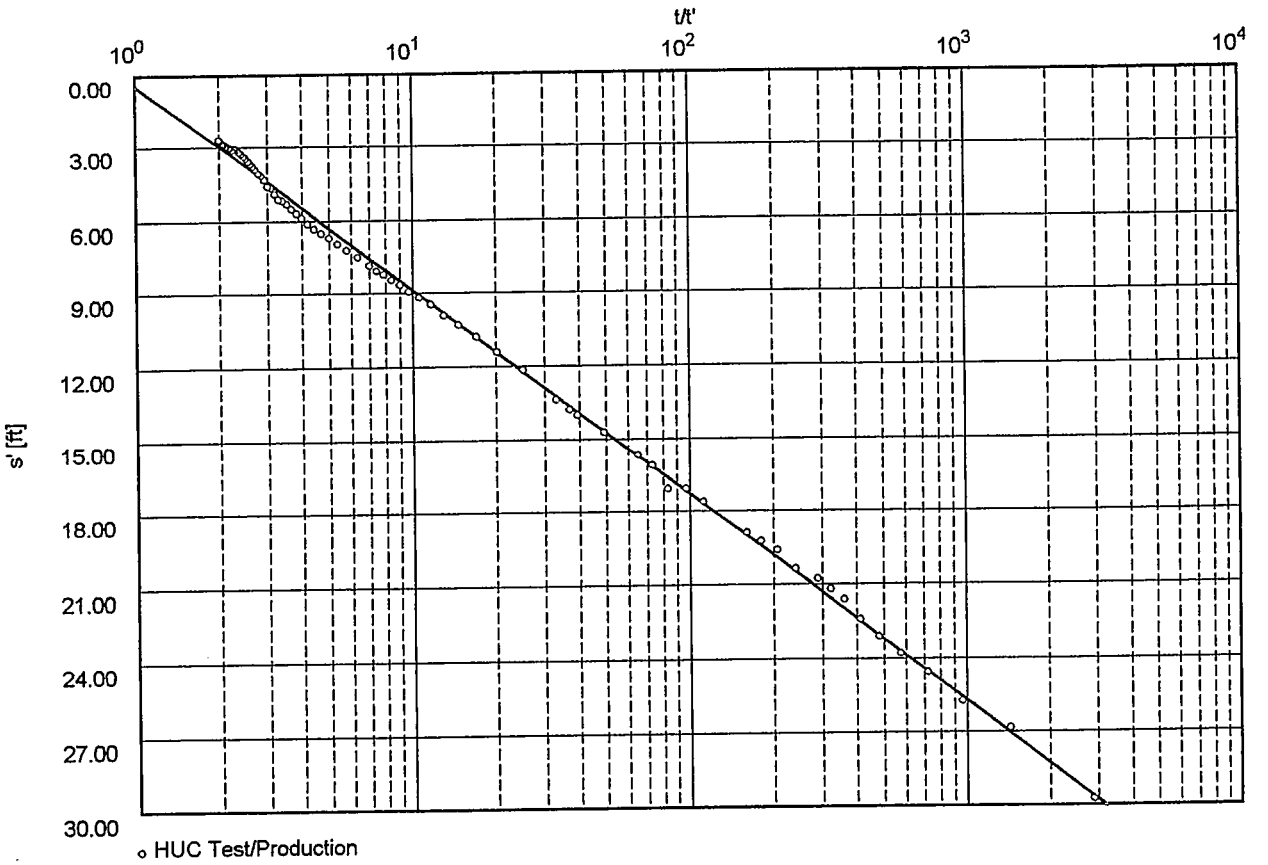
Pumping Test No. Constant-Discharge 2,500/2,200 gpm	Test conducted on: October 2-16, 2001
Production Well No. 1	Constant-Discharge Pumping Test
Discharge 2200.00 U.S.gal/min	Distance from the pumping well 1.50 ft

Static water level: 31.70 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	2700.00	88.85	57.15	
52	2760.00	88.90	57.20	
53	2820.00	89.00	57.30	
54	2880.00	89.05	57.35	
55	2940.00	89.00	57.30	
56	3000.00	89.08	57.38	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 10-30-2001	Page 1
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Recovery Data (14 day constant)	Test conducted on: October 16-18, 2001
Production Well No. 1	
Discharge 2200.00 U.S.gal/min	
	Pumping test duration: 2880.00 min



Transmissivity [ft²/min]: 6.38×10^{0}

Hydraulic conductivity [ft/min]: 1.16×10^{-2}

Aquifer thickness [ft]: 550.00

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 10-30-2001	Page 2
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Recovery Data (14 day constant)	Test conducted on: October 16-18, 2001
Production Well No. 1	HUC Test/Production Well
Discharge 2200.00 U.S.gal/min	Distance from the pumping well 1.50 ft
Static water level: 31.70 ft below datum	Pumping test duration: 2880.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	
1	1.00	61.43	29.73	
2	2.00	58.55	26.85	
3	3.00	57.46	25.76	
4	4.00	56.28	24.58	
5	5.00	55.49	23.79	
6	6.00	54.79	23.09	
7	7.00	54.11	22.41	
8	8.00	53.31	21.61	
9	9.00	52.92	21.22	
10	10.00	52.51	20.81	
11	12.00	52.09	20.39	
12	14.00	51.36	19.66	
13	16.00	50.98	19.28	
14	18.00	50.61	18.91	
15	26.00	49.32	17.62	
16	30.00	48.79	17.09	
17	35.00	48.79	17.09	
18	40.00	47.81	16.11	
19	45.00	47.39	15.69	
20	60.00	46.42	14.72	
21	75.00	45.71	14.01	
22	80.00	45.48	13.78	
23	90.00	45.08	13.38	
24	120.00	43.85	12.15	
25	150.00	43.10	11.40	
26	180.00	42.50	10.80	
27	210.00	42.02	10.32	
28	240.00	41.64	9.94	
29	270.00	41.18	9.48	
30	300.00	40.90	9.20	
31	330.00	40.65	8.95	
32	360.00	40.35	8.65	
33	390.00	40.15	8.45	
34	420.00	39.93	8.23	
35	450.00	39.77	8.07	
36	480.00	39.55	7.85	
37	540.00	39.20	7.50	
38	600.00	38.90	7.20	
39	660.00	38.64	6.94	
40	720.00	38.40	6.70	
41	780.00	38.21	6.51	
42	840.00	38.04	6.34	
43	900.00	37.85	6.15	
44	960.00	37.61	5.91	
45	1020.00	37.43	5.73	
46	1080.00	37.24	5.54	
47	1140.00	37.05	5.35	
48	1200.00	36.91	5.21	
49	1260.00	36.86	5.16	
50	1320.00	36.67	4.97	

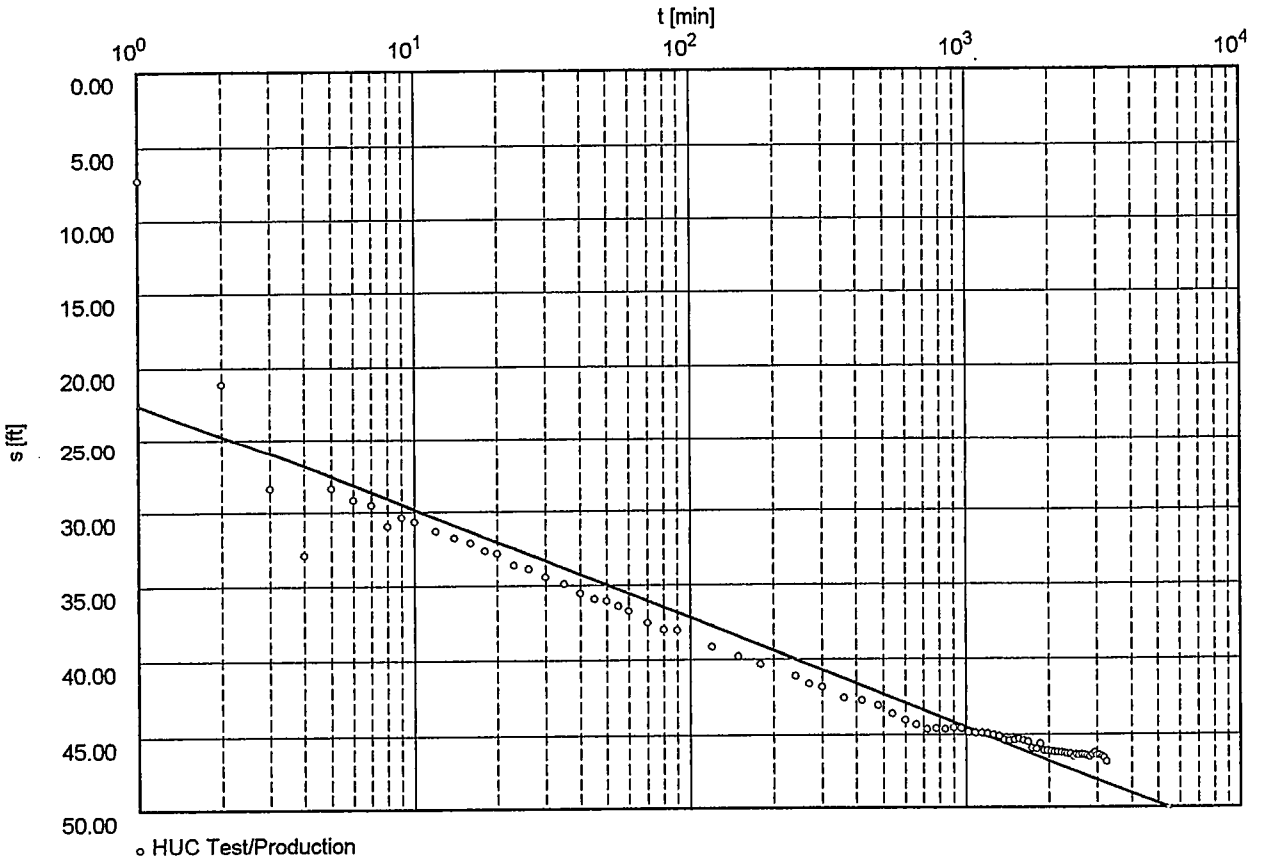
AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Recovery method after THEIS & JACOB Confined aquifer	Date: 10-30-2001	Page 3
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Recovery Data (14 day constant)	Test conducted on: October 16-18, 2001
Production Well No. 1	HUC Test/Production Well
Discharge 2200.00 U.S.gal/min	Distance from the pumping well 1.50 ft
Static water level: 31.70 ft below datum	Pumping test duration: 2880.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	
51	1380.00	36.41	4.71	
52	1440.00	36.36	4.66	
53	1500.00	36.08	4.38	
54	1560.00	35.89	4.19	
55	1620.00	35.82	4.12	
56	1680.00	35.64	3.94	
57	1740.00	35.52	3.82	
58	1800.00	35.42	3.72	
59	1860.00	35.31	3.61	
60	1920.00	35.20	3.50	
61	1980.00	35.10	3.40	
62	2040.00	35.02	3.32	
63	2100.00	34.94	3.24	
64	2160.00	34.84	3.14	
65	2220.00	34.80	3.10	
66	2280.00	34.77	3.07	
67	2340.00	34.84	3.14	
68	2400.00	34.76	3.06	
69	2460.00	34.72	3.02	
70	2520.00	34.69	2.99	
71	2580.00	34.65	2.95	
72	2640.00	34.61	2.91	
73	2700.00	34.58	2.88	
74	2760.00	34.53	2.83	
75	2820.00	34.46	2.76	
76	2880.00	34.39	2.69	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 10-30-2001	Page 1
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2nd Constant-Discharge	Test conducted on: October 18-20, 2001
Production Well No. 1	
Discharge 2200.00 U.S.gal/min	



∘ HUC Test/Production

Transmissivity [ft²/min]: 7.33×10^{0}

Hydraulic conductivity [ft/min]: 1.33×10^{-2}

Aquifer thickness [ft]: 550.00

Storativity: 6.26×10^{-3}

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 10-30-2001	Page 2
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2nd Constant-Discharge	Test conducted on: October 18-20, 2001
Production Well No. 1	HUC Test/Production Well
Discharge 2200.00 U.S.gal/min	Distance from the pumping well 1.50 ft

Static water level: 34.79 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	1.00	42.03	7.24	
2	2.00	55.89	21.10	
3	3.00	63.26	28.47	
4	4.00	67.72	32.93	
5	5.00	63.28	28.49	
6	6.00	64.04	29.25	
7	7.00	64.36	29.57	
8	8.00	65.78	30.99	
9	9.00	65.16	30.37	
10	10.00	65.47	30.68	
11	12.00	66.11	31.32	
12	14.00	66.59	31.80	
13	16.00	66.94	32.15	
14	18.00	67.46	32.67	
15	20.00	67.66	32.87	
16	23.00	68.43	33.64	
17	26.00	68.72	33.93	
18	30.00	69.24	34.45	
19	35.00	69.73	34.94	
20	40.00	70.36	35.57	
21	45.00	70.72	35.93	
22	50.00	70.87	36.08	
23	55.00	71.22	36.43	
24	60.00	71.53	36.74	
25	70.00	72.37	37.58	
26	80.00	72.83	38.04	
27	90.00	72.86	38.07	
28	120.00	73.98	39.19	
29	150.00	74.59	39.80	
30	180.00	75.12	40.33	
31	240.00	75.93	41.14	
32	270.00	76.44	41.65	
33	300.00	76.63	41.84	
34	360.00	77.35	42.56	
35	420.00	77.55	42.76	
36	480.00	77.86	43.07	
37	540.00	78.42	43.63	
38	600.00	78.83	44.04	
39	660.00	79.13	44.34	
40	720.00	79.44	44.65	
41	780.00	79.41	44.62	
42	840.00	79.43	44.64	
43	900.00	79.36	44.57	
44	960.00	79.38	44.59	
45	1020.00	79.66	44.87	
46	1080.00	79.68	44.89	
47	1140.00	79.68	44.89	
48	1200.00	79.76	44.97	
49	1260.00	79.81	45.02	
50	1320.00	79.92	45.13	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 10-30-2001	Page 3
		Project: HUC Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2nd Constant-Discharge	Test conducted on: October 18-20, 2001
Production Well No. 1	HUC Test/Production Well
Discharge 2200.00 U.S.gal/min	Distance from the pumping well 1.50 ft
Static water level: 34.79 ft below datum	

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	1380.00	80.15	45.36	
52	1440.00	80.19	45.40	
53	1500.00	80.17	45.38	
54	1560.00	80.11	45.32	
55	1620.00	80.20	45.41	
56	1680.00	80.30	45.51	
57	1740.00	80.71	45.92	
58	1800.00	80.75	45.96	
59	1860.00	80.40	45.61	
60	1920.00	80.88	46.09	
61	1980.00	80.90	46.11	
62	2040.00	80.92	46.13	
63	2100.00	80.95	46.16	
64	2160.00	80.97	46.18	
65	2220.00	81.02	46.23	
66	2280.00	81.07	46.28	
67	2340.00	81.11	46.32	
68	2400.00	81.09	46.30	
69	2460.00	81.28	46.49	
70	2520.00	81.16	46.37	
71	2580.00	81.18	46.39	
72	2640.00	81.14	46.35	
73	2700.00	81.18	46.39	
74	2760.00	81.24	46.45	
75	2820.00	81.26	46.47	
76	2880.00	81.14	46.35	
77	2940.00	81.02	46.23	
78	3000.00	81.19	46.40	
79	3060.00	81.19	46.40	
80	3120.00	81.25	46.46	
81	3180.00	81.35	46.56	
82	3240.00	81.60	46.81	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec 8, 2001	Page 1
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Long-term Pumping Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]
1	0.00	10.79	-0.06
2	59.00	10.68	-0.17
3	119.00	10.70	-0.15
4	178.00	10.73	-0.12
5	237.00	10.76	-0.09
6	298.00	10.80	-0.05
7	355.00	10.82	-0.03
8	422.00	10.84	-0.01
9	473.00	10.85	0.00
10	531.00	10.86	0.01
11	596.00	10.86	0.01
12	668.00	10.85	0.00
13	708.00	10.82	-0.03
14	794.00	10.80	-0.05
15	841.00	10.80	-0.05
16	891.00	10.79	-0.06
17	944.00	10.79	-0.06
18	1000.00	10.78	-0.07
19	1059.00	10.77	-0.08
20	1122.00	10.77	-0.08
21	1188.00	10.77	-0.08
22	1259.00	10.76	-0.09
23	1333.00	10.76	-0.09
24	1412.00	10.73	-0.12
25	1496.00	10.72	-0.13
26	1585.00	10.74	-0.11
27	1679.00	10.78	-0.07
28	1778.00	10.82	-0.03
29	1884.00	10.84	-0.01
30	1995.00	10.85	0.00
31	2113.00	10.82	-0.03
32	2239.00	10.79	-0.06
33	2359.00	10.78	-0.07
34	2479.00	10.77	-0.08
35	2599.00	10.77	-0.08
36	2719.00	10.74	-0.11
37	2839.00	10.71	-0.14
38	2959.00	10.72	-0.13
39	3079.00	10.74	-0.11
40	3199.00	10.79	-0.06
41	3319.00	10.79	-0.06
42	3439.00	10.74	-0.11
43	3559.00	10.73	-0.12
44	3679.00	10.69	-0.16
45	3799.00	10.67	-0.18
46	3919.00	10.66	-0.19
47	4039.00	10.65	-0.20
48	4159.00	10.62	-0.23
49	4279.00	10.60	-0.25
50	4399.00	10.58	-0.27

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec 8, 2001	Page 2
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Long-term Pumping Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	4519.00	10.60	-0.25	
52	4639.00	10.64	-0.21	
53	4759.00	10.64	-0.21	
54	4879.00	10.63	-0.22	
55	4999.00	10.59	-0.26	
56	5119.00	10.54	-0.31	
57	5239.00	10.50	-0.35	
58	5359.00	10.48	-0.37	
59	5479.00	10.48	-0.37	
60	5599.00	10.45	-0.40	
61	5719.00	10.41	-0.44	
62	5839.00	10.39	-0.46	
63	5959.00	10.41	-0.44	
64	6079.00	10.44	-0.41	
65	6199.00	10.45	-0.40	
66	6319.00	10.45	-0.40	
67	6439.00	10.39	-0.46	
68	6559.00	10.35	-0.50	
69	6679.00	10.29	-0.56	
70	6799.00	10.28	-0.57	
71	6919.00	10.27	-0.58	
72	7039.00	10.22	-0.63	
73	7159.00	10.18	-0.67	
74	7279.00	10.16	-0.69	
75	7399.00	10.16	-0.69	
76	7519.00	10.19	-0.66	
77	7639.00	10.19	-0.66	
78	7759.00	10.17	-0.68	
79	7879.00	10.12	-0.73	
80	7999.00	10.09	-0.76	
81	8119.00	10.07	-0.78	
82	8239.00	10.02	-0.83	
83	8359.00	10.02	-0.83	
84	8479.00	9.99	-0.86	
85	8599.00	9.95	-0.90	
86	8719.00	9.93	-0.92	
87	8839.00	9.95	-0.90	
88	8959.00	10.01	-0.84	
89	9079.00	10.03	-0.82	
90	9199.00	9.99	-0.86	
91	9319.00	9.93	-0.92	
92	9439.00	9.83	-1.02	
93	9559.00	9.79	-1.06	
94	9679.00	9.75	-1.10	
95	9799.00	9.74	-1.11	
96	9919.00	9.71	-1.14	
97	10039.00	9.66	-1.19	
98	10159.00	9.65	-1.20	
99	10279.00	9.66	-1.19	
100	10399.00	9.69	-1.16	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec 8, 2001	Page 3
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Long-term Pumping Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	10519.00	9.71	-1.14	
102	10639.00	9.70	-1.15	
103	10759.00	9.67	-1.18	
104	10879.00	9.63	-1.22	
105	10999.00	9.63	-1.22	
106	11119.00	9.61	-1.24	
107	11239.00	9.62	-1.23	
108	11359.00	9.62	-1.23	
109	11479.00	9.59	-1.26	
110	11599.00	9.61	-1.24	
111	11719.00	9.64	-1.21	
112	11839.00	9.70	-1.15	
113	11959.00	9.74	-1.11	
114	12079.00	9.74	-1.11	
115	12199.00	9.73	-1.12	
116	12319.00	9.73	-1.12	
117	12439.00	9.76	-1.09	
118	12559.00	9.77	-1.08	
119	12679.00	9.77	-1.08	
120	12799.00	9.78	-1.07	
121	12919.00	9.77	-1.08	
122	13039.00	9.72	-1.13	
123	13159.00	9.70	-1.15	
124	13279.00	9.73	-1.12	
125	13399.00	9.71	-1.14	
126	13519.00	9.70	-1.15	
127	13639.00	9.64	-1.21	
128	13759.00	9.58	-1.27	
129	13879.00	9.59	-1.26	
130	13999.00	9.54	-1.31	
131	14119.00	9.55	-1.30	
132	14239.00	9.51	-1.34	
133	14359.00	9.49	-1.36	
134	14479.00	9.49	-1.36	
135	14599.00	9.49	-1.36	
136	14719.00	9.52	-1.33	
137	14839.00	9.56	-1.29	
138	14959.00	9.59	-1.26	
139	15079.00	9.59	-1.26	
140	15199.00	9.58	-1.27	
141	15319.00	9.58	-1.27	
142	15439.00	9.59	-1.26	
143	15559.00	9.60	-1.25	
144	15679.00	9.61	-1.24	
145	15799.00	9.57	-1.28	
146	15919.00	9.57	-1.28	
147	16039.00	9.60	-1.25	
148	16159.00	9.63	-1.22	
149	16279.00	9.66	-1.19	
150	16399.00	9.67	-1.18	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec 8, 2001	Page 4
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. Long-term Pumping Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	16519.00	9.65	-1.20	
152	16639.00	9.62	-1.23	
153	16759.00	9.62	-1.23	
154	16879.00	9.63	-1.22	
155	16999.00	9.65	-1.20	
156	17119.00	9.64	-1.21	
157	17239.00	9.63	-1.22	
158	17359.00	9.63	-1.22	
159	17479.00	9.65	-1.20	
160	17599.00	9.71	-1.14	
161	17719.00	9.75	-1.10	
162	17839.00	9.76	-1.09	
163	17959.00	9.73	-1.12	
164	18079.00	9.71	-1.14	
165	18199.00	9.69	-1.16	
166	18319.00	9.68	-1.17	
167	18439.00	9.68	-1.17	
168	18559.00	9.66	-1.19	
169	18679.00	9.63	-1.22	
170	18799.00	9.62	-1.23	
171	18919.00	9.64	-1.21	
172	19039.00	9.68	-1.17	
173	19159.00	9.70	-1.15	
174	19279.00	9.71	-1.14	
175	19399.00	9.69	-1.16	
176	19519.00	9.68	-1.17	
177	19639.00	9.67	-1.18	
178	19759.00	9.67	-1.18	
179	19879.00	9.69	-1.16	
180	19999.00	9.68	-1.17	
181	20119.00	9.68	-1.17	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 8, 2001 | Page 1 Project: Herlong Test/Production Well Evaluated by: David Carlson

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	60.00	9.76	-1.10	
2	120.00	9.76	-1.10	
3	180.00	9.76	-1.09	
4	240.00	9.78	-1.07	
5	300.00	9.78	-1.07	
6	360.00	9.79	-1.06	
7	420.00	9.79	-1.06	
8	480.00	9.79	-1.06	
9	540.00	9.79	-1.06	
10	600.00	9.78	-1.07	
11	660.00	9.77	-1.08	
12	720.00	9.76	-1.09	
13	780.00	9.76	-1.09	
14	840.00	9.77	-1.08	
15	900.00	9.76	-1.09	
16	960.00	9.75	-1.10	
17	1020.00	9.77	-1.08	
18	1080.00	9.78	-1.07	
19	1140.00	9.77	-1.08	
20	1200.00	9.78	-1.07	
21	1260.00	9.78	-1.07	
22	1320.00	9.77	-1.08	
23	1380.00	9.76	-1.09	
24	1440.00	9.75	-1.10	
25	1500.00	9.74	-1.11	
26	1560.00	9.74	-1.11	
27	1620.00	9.74	-1.11	
28	1680.00	9.76	-1.09	
29	1740.00	9.77	-1.08	
30	1800.00	9.77	-1.08	
31	1860.00	9.78	-1.07	
32	1920.00	9.71	-1.14	
33	1980.00	9.69	-1.16	
34	2040.00	9.65	-1.20	
35	2100.00	9.64	-1.21	
36	2160.00	9.62	-1.23	
37	2220.00	9.59	-1.26	
38	2280.00	9.58	-1.27	
39	2340.00	9.57	-1.29	
40	2400.00	9.55	-1.30	
41	2460.00	9.55	-1.30	
42	2520.00	9.55	-1.30	
43	2580.00	9.55	-1.30	
44	2640.00	9.53	-1.32	
45	2700.00	9.52	-1.33	
46	2760.00	9.51	-1.34	
47	2820.00	9.50	-1.35	
48	2880.00	9.41	-1.44	
49	2940.00	9.43	-1.42	
50	3000.00	9.45	-1.40	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 8, 2001	Page 2
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	3060.00	9.47	-1.38	
52	3120.00	9.50	-1.35	
53	3180.00	9.53	-1.32	
54	3240.00	9.55	-1.30	
55	3300.00	9.56	-1.29	
56	3360.00	9.57	-1.28	
57	3420.00	9.57	-1.28	
58	3480.00	9.56	-1.29	
59	3540.00	9.56	-1.29	
60	3600.00	9.55	-1.30	
61	3660.00	9.54	-1.31	
62	3720.00	9.54	-1.31	
63	3780.00	9.53	-1.32	
64	3840.00	9.54	-1.31	
65	3900.00	9.55	-1.30	
66	3960.00	9.56	-1.29	
67	4020.00	9.57	-1.28	
68	4080.00	9.57	-1.28	
69	4140.00	9.56	-1.29	
70	4200.00	9.56	-1.29	
71	4260.00	9.55	-1.30	
72	4320.00	9.56	-1.29	
73	4380.00	9.58	-1.27	
74	4440.00	9.60	-1.25	
75	4500.00	9.63	-1.22	
76	4560.00	9.66	-1.19	
77	4620.00	9.70	-1.15	
78	4680.00	9.71	-1.14	
79	4740.00	9.74	-1.12	
80	4800.00	9.74	-1.11	
81	4860.00	9.74	-1.11	
82	4920.00	9.73	-1.12	
83	4980.00	9.73	-1.12	
84	5040.00	9.71	-1.14	
85	5100.00	9.73	-1.13	
86	5160.00	9.73	-1.13	
87	5220.00	9.72	-1.13	
88	5280.00	9.72	-1.13	
89	5340.00	9.73	-1.12	
90	5400.00	9.74	-1.11	
91	5460.00	9.74	-1.11	
92	5520.00	9.73	-1.12	
93	5580.00	9.72	-1.13	
94	5640.00	9.72	-1.13	
95	5700.00	9.71	-1.14	
96	5760.00	9.69	-1.16	
97	5820.00	9.70	-1.15	
98	5880.00	9.72	-1.13	
99	5940.00	9.74	-1.11	
100	6000.00	9.77	-1.08	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 8, 2001	Page 3
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6060.00	9.79	-1.06	
102	6120.00	9.89	-0.96	
103	6180.00	9.87	-0.99	
104	6240.00	9.85	-1.00	
105	6300.00	9.83	-1.02	
106	6360.00	9.82	-1.04	
107	6420.00	9.81	-1.04	
108	6480.00	9.80	-1.05	
109	6540.00	9.80	-1.05	
110	6600.00	9.79	-1.06	
111	6660.00	9.78	-1.07	
112	6720.00	9.78	-1.07	
113	6780.00	9.78	-1.07	
114	6840.00	9.79	-1.06	
115	6900.00	9.79	-1.06	
116	6960.00	9.79	-1.06	
117	7020.00	9.79	-1.06	
118	7080.00	9.77	-1.08	
119	7140.00	9.76	-1.09	
120	7200.00	9.76	-1.09	
121	7260.00	9.76	-1.09	
122	7320.00	9.78	-1.07	
123	7380.00	9.79	-1.06	
124	7440.00	9.81	-1.04	
125	7500.00	9.82	-1.03	
126	7560.00	9.83	-1.02	
127	7620.00	9.83	-1.02	
128	7680.00	9.82	-1.04	
129	7740.00	9.81	-1.04	
130	7800.00	9.78	-1.07	
131	7860.00	9.75	-1.10	
132	7920.00	9.74	-1.11	
133	7980.00	9.74	-1.11	
134	8040.00	9.72	-1.13	
135	8100.00	9.74	-1.11	
136	8160.00	9.72	-1.13	
137	8220.00	9.72	-1.13	
138	8280.00	9.73	-1.12	
139	8340.00	9.73	-1.12	
140	8400.00	9.73	-1.12	
141	8460.00	9.72	-1.13	
142	8520.00	9.72	-1.13	
143	8580.00	9.70	-1.15	
144	8640.00	9.68	-1.17	
145	8700.00	9.70	-1.15	
146	8760.00	9.70	-1.15	
147	8820.00	9.72	-1.13	
148	8880.00	9.74	-1.11	
149	8940.00	9.76	-1.09	
150	9000.00	9.76	-1.09	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 8, 2001 | Page 4 Project: Herlong Test/Production Well Evaluated by: David Carlson

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	9060.00	9.77	-1.08	
152	9120.00	9.78	-1.07	
153	9180.00	9.78	-1.07	
154	9240.00	9.76	-1.09	
155	9300.00	9.77	-1.08	
156	9360.00	9.77	-1.08	
157	9420.00	9.77	-1.08	
158	9480.00	9.78	-1.07	
159	9540.00	9.80	-1.05	
160	9600.00	9.79	-1.06	
161	9660.00	9.79	-1.06	
162	9720.00	9.82	-1.03	
163	9780.00	9.83	-1.02	
164	9840.00	9.82	-1.03	
165	9900.00	9.81	-1.04	
166	9960.00	9.79	-1.06	
167	10020.00	9.77	-1.08	
168	10080.00	9.74	-1.11	
169	10140.00	9.73	-1.12	
170	10200.00	9.71	-1.14	
171	10260.00	9.70	-1.15	
172	10320.00	9.72	-1.13	
173	10380.00	9.72	-1.13	
174	10440.00	9.72	-1.13	
175	10500.00	9.71	-1.14	
176	10560.00	9.72	-1.13	
177	10620.00	9.71	-1.14	
178	10680.00	9.68	-1.17	
179	10740.00	9.66	-1.19	
180	10800.00	9.65	-1.20	
181	10860.00	9.64	-1.21	
182	10920.00	9.64	-1.21	
183	10980.00	9.63	-1.22	
184	11040.00	9.65	-1.20	
185	11100.00	9.64	-1.21	
186	11160.00	9.65	-1.20	
187	11220.00	9.65	-1.20	
188	11280.00	9.63	-1.22	
189	11340.00	9.63	-1.22	
190	11400.00	9.61	-1.24	
191	11460.00	9.59	-1.26	
192	11520.00	9.52	-1.33	
193	11580.00	9.55	-1.30	
194	11640.00	9.58	-1.27	
195	11700.00	9.60	-1.25	
196	11760.00	9.64	-1.21	
197	11820.00	9.67	-1.18	
198	11880.00	9.67	-1.18	
199	11940.00	9.67	-1.18	
200	12000.00	9.69	-1.16	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 8, 2001 | Page 5 Project: Herlong Test/Production Well Evaluated by: David Carlson

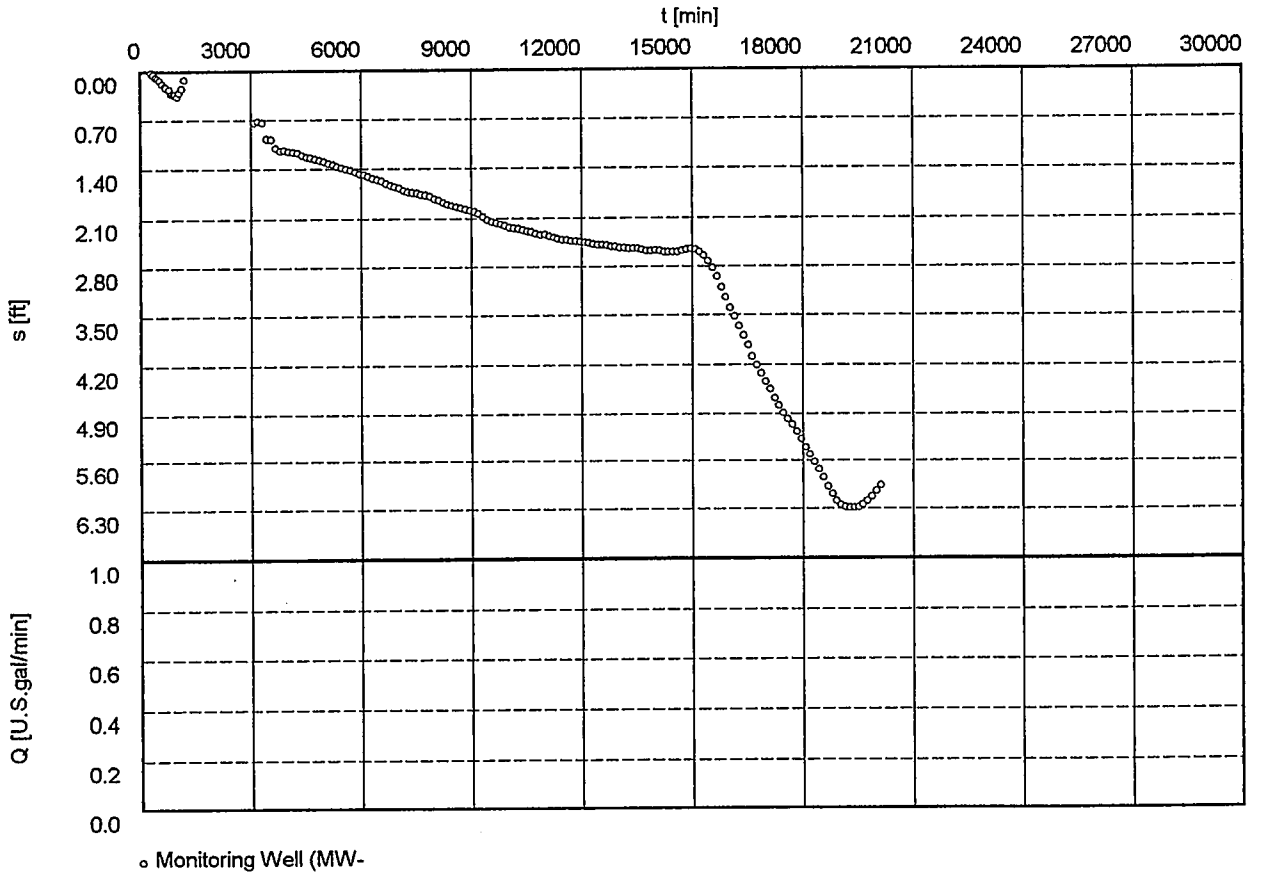
Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-1)	Monitoring Well (MW-1)
	Distance from the pumping well 341.00 ft

Static water level: 10.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	12060.00	9.69	-1.16	
202	12120.00	9.66	-1.19	
203	12180.00	9.65	-1.20	
204	12240.00	9.63	-1.22	
205	12300.00	9.62	-1.23	
206	12360.00	9.61	-1.24	
207	12420.00	9.61	-1.24	
208	12480.00	9.61	-1.24	
209	12540.00	9.60	-1.25	
210	12600.00	9.60	-1.25	
211	12660.00	9.60	-1.25	
212	12720.00	9.59	-1.26	
213	12780.00	9.56	-1.29	
214	12840.00	9.55	-1.30	
215	12900.00	9.54	-1.32	
216	12960.00	9.53	-1.32	
217	13020.00	9.63	-1.22	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 1
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-2)	



AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 2
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	31.11	-0.04	
2	59.00	31.12	-0.03	
3	119.00	31.11	-0.04	
4	178.00	31.13	-0.02	
5	237.00	31.14	-0.01	
6	298.00	31.17	0.02	
7	355.00	31.20	0.05	
8	422.00	31.23	0.08	
9	473.00	31.25	0.10	
10	531.00	31.28	0.13	
11	596.00	31.33	0.18	
12	668.00	31.36	0.21	
13	708.00	31.38	0.23	
14	794.00	31.41	0.26	
15	841.00	31.47	0.32	
16	891.00	31.48	0.33	
17	944.00	31.48	0.33	
18	1000.00	31.51	0.36	
19	1059.00	31.45	0.30	
20	1122.00	31.39	0.24	
21	1188.00	31.27	0.12	
22	1259.00	31.11	-0.04	
23	1333.00	30.98	-0.17	
24	1412.00	30.86	-0.29	
25	1496.00	30.77	-0.38	
26	1585.00	30.72	-0.43	
27	1679.00	30.68	-0.47	
28	1778.00	30.62	-0.53	
29	1884.00	30.59	-0.56	
30	1995.00	30.55	-0.60	
31	2113.00	30.53	-0.62	
32	2239.00	30.53	-0.62	
33	2359.00	30.57	-0.58	
34	2479.00	30.60	-0.55	
35	2599.00	30.62	-0.53	
36	2719.00	30.64	-0.51	
37	2839.00	30.64	-0.51	
38	2959.00	30.67	-0.48	
39	3079.00	31.89	0.74	
40	3199.00	31.87	0.72	
41	3319.00	31.89	0.74	
42	3439.00	32.12	0.97	
43	3559.00	32.13	0.98	
44	3679.00	32.26	1.11	
45	3799.00	32.30	1.15	
46	3919.00	32.29	1.14	
47	4039.00	32.31	1.16	
48	4159.00	32.32	1.17	
49	4279.00	32.33	1.18	
50	4399.00	32.36	1.21	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001 | Page 3 Project: Herlong Test/Production Well Evaluated by: David Carlson

Pumping Test No. First long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	4519.00	32.39	1.24	
52	4639.00	32.40	1.25	
53	4759.00	32.41	1.26	
54	4879.00	32.43	1.29	
55	4999.00	32.46	1.31	
56	5119.00	32.48	1.33	
57	5239.00	32.49	1.35	
58	5359.00	32.52	1.37	
59	5479.00	32.54	1.39	
60	5599.00	32.56	1.41	
61	5719.00	32.58	1.43	
62	5839.00	32.61	1.46	
63	5959.00	32.63	1.48	
64	6079.00	32.64	1.49	
65	6199.00	32.67	1.52	
66	6319.00	32.69	1.54	
67	6439.00	32.71	1.56	
68	6559.00	32.73	1.58	
69	6679.00	32.76	1.61	
70	6799.00	32.79	1.64	
71	6919.00	32.81	1.66	
72	7039.00	32.83	1.68	
73	7159.00	32.86	1.71	
74	7279.00	32.88	1.73	
75	7399.00	32.89	1.74	
76	7519.00	32.90	1.75	
77	7639.00	32.91	1.76	
78	7759.00	32.93	1.78	
79	7879.00	32.94	1.79	
80	7999.00	32.98	1.83	
81	8119.00	32.99	1.84	
82	8239.00	33.03	1.88	
83	8359.00	33.05	1.90	
84	8479.00	33.08	1.93	
85	8599.00	33.09	1.94	
86	8719.00	33.11	1.96	
87	8839.00	33.13	1.98	
88	8959.00	33.15	2.00	
89	9079.00	33.17	2.02	
90	9199.00	33.19	2.04	
91	9319.00	33.24	2.09	
92	9439.00	33.28	2.13	
93	9559.00	33.31	2.16	
94	9679.00	33.33	2.18	
95	9799.00	33.35	2.20	
96	9919.00	33.36	2.21	
97	10039.00	33.39	2.24	
98	10159.00	33.39	2.24	
99	10279.00	33.41	2.26	
100	10399.00	33.42	2.27	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 4
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	10519.00	33.44	2.29	
102	10639.00	33.45	2.30	
103	10759.00	33.48	2.33	
104	10879.00	33.50	2.35	
105	10999.00	33.49	2.34	
106	11119.00	33.51	2.36	
107	11239.00	33.53	2.38	
108	11359.00	33.55	2.40	
109	11479.00	33.57	2.42	
110	11599.00	33.57	2.42	
111	11719.00	33.58	2.43	
112	11839.00	33.59	2.44	
113	11959.00	33.59	2.44	
114	12079.00	33.60	2.45	
115	12199.00	33.61	2.46	
116	12319.00	33.63	2.48	
117	12439.00	33.64	2.49	
118	12559.00	33.64	2.49	
119	12679.00	33.65	2.50	
120	12799.00	33.66	2.51	
121	12919.00	33.66	2.51	
122	13039.00	33.68	2.53	
123	13159.00	33.68	2.53	
124	13279.00	33.69	2.54	
125	13399.00	33.69	2.54	
126	13519.00	33.70	2.55	
127	13639.00	33.71	2.56	
128	13759.00	33.73	2.58	
129	13879.00	33.73	2.58	
130	13999.00	33.72	2.57	
131	14119.00	33.73	2.58	
132	14239.00	33.74	2.59	
133	14359.00	33.75	2.60	
134	14479.00	33.75	2.60	
135	14599.00	33.74	2.59	
136	14719.00	33.73	2.58	
137	14839.00	33.71	2.56	
138	14959.00	33.70	2.55	
139	15079.00	33.71	2.56	
140	15199.00	33.74	2.59	
141	15319.00	33.80	2.65	
142	15439.00	33.88	2.73	
143	15559.00	33.98	2.83	
144	15679.00	34.10	2.95	
145	15799.00	34.26	3.11	
146	15919.00	34.40	3.25	
147	16039.00	34.54	3.39	
148	16159.00	34.67	3.52	
149	16279.00	34.80	3.65	
150	16399.00	34.94	3.79	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 5
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

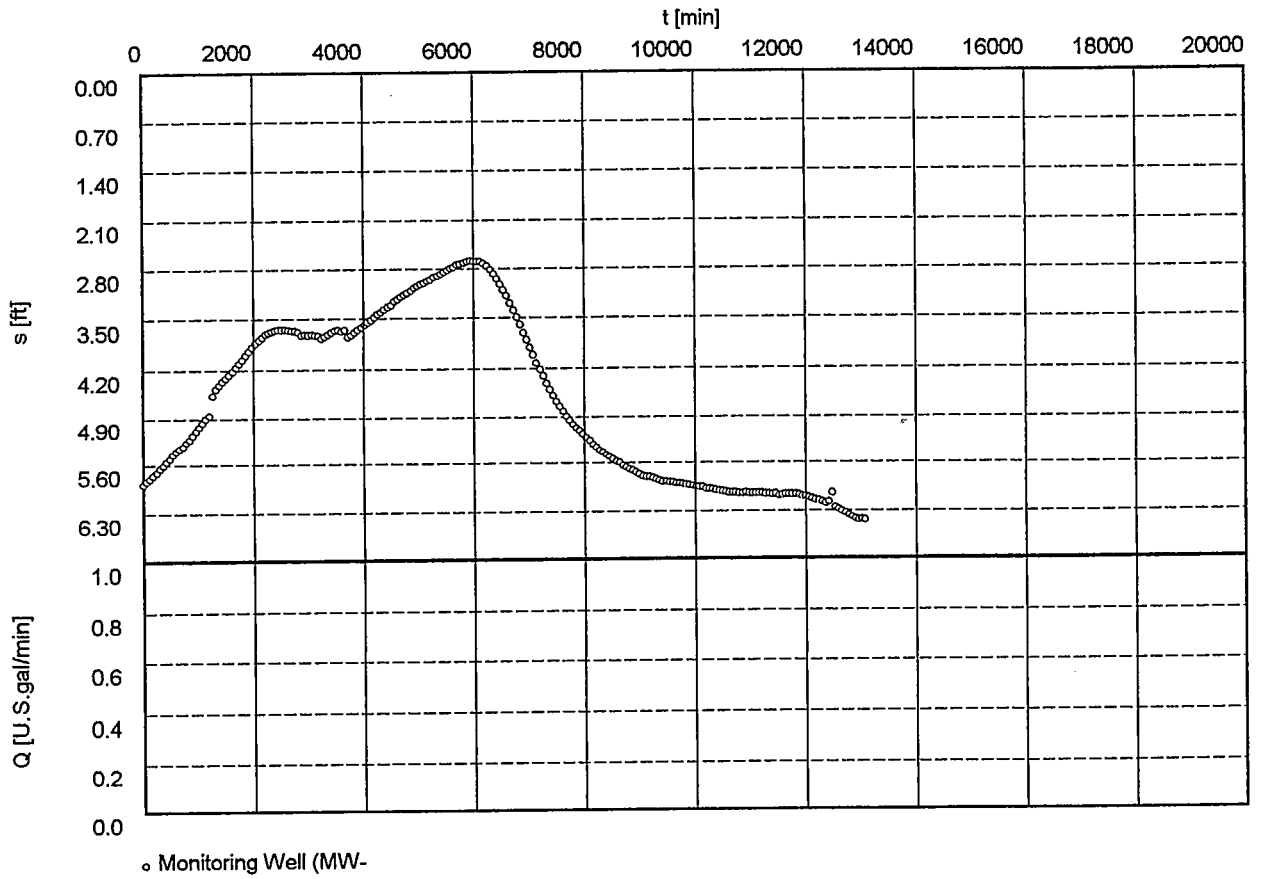
Pumping Test No. First long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	16519.00	35.08	3.93	
152	16639.00	35.23	4.08	
153	16759.00	35.36	4.21	
154	16879.00	35.47	4.32	
155	16999.00	35.59	4.44	
156	17119.00	35.70	4.55	
157	17239.00	35.83	4.68	
158	17359.00	35.94	4.79	
159	17479.00	36.05	4.90	
160	17599.00	36.13	4.98	
161	17719.00	36.22	5.07	
162	17839.00	36.31	5.16	
163	17959.00	36.42	5.27	
164	18079.00	36.54	5.39	
165	18199.00	36.66	5.51	
166	18319.00	36.78	5.63	
167	18439.00	36.88	5.73	
168	18559.00	37.00	5.85	
169	18679.00	37.13	5.98	
170	18799.00	37.24	6.09	
171	18919.00	37.34	6.19	
172	19039.00	37.40	6.25	
173	19159.00	37.43	6.28	
174	19279.00	37.43	6.28	
175	19399.00	37.43	6.28	
176	19519.00	37.43	6.28	
177	19639.00	37.39	6.24	
178	19759.00	37.34	6.19	
179	19879.00	37.28	6.13	
180	19999.00	37.20	6.05	
181	20119.00	37.12	5.97	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 1
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25,2001
Monitoring Well (MW-2)	



AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 2
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25,2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	37.03	5.88	
2	60.00	36.98	5.83	
3	120.00	36.95	5.80	
4	180.00	36.90	5.75	
5	240.00	36.85	5.70	
6	300.00	36.80	5.65	
7	360.00	36.76	5.61	
8	420.00	36.71	5.56	
9	480.00	36.66	5.51	
10	540.00	36.60	5.45	
11	600.00	36.56	5.41	
12	660.00	36.51	5.36	
13	720.00	36.48	5.33	
14	780.00	36.41	5.26	
15	840.00	36.37	5.22	
16	900.00	36.31	5.16	
17	960.00	36.24	5.09	
18	1020.00	36.18	5.03	
19	1080.00	36.11	4.96	
20	1140.00	36.06	4.91	
21	1200.00	36.01	4.86	
22	1260.00	35.71	4.56	
23	1320.00	35.62	4.47	
24	1380.00	35.57	4.42	
25	1440.00	35.51	4.36	
26	1500.00	35.47	4.32	
27	1560.00	35.42	4.27	
28	1620.00	35.36	4.21	
29	1680.00	35.31	4.16	
30	1740.00	35.26	4.11	
31	1800.00	35.20	4.05	
32	1860.00	35.15	4.00	
33	1920.00	35.09	3.94	
34	1980.00	35.03	3.88	
35	2040.00	34.98	3.83	
36	2100.00	34.94	3.79	
37	2160.00	34.91	3.76	
38	2220.00	34.86	3.71	
39	2280.00	34.84	3.69	
40	2340.00	34.82	3.67	
41	2400.00	34.81	3.66	
42	2460.00	34.80	3.65	
43	2520.00	34.79	3.64	
44	2580.00	34.79	3.64	
45	2640.00	34.80	3.65	
46	2700.00	34.81	3.66	
47	2760.00	34.82	3.67	
48	2820.00	34.83	3.68	
49	2880.00	34.88	3.73	
50	2940.00	34.87	3.72	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 3
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25,2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	3000.00	34.88	3.73	
52	3060.00	34.87	3.72	
53	3120.00	34.88	3.73	
54	3180.00	34.89	3.74	
55	3240.00	34.92	3.77	
56	3300.00	34.90	3.75	
57	3360.00	34.87	3.72	
58	3420.00	34.84	3.69	
59	3480.00	34.82	3.67	
60	3540.00	34.81	3.66	
61	3600.00	34.82	3.67	
62	3660.00	34.81	3.66	
63	3720.00	34.90	3.75	
64	3780.00	34.88	3.73	
65	3840.00	34.84	3.69	
66	3900.00	34.80	3.65	
67	3960.00	34.77	3.62	
68	4020.00	34.73	3.58	
69	4080.00	34.70	3.55	
70	4140.00	34.67	3.52	
71	4200.00	34.63	3.48	
72	4260.00	34.60	3.45	
73	4320.00	34.57	3.42	
74	4380.00	34.53	3.38	
75	4440.00	34.49	3.35	
76	4500.00	34.46	3.31	
77	4560.00	34.41	3.26	
78	4620.00	34.38	3.23	
79	4680.00	34.35	3.20	
80	4740.00	34.33	3.18	
81	4800.00	34.30	3.15	
82	4860.00	34.26	3.11	
83	4920.00	34.23	3.08	
84	4980.00	34.20	3.05	
85	5040.00	34.17	3.02	
86	5100.00	34.16	3.01	
87	5160.00	34.12	2.97	
88	5220.00	34.11	2.96	
89	5280.00	34.08	2.93	
90	5340.00	34.05	2.90	
91	5400.00	34.03	2.88	
92	5460.00	34.01	2.86	
93	5520.00	33.98	2.83	
94	5580.00	33.95	2.80	
95	5640.00	33.93	2.78	
96	5700.00	33.90	2.75	
97	5760.00	33.89	2.74	
98	5820.00	33.87	2.72	
99	5880.00	33.85	2.70	
100	5940.00	33.84	2.69	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001 | Page 4 Project: Herlong Test/Production Well Evaluated by: David Carlson

Pumping Test No. 2 and 3	Test conducted on: October 16-25,2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6000.00	33.85	2.70	
102	6060.00	33.85	2.70	
103	6120.00	33.85	2.70	
104	6180.00	33.88	2.73	
105	6240.00	33.91	2.76	
106	6300.00	33.96	2.81	
107	6360.00	34.03	2.88	
108	6420.00	34.10	2.95	
109	6480.00	34.18	3.03	
110	6540.00	34.26	3.11	
111	6600.00	34.34	3.19	
112	6660.00	34.45	3.30	
113	6720.00	34.54	3.39	
114	6780.00	34.65	3.50	
115	6840.00	34.75	3.60	
116	6900.00	34.86	3.71	
117	6960.00	34.96	3.81	
118	7020.00	35.06	3.91	
119	7080.00	35.16	4.01	
120	7140.00	35.28	4.13	
121	7200.00	35.37	4.22	
122	7260.00	35.46	4.31	
123	7320.00	35.56	4.41	
124	7380.00	35.65	4.50	
125	7440.00	35.74	4.59	
126	7500.00	35.83	4.68	
127	7560.00	35.91	4.76	
128	7620.00	35.98	4.83	
129	7680.00	36.05	4.90	
130	7740.00	36.11	4.96	
131	7800.00	36.17	5.02	
132	7860.00	36.22	5.07	
133	7920.00	36.26	5.11	
134	7980.00	36.31	5.16	
135	8040.00	36.37	5.22	
136	8100.00	36.41	5.26	
137	8160.00	36.46	5.31	
138	8220.00	36.51	5.36	
139	8280.00	36.55	5.40	
140	8340.00	36.59	5.44	
141	8400.00	36.63	5.48	
142	8460.00	36.66	5.51	
143	8520.00	36.70	5.55	
144	8580.00	36.73	5.58	
145	8640.00	36.75	5.60	
146	8700.00	36.79	5.64	
147	8760.00	36.82	5.67	
148	8820.00	36.84	5.69	
149	8880.00	36.87	5.72	
150	8940.00	36.90	5.75	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 5
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25,2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	9000.00	36.91	5.76	
152	9060.00	36.94	5.79	
153	9120.00	36.95	5.80	
154	9180.00	36.96	5.81	
155	9240.00	36.98	5.83	
156	9300.00	36.99	5.84	
157	9360.00	37.01	5.86	
158	9420.00	37.02	5.87	
159	9480.00	37.02	5.87	
160	9540.00	37.03	5.88	
161	9600.00	37.04	5.89	
162	9660.00	37.05	5.90	
163	9720.00	37.05	5.90	
164	9780.00	37.06	5.91	
165	9840.00	37.07	5.92	
166	9900.00	37.08	5.93	
167	9960.00	37.09	5.94	
168	10020.00	37.09	5.94	
169	10080.00	37.11	5.96	
170	10140.00	37.11	5.96	
171	10200.00	37.13	5.98	
172	10260.00	37.14	5.99	
173	10320.00	37.14	5.99	
174	10380.00	37.15	6.00	
175	10440.00	37.16	6.01	
176	10500.00	37.17	6.02	
177	10560.00	37.18	6.03	
178	10620.00	37.18	6.04	
179	10680.00	37.19	6.04	
180	10740.00	37.19	6.04	
181	10800.00	37.20	6.05	
182	10860.00	37.20	6.05	
183	10920.00	37.18	6.04	
184	10980.00	37.19	6.04	
185	11040.00	37.19	6.04	
186	11100.00	37.20	6.05	
187	11160.00	37.20	6.05	
188	11220.00	37.19	6.04	
189	11280.00	37.21	6.06	
190	11340.00	37.21	6.06	
191	11400.00	37.21	6.06	
192	11460.00	37.20	6.05	
193	11520.00	37.23	6.08	
194	11580.00	37.22	6.07	
195	11640.00	37.22	6.07	
196	11700.00	37.21	6.06	
197	11760.00	37.21	6.06	
198	11820.00	37.22	6.07	
199	11880.00	37.22	6.07	
200	11940.00	37.24	6.09	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 6
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

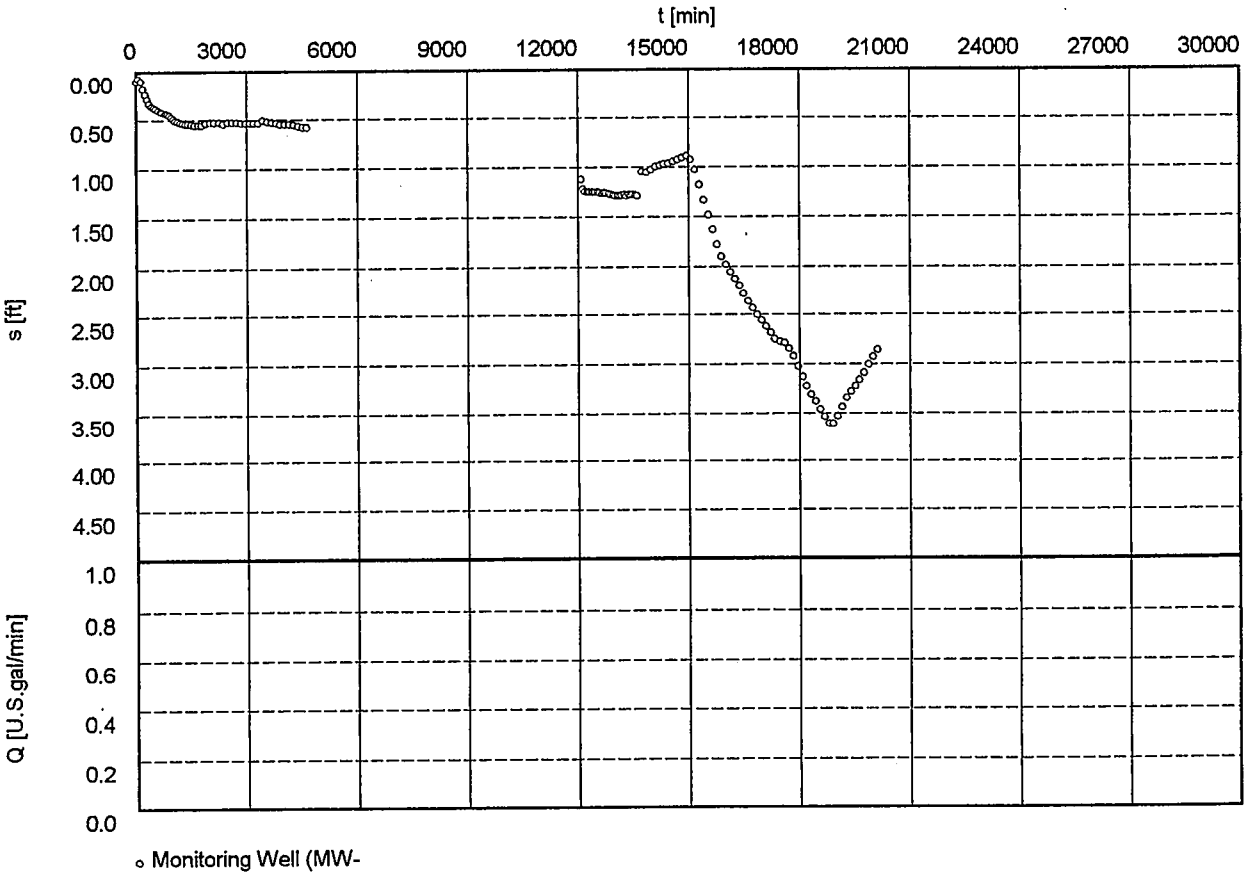
Pumping Test No. 2 and 3	Test conducted on: October 16-25,2001
Monitoring Well (MW-2)	Monitoring Well (MW-2)
	Distance from the pumping well 1.68 ft

Static water level: 31.15 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	12000.00	37.24	6.09	
202	12060.00	37.26	6.11	
203	12120.00	37.28	6.13	
204	12180.00	37.29	6.14	
205	12240.00	37.31	6.16	
206	12300.00	37.32	6.17	
207	12360.00	37.34	6.19	
208	12420.00	37.32	6.17	
209	12480.00	37.19	6.04	
210	12540.00	37.40	6.25	
211	12600.00	37.43	6.28	
212	12660.00	37.46	6.31	
213	12720.00	37.48	6.33	
214	12780.00	37.51	6.36	
215	12840.00	37.54	6.39	
216	12900.00	37.57	6.42	
217	12960.00	37.59	6.44	
218	13020.00	37.58	6.43	
219	13080.00	37.59	6.44	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 1
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-3)	



AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 2
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]
1	0.00	30.95	0.10
2	59.00	30.92	0.07
3	119.00	30.95	0.10
4	178.00	31.02	0.17
5	237.00	31.08	0.23
6	298.00	31.13	0.28
7	355.00	31.17	0.32
8	422.00	31.20	0.35
9	473.00	31.22	0.37
10	531.00	31.23	0.38
11	596.00	31.25	0.40
12	668.00	31.26	0.41
13	708.00	31.27	0.42
14	794.00	31.28	0.43
15	841.00	31.29	0.44
16	891.00	31.30	0.45
17	944.00	31.32	0.47
18	1000.00	31.34	0.49
19	1059.00	31.36	0.51
20	1122.00	31.36	0.51
21	1188.00	31.38	0.53
22	1259.00	31.39	0.54
23	1333.00	31.39	0.54
24	1412.00	31.39	0.54
25	1496.00	31.40	0.55
26	1585.00	31.41	0.56
27	1679.00	31.40	0.55
28	1778.00	31.40	0.55
29	1884.00	31.38	0.53
30	1995.00	31.38	0.53
31	2113.00	31.38	0.53
32	2239.00	31.38	0.53
33	2359.00	31.39	0.54
34	2479.00	31.38	0.53
35	2599.00	31.38	0.53
36	2719.00	31.38	0.53
37	2839.00	31.38	0.53
38	2959.00	31.39	0.54
39	3079.00	31.39	0.54
40	3199.00	31.39	0.54
41	3319.00	31.39	0.54
42	3439.00	31.36	0.51
43	3559.00	31.37	0.52
44	3679.00	31.38	0.53
45	3799.00	31.39	0.54
46	3919.00	31.40	0.55
47	4039.00	31.40	0.55
48	4159.00	31.40	0.55
49	4279.00	31.41	0.56
50	4399.00	31.42	0.57

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001 | Page 3 Project: Herlong Test/Production Well Evaluated by: David Carlson

Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	4519.00	31.43	0.58	
52	4639.00	31.43	0.58	
53	12080.00	31.98	1.13	
54	12140.00	32.08	1.23	
55	12200.00	32.10	1.25	
56	12260.00	32.10	1.25	
57	12320.00	32.10	1.25	
58	12380.00	32.10	1.25	
59	12420.00	32.10	1.25	
60	12480.00	32.10	1.25	
61	12540.00	32.11	1.26	
62	12600.00	32.11	1.26	
63	12660.00	32.11	1.26	
64	12720.00	32.11	1.26	
65	12780.00	32.12	1.27	
66	12840.00	32.13	1.28	
67	12900.00	32.13	1.28	
68	12960.00	32.13	1.28	
69	13020.00	32.14	1.29	
70	13080.00	32.14	1.29	
71	13140.00	32.14	1.29	
72	13200.00	32.14	1.29	
73	13260.00	32.13	1.28	
74	13320.00	32.14	1.29	
75	13380.00	32.13	1.28	
76	13440.00	32.13	1.28	
77	13500.00	32.13	1.28	
78	13560.00	32.14	1.29	
79	13620.00	32.14	1.29	
80	13740.00	31.90	1.05	
81	13860.00	31.91	1.06	
82	13980.00	31.88	1.03	
83	14100.00	31.85	1.00	
84	14220.00	31.83	0.98	
85	14340.00	31.83	0.98	
86	14460.00	31.82	0.97	
87	14580.00	31.80	0.95	
88	14700.00	31.78	0.93	
89	14820.00	31.76	0.91	
90	14940.00	31.74	0.89	
91	15060.00	31.78	0.93	
92	15180.00	31.88	1.03	
93	15300.00	32.03	1.18	
94	15420.00	32.19	1.34	
95	15540.00	32.34	1.49	
96	15660.00	32.48	1.63	
97	15780.00	32.63	1.78	
98	15900.00	32.75	1.90	
99	16020.00	32.83	1.98	
100	16140.00	32.91	2.06	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 4
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

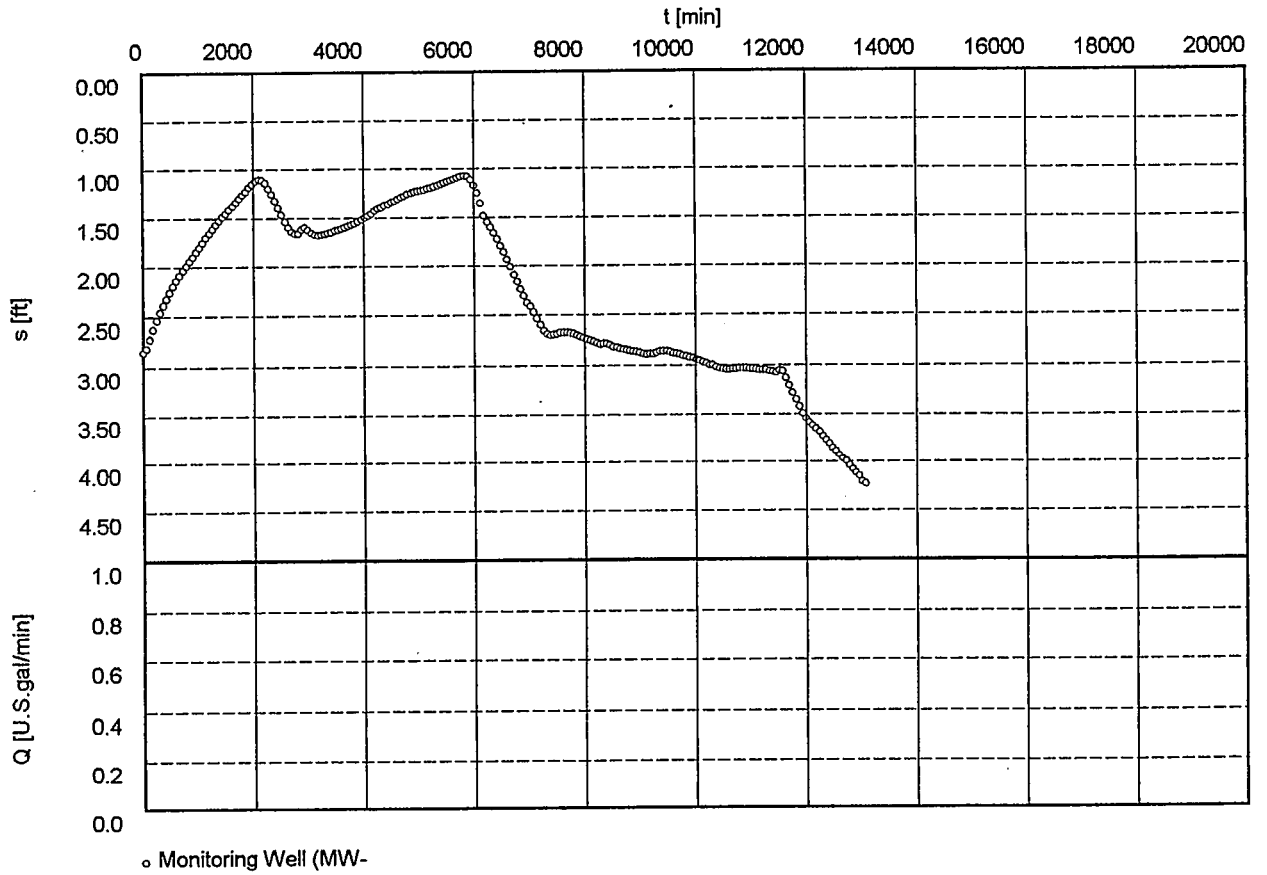
Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	16260.00	32.98	2.13	
102	16380.00	33.05	2.20	
103	16500.00	33.13	2.28	
104	16620.00	33.21	2.36	
105	16740.00	33.29	2.44	
106	16860.00	33.35	2.50	
107	16980.00	33.41	2.56	
108	17100.00	33.47	2.62	
109	17220.00	33.54	2.69	
110	17340.00	33.60	2.75	
111	17480.00	33.63	2.78	
112	17600.00	33.64	2.79	
113	17720.00	33.70	2.85	
114	17840.00	33.78	2.93	
115	17960.00	33.87	3.02	
116	18080.00	33.98	3.13	
117	18200.00	34.08	3.23	
118	18320.00	34.16	3.31	
119	18440.00	34.23	3.38	
120	18560.00	34.31	3.46	
121	18680.00	34.39	3.54	
122	18800.00	34.46	3.61	
123	18920.00	34.46	3.61	
124	19040.00	34.39	3.54	
125	19160.00	34.29	3.44	
126	19280.00	34.20	3.35	
127	19400.00	34.13	3.28	
128	19520.00	34.08	3.23	
129	19640.00	34.01	3.16	
130	19760.00	33.94	3.09	
131	19880.00	33.86	3.01	
132	20000.00	33.78	2.93	
133	20120.00	33.71	2.86	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 1
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring (MW-3)	



AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 2
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	33.70	2.85	
2	60.00	33.66	2.81	
3	120.00	33.57	2.72	
4	180.00	33.47	2.62	
5	240.00	33.39	2.54	
6	300.00	33.31	2.46	
7	360.00	33.24	2.39	
8	420.00	33.17	2.32	
9	480.00	33.11	2.26	
10	540.00	33.05	2.20	
11	600.00	32.99	2.14	
12	660.00	32.94	2.09	
13	720.00	32.89	2.04	
14	780.00	32.84	1.99	
15	840.00	32.79	1.94	
16	900.00	32.75	1.90	
17	960.00	32.70	1.85	
18	1020.00	32.65	1.80	
19	1080.00	32.60	1.75	
20	1140.00	32.55	1.70	
21	1200.00	32.51	1.66	
22	1260.00	32.46	1.61	
23	1320.00	32.42	1.57	
24	1380.00	32.38	1.53	
25	1440.00	32.34	1.49	
26	1500.00	32.31	1.46	
27	1560.00	32.27	1.42	
28	1620.00	32.23	1.38	
29	1680.00	32.20	1.35	
30	1740.00	32.16	1.31	
31	1800.00	32.12	1.27	
32	1860.00	32.08	1.23	
33	1920.00	32.04	1.19	
34	1980.00	32.01	1.16	
35	2040.00	31.98	1.13	
36	2100.00	31.96	1.11	
37	2160.00	31.97	1.12	
38	2220.00	32.00	1.15	
39	2280.00	32.05	1.20	
40	2340.00	32.11	1.26	
41	2400.00	32.18	1.33	
42	2460.00	32.25	1.40	
43	2520.00	32.32	1.47	
44	2580.00	32.39	1.54	
45	2640.00	32.45	1.60	
46	2700.00	32.49	1.64	
47	2760.00	32.51	1.66	
48	2820.00	32.51	1.66	
49	2880.00	32.47	1.62	
50	2940.00	32.45	1.60	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 3
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	3000.00	32.48	1.63	
52	3060.00	32.51	1.65	
53	3120.00	32.52	1.67	
54	3180.00	32.53	1.68	
55	3240.00	32.53	1.68	
56	3300.00	32.52	1.67	
57	3360.00	32.51	1.66	
58	3420.00	32.50	1.65	
59	3480.00	32.48	1.63	
60	3540.00	32.47	1.62	
61	3600.00	32.46	1.61	
62	3660.00	32.45	1.60	
63	3720.00	32.44	1.59	
64	3780.00	32.42	1.57	
65	3840.00	32.41	1.56	
66	3900.00	32.39	1.54	
67	3960.00	32.37	1.52	
68	4020.00	32.35	1.50	
69	4080.00	32.33	1.48	
70	4140.00	32.31	1.46	
71	4200.00	32.28	1.43	
72	4260.00	32.27	1.42	
73	4320.00	32.25	1.40	
74	4380.00	32.23	1.38	
75	4440.00	32.22	1.37	
76	4500.00	32.20	1.35	
77	4560.00	32.18	1.33	
78	4620.00	32.17	1.32	
79	4680.00	32.15	1.30	
80	4740.00	32.14	1.29	
81	4800.00	32.12	1.27	
82	4860.00	32.10	1.25	
83	4920.00	32.09	1.24	
84	4980.00	32.09	1.24	
85	5040.00	32.08	1.23	
86	5100.00	32.07	1.22	
87	5160.00	32.06	1.21	
88	5220.00	32.05	1.20	
89	5280.00	32.04	1.19	
90	5340.00	32.03	1.18	
91	5400.00	32.02	1.17	
92	5460.00	32.00	1.15	
93	5520.00	31.99	1.14	
94	5580.00	31.98	1.13	
95	5640.00	31.96	1.11	
96	5700.00	31.95	1.10	
97	5760.00	31.94	1.09	
98	5820.00	31.93	1.08	
99	5880.00	31.94	1.09	
100	5940.00	31.97	1.12	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 4
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6000.00	32.03	1.18	
102	6060.00	32.11	1.26	
103	6120.00	32.21	1.36	
104	6180.00	32.34	1.49	
105	6240.00	32.40	1.55	
106	6300.00	32.45	1.60	
107	6360.00	32.51	1.66	
108	6420.00	32.57	1.72	
109	6480.00	32.64	1.79	
110	6540.00	32.71	1.86	
111	6600.00	32.79	1.94	
112	6660.00	32.86	2.01	
113	6720.00	32.94	2.09	
114	6780.00	33.02	2.17	
115	6840.00	33.09	2.24	
116	6900.00	33.16	2.31	
117	6960.00	33.23	2.38	
118	7020.00	33.26	2.41	
119	7080.00	33.32	2.47	
120	7140.00	33.39	2.54	
121	7200.00	33.45	2.60	
122	7260.00	33.50	2.65	
123	7320.00	33.54	2.69	
124	7380.00	33.55	2.70	
125	7440.00	33.54	2.69	
126	7500.00	33.54	2.69	
127	7560.00	33.53	2.68	
128	7620.00	33.52	2.67	
129	7680.00	33.52	2.67	
130	7740.00	33.53	2.68	
131	7800.00	33.53	2.68	
132	7860.00	33.55	2.70	
133	7920.00	33.56	2.71	
134	7980.00	33.57	2.72	
135	8040.00	33.59	2.74	
136	8100.00	33.60	2.75	
137	8160.00	33.61	2.76	
138	8220.00	33.63	2.78	
139	8280.00	33.64	2.79	
140	8340.00	33.64	2.79	
141	8400.00	33.64	2.79	
142	8460.00	33.64	2.79	
143	8520.00	33.66	2.81	
144	8580.00	33.67	2.82	
145	8640.00	33.68	2.83	
146	8700.00	33.69	2.84	
147	8760.00	33.70	2.85	
148	8820.00	33.70	2.85	
149	8880.00	33.71	2.86	
150	8940.00	33.72	2.87	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 5
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	9000.00	33.72	2.87	
152	9060.00	33.73	2.88	
153	9120.00	33.74	2.89	
154	9180.00	33.74	2.89	
155	9240.00	33.74	2.89	
156	9300.00	33.72	2.87	
157	9360.00	33.71	2.86	
158	9420.00	33.71	2.86	
159	9480.00	33.71	2.86	
160	9540.00	33.72	2.87	
161	9600.00	33.73	2.88	
162	9660.00	33.74	2.89	
163	9720.00	33.74	2.89	
164	9780.00	33.75	2.90	
165	9840.00	33.76	2.91	
166	9900.00	33.77	2.92	
167	9960.00	33.78	2.93	
168	10020.00	33.79	2.94	
169	10080.00	33.80	2.95	
170	10140.00	33.82	2.97	
171	10200.00	33.83	2.98	
172	10260.00	33.85	3.00	
173	10320.00	33.85	3.00	
174	10380.00	33.87	3.02	
175	10440.00	33.88	3.03	
176	10500.00	33.89	3.04	
177	10560.00	33.89	3.04	
178	10620.00	33.90	3.05	
179	10680.00	33.89	3.04	
180	10740.00	33.89	3.04	
181	10800.00	33.88	3.03	
182	10860.00	33.88	3.03	
183	10920.00	33.89	3.04	
184	10980.00	33.89	3.04	
185	11040.00	33.89	3.04	
186	11100.00	33.89	3.04	
187	11160.00	33.90	3.05	
188	11220.00	33.90	3.05	
189	11280.00	33.90	3.05	
190	11340.00	33.91	3.06	
191	11400.00	33.92	3.07	
192	11460.00	33.92	3.07	
193	11520.00	33.91	3.06	
194	11580.00	33.91	3.06	
195	11640.00	33.98	3.13	
196	11700.00	34.06	3.21	
197	11760.00	34.14	3.29	
198	11820.00	34.21	3.36	
199	11880.00	34.28	3.43	
200	11940.00	34.34	3.49	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 6
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

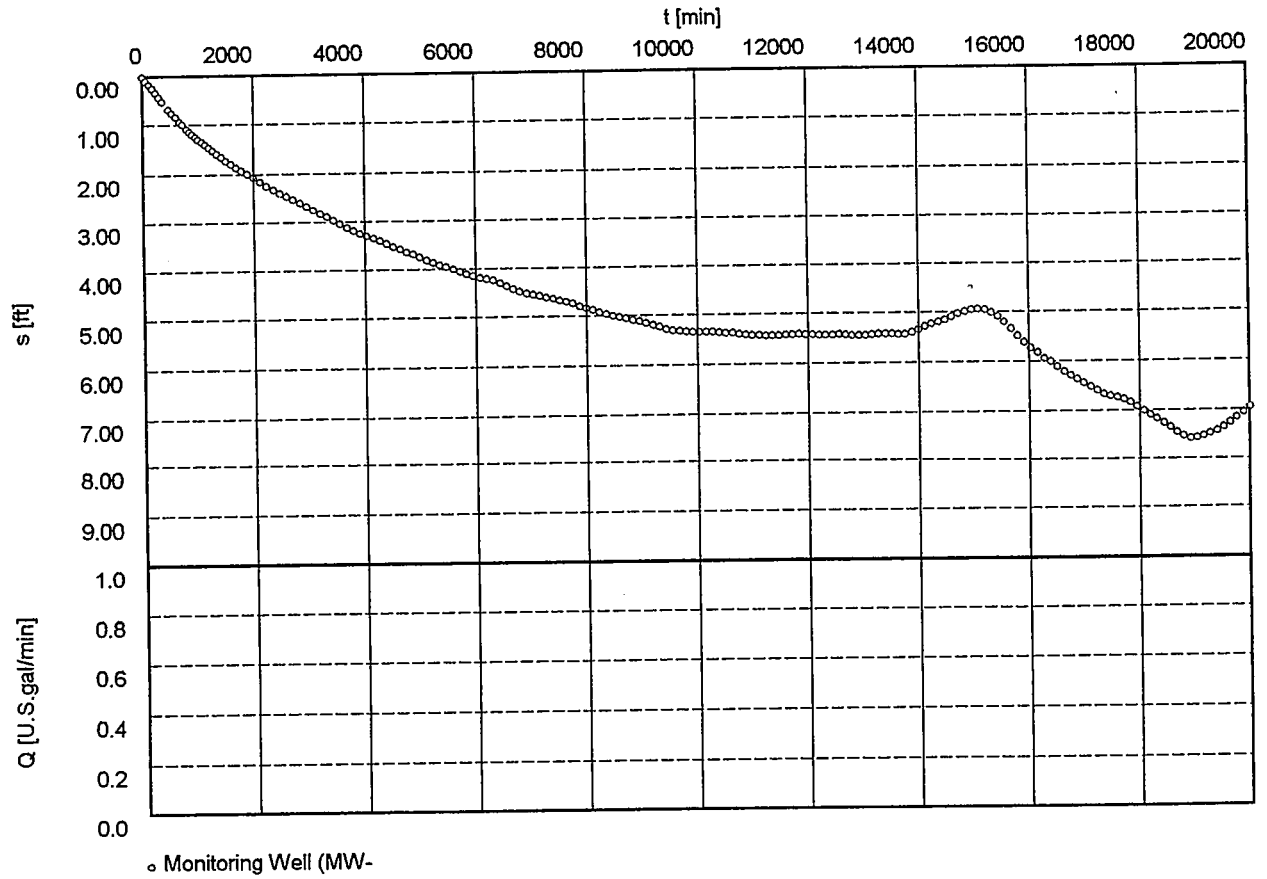
Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring (MW-3)	Monitoring Well (MW-3)
	Distance from the pumping well 900.00 ft

Static water level: 30.85 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	12000.00	34.40	3.55	
202	12060.00	34.44	3.59	
203	12120.00	34.48	3.63	
204	12180.00	34.51	3.66	
205	12240.00	34.54	3.69	
206	12300.00	34.58	3.73	
207	12360.00	34.62	3.77	
208	12420.00	34.66	3.81	
209	12480.00	34.70	3.85	
210	12540.00	34.74	3.89	
211	12600.00	34.78	3.93	
212	12660.00	34.82	3.96	
213	12720.00	34.85	4.00	
214	12780.00	34.89	4.04	
215	12840.00	34.93	4.08	
216	12900.00	34.97	4.12	
217	12960.00	35.00	4.15	
218	13020.00	35.06	4.21	
219	13080.00	35.08	4.23	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 1
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-4)	



AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 2
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-4)	Monitoring Well (MW-4)
	Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]
1	0.00	38.52	0.02
2	59.00	38.61	0.11
3	119.00	38.67	0.17
4	178.00	38.75	0.25
5	237.00	38.84	0.34
6	298.00	38.94	0.44
7	355.00	39.02	0.52
8	473.00	39.18	0.68
9	531.00	39.26	0.76
10	596.00	39.34	0.84
11	668.00	39.44	0.94
12	708.00	39.49	0.99
13	794.00	39.59	1.09
14	841.00	39.64	1.14
15	891.00	39.69	1.19
16	944.00	39.75	1.25
17	1000.00	39.80	1.30
18	1059.00	39.85	1.35
19	1122.00	39.91	1.41
20	1188.00	39.96	1.46
21	1259.00	40.03	1.53
22	1333.00	40.09	1.59
23	1412.00	40.16	1.66
24	1496.00	40.23	1.73
25	1585.00	40.30	1.80
26	1679.00	40.37	1.87
27	1778.00	40.43	1.93
28	1884.00	40.50	2.00
29	1995.00	40.58	2.08
30	2113.00	40.66	2.16
31	2239.00	40.75	2.25
32	2359.00	40.83	2.33
33	2479.00	40.90	2.40
34	2599.00	40.97	2.47
35	2719.00	41.03	2.53
36	2839.00	41.11	2.61
37	2959.00	41.19	2.69
38	3079.00	41.26	2.76
39	3199.00	41.34	2.84
40	3319.00	41.40	2.90
41	3439.00	41.49	2.99
42	3559.00	41.56	3.06
43	3679.00	41.64	3.14
44	3799.00	41.70	3.20
45	3919.00	41.76	3.26
46	4039.00	41.81	3.31
47	4159.00	41.86	3.36
48	4279.00	41.92	3.42
49	4399.00	41.97	3.47
50	4519.00	42.04	3.54

AquA Hydrogeologic Consulting
P.O. Box 18793
Reno, Nevada 89511
ph.(775) 250-9700

Pumping test analysis
Time-Drawdown plot
with discharge

Project: Herlong Test/Production Well

Evaluated by: David Carlson

Pumping Test No. First Long-term Test

Test conducted on: October 2-16, 2001

Monitoring Well (MW-4)

Monitoring Well (MW-4)

Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]
51	4639.00	42.09	3.59
52	4759.00	42.15	3.65
53	4879.00	42.20	3.70
54	4999.00	42.26	3.76
55	5119.00	42.32	3.82
56	5239.00	42.38	3.88
57	5359.00	42.42	3.92
58	5479.00	42.47	3.97
59	5599.00	42.51	4.01
60	5719.00	42.56	4.06
61	5839.00	42.61	4.11
62	5959.00	42.65	4.15
63	6079.00	42.69	4.19
64	6199.00	42.71	4.21
65	6319.00	42.75	4.25
66	6439.00	42.81	4.31
67	6559.00	42.87	4.37
68	6679.00	42.93	4.43
69	6799.00	42.98	4.48
70	6919.00	43.02	4.52
71	7039.00	43.05	4.55
72	7159.00	43.08	4.58
73	7279.00	43.11	4.61
74	7399.00	43.14	4.64
75	7519.00	43.18	4.68
76	7639.00	43.20	4.70
77	7759.00	43.24	4.74
78	7879.00	43.30	4.80
79	7999.00	43.34	4.84
80	8119.00	43.38	4.88
81	8239.00	43.43	4.93
82	8359.00	43.47	4.97
83	8479.00	43.50	5.00
84	8599.00	43.53	5.03
85	8719.00	43.56	5.06
86	8839.00	43.59	5.09
87	8959.00	43.62	5.12
88	9079.00	43.66	5.16
89	9199.00	43.70	5.20
90	9319.00	43.74	5.24
91	9439.00	43.78	5.28
92	9559.00	43.81	5.31
93	9679.00	43.83	5.33
94	9799.00	43.84	5.34
95	9919.00	43.85	5.35
96	10039.00	43.85	5.35
97	10159.00	43.86	5.36
98	10279.00	43.85	5.35
99	10399.00	43.86	5.36
100	10519.00	43.87	5.37

AquA Hydrogeologic Consulting
P.O. Box 18793
Reno, Nevada 89511
ph.(775) 250-9700

Pumping test analysis
Time-Drawdown plot
with discharge

Project: Herlong Test/Production Well

Evaluated by: David Carlson

Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-4)	Monitoring Well (MW-4)
	Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	10639.00	43.88	5.38	
102	10759.00	43.90	5.40	
103	10879.00	43.91	5.41	
104	10999.00	43.93	5.43	
105	11119.00	43.93	5.43	
106	11239.00	43.94	5.44	
107	11359.00	43.94	5.44	
108	11479.00	43.94	5.44	
109	11599.00	43.93	5.43	
110	11719.00	43.92	5.42	
111	11839.00	43.92	5.42	
112	11959.00	43.92	5.42	
113	12079.00	43.93	5.43	
114	12199.00	43.93	5.43	
115	12319.00	43.93	5.43	
116	12439.00	43.93	5.43	
117	12559.00	43.93	5.43	
118	12679.00	43.94	5.44	
119	12799.00	43.95	5.45	
120	12919.00	43.95	5.45	
121	13039.00	43.95	5.45	
122	13159.00	43.94	5.44	
123	13279.00	43.93	5.43	
124	13399.00	43.92	5.42	
125	13519.00	43.93	5.43	
126	13639.00	43.94	5.44	
127	13759.00	43.94	5.44	
128	13879.00	43.91	5.41	
129	13999.00	43.85	5.35	
130	14119.00	43.79	5.29	
131	14239.00	43.74	5.24	
132	14359.00	43.70	5.20	
133	14479.00	43.65	5.15	
134	14599.00	43.60	5.10	
135	14719.00	43.54	5.04	
136	14839.00	43.49	4.99	
137	14959.00	43.45	4.95	
138	15079.00	43.44	4.94	
139	15199.00	43.46	4.96	
140	15319.00	43.52	5.02	
141	15439.00	43.60	5.10	
142	15559.00	43.71	5.21	
143	15679.00	43.84	5.34	
144	15799.00	43.99	5.49	
145	15919.00	44.12	5.62	
146	16039.00	44.23	5.73	
147	16159.00	44.32	5.82	
148	16279.00	44.45	5.95	
149	16399.00	44.52	6.02	
150	16519.00	44.62	6.12	

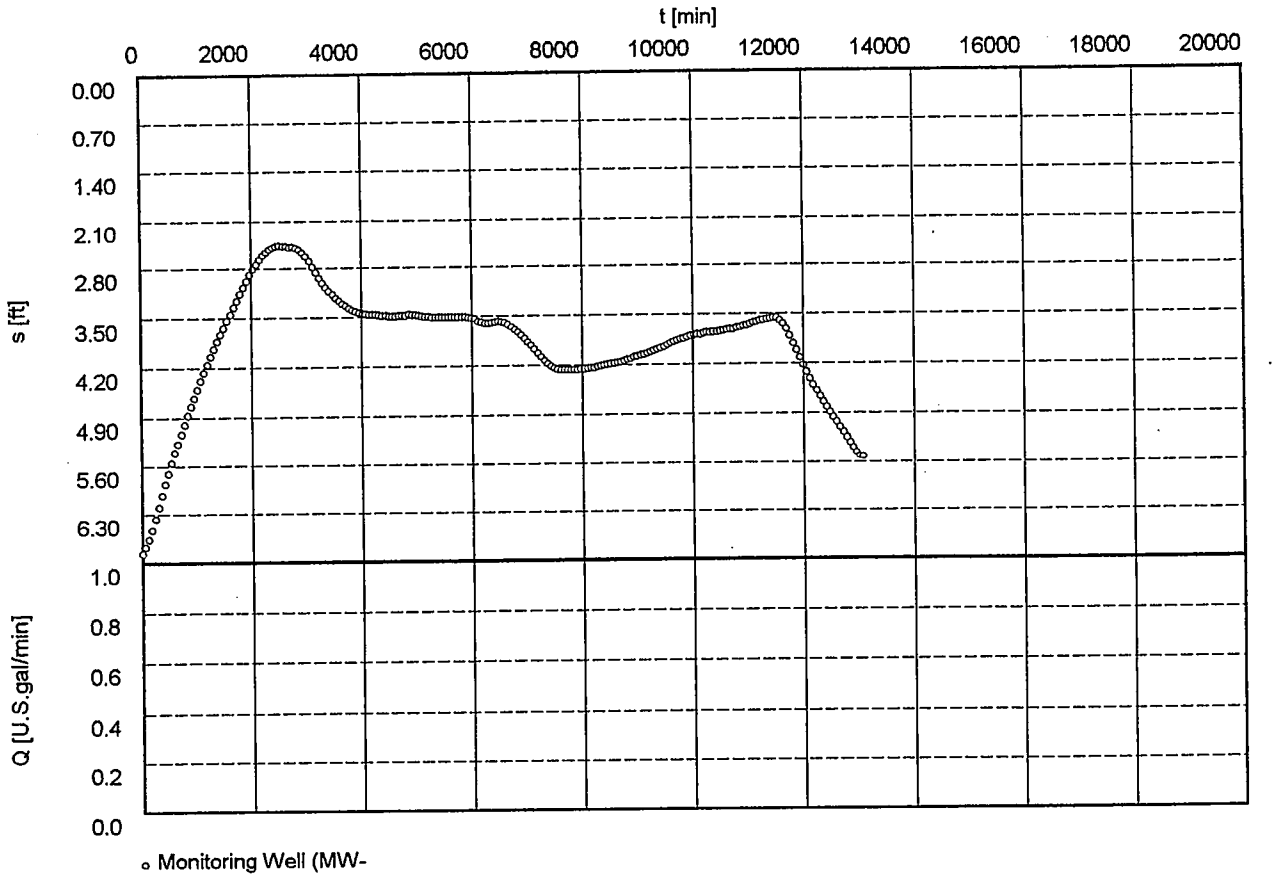
AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 5
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. First Long-term Test	Test conducted on: October 2-16, 2001
Monitoring Well (MW-4)	Monitoring Well (MW-4)
	Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	16639.00	44.72	6.22	
152	16759.00	44.80	6.30	
153	16879.00	44.87	6.37	
154	16999.00	44.94	6.44	
155	17119.00	45.02	6.52	
156	17239.00	45.10	6.60	
157	17359.00	45.17	6.67	
158	17479.00	45.22	6.72	
159	17599.00	45.24	6.74	
160	17719.00	45.28	6.78	
161	17839.00	45.34	6.84	
162	17959.00	45.43	6.93	
163	18079.00	45.52	7.02	
164	18199.00	45.61	7.11	
165	18319.00	45.69	7.19	
166	18439.00	45.77	7.27	
167	18559.00	45.87	7.37	
168	18679.00	45.96	7.46	
169	18799.00	46.05	7.55	
170	18919.00	46.09	7.59	
171	19039.00	46.08	7.58	
172	19159.00	46.05	7.55	
173	19279.00	45.99	7.49	
174	19399.00	45.93	7.43	
175	19519.00	45.87	7.37	
176	19639.00	45.78	7.28	
177	19759.00	45.67	7.17	
178	19879.00	45.57	7.07	
179	19999.00	45.46	6.96	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 1
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	
Pumping Test No. 2 and 3		Test conducted on: October 16-25, 2001	
Monitoring Well (MW-4)			



AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001 | Page 2 Project: Herlong Test/Production Well Evaluated by: David Carlson

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-4)	Monitoring Well (MW-4)
	Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	45.37	6.87	
2	60.00	45.27	6.77	
3	120.00	45.16	6.66	
4	180.00	45.03	6.53	
5	240.00	44.87	6.37	
6	300.00	44.70	6.20	
7	360.00	44.53	6.03	
8	420.00	44.36	5.86	
9	480.00	44.20	5.70	
10	540.00	44.05	5.55	
11	600.00	43.90	5.40	
12	660.00	43.77	5.27	
13	720.00	43.63	5.13	
14	780.00	43.51	5.01	
15	840.00	43.38	4.88	
16	900.00	43.26	4.76	
17	960.00	43.13	4.63	
18	1020.00	43.01	4.51	
19	1080.00	42.89	4.39	
20	1140.00	42.77	4.27	
21	1200.00	42.66	4.16	
22	1260.00	42.54	4.04	
23	1320.00	42.43	3.93	
24	1380.00	42.33	3.83	
25	1440.00	42.23	3.73	
26	1500.00	42.13	3.63	
27	1560.00	42.04	3.54	
28	1620.00	41.95	3.45	
29	1680.00	41.85	3.35	
30	1740.00	41.76	3.26	
31	1800.00	41.67	3.17	
32	1860.00	41.58	3.08	
33	1920.00	41.49	2.99	
34	1980.00	41.40	2.90	
35	2040.00	41.32	2.82	
36	2100.00	41.25	2.75	
37	2160.00	41.18	2.68	
38	2220.00	41.11	2.61	
39	2280.00	41.06	2.56	
40	2340.00	41.03	2.53	
41	2400.00	41.00	2.50	
42	2460.00	40.98	2.48	
43	2520.00	40.97	2.47	
44	2580.00	40.97	2.47	
45	2640.00	40.98	2.48	
46	2700.00	41.00	2.50	
47	2760.00	40.99	2.49	
48	2820.00	41.01	2.51	
49	2880.00	41.03	2.53	
50	2940.00	41.08	2.58	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 3
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-4)	Monitoring Well (MW-4)
	Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	3000.00	41.13	2.63	
52	3060.00	41.20	2.70	
53	3120.00	41.29	2.79	
54	3180.00	41.37	2.87	
55	3240.00	41.45	2.95	
56	3300.00	41.52	3.02	
57	3360.00	41.59	3.09	
58	3420.00	41.64	3.14	
59	3480.00	41.69	3.19	
60	3540.00	41.73	3.23	
61	3600.00	41.78	3.28	
62	3660.00	41.82	3.32	
63	3720.00	41.85	3.35	
64	3780.00	41.88	3.38	
65	3840.00	41.90	3.40	
66	3900.00	41.92	3.42	
67	3960.00	41.94	3.44	
68	4020.00	41.95	3.45	
69	4080.00	41.96	3.46	
70	4140.00	41.97	3.47	
71	4200.00	41.97	3.47	
72	4260.00	41.97	3.47	
73	4320.00	41.98	3.48	
74	4380.00	41.99	3.49	
75	4440.00	41.99	3.49	
76	4500.00	41.99	3.49	
77	4560.00	41.99	3.49	
78	4620.00	41.99	3.49	
79	4680.00	41.99	3.49	
80	4740.00	41.99	3.49	
81	4800.00	41.99	3.49	
82	4860.00	41.97	3.47	
83	4920.00	41.97	3.47	
84	4980.00	41.98	3.48	
85	5040.00	41.98	3.48	
86	5100.00	41.99	3.49	
87	5160.00	42.00	3.50	
88	5220.00	42.01	3.51	
89	5280.00	42.01	3.51	
90	5340.00	42.02	3.52	
91	5400.00	42.02	3.52	
92	5460.00	42.02	3.52	
93	5520.00	42.02	3.52	
94	5580.00	42.02	3.52	
95	5640.00	42.01	3.51	
96	5700.00	42.01	3.51	
97	5760.00	42.01	3.51	
98	5820.00	42.01	3.51	
99	5880.00	42.01	3.51	
100	5940.00	42.02	3.52	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 4
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-4)	Monitoring Well (MW-4)
	Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6000.00	42.03	3.53	
102	6060.00	42.04	3.54	
103	6120.00	42.08	3.58	
104	6180.00	42.09	3.59	
105	6240.00	42.10	3.60	
106	6300.00	42.10	3.60	
107	6360.00	42.09	3.59	
108	6420.00	42.08	3.58	
109	6480.00	42.08	3.58	
110	6540.00	42.09	3.59	
111	6600.00	42.10	3.60	
112	6660.00	42.12	3.62	
113	6720.00	42.15	3.65	
114	6780.00	42.19	3.69	
115	6840.00	42.23	3.73	
116	6900.00	42.27	3.77	
117	6960.00	42.32	3.82	
118	7020.00	42.37	3.87	
119	7080.00	42.42	3.92	
120	7140.00	42.47	3.97	
121	7200.00	42.53	4.03	
122	7260.00	42.58	4.08	
123	7320.00	42.64	4.14	
124	7380.00	42.68	4.18	
125	7440.00	42.72	4.22	
126	7500.00	42.74	4.24	
127	7560.00	42.76	4.26	
128	7620.00	42.77	4.27	
129	7680.00	42.77	4.27	
130	7740.00	42.77	4.27	
131	7800.00	42.77	4.27	
132	7860.00	42.77	4.27	
133	7920.00	42.77	4.27	
134	7980.00	42.77	4.27	
135	8040.00	42.76	4.26	
136	8100.00	42.75	4.25	
137	8160.00	42.74	4.24	
138	8220.00	42.74	4.24	
139	8280.00	42.73	4.23	
140	8340.00	42.72	4.22	
141	8400.00	42.71	4.21	
142	8460.00	42.70	4.20	
143	8520.00	42.69	4.19	
144	8580.00	42.68	4.18	
145	8640.00	42.67	4.17	
146	8700.00	42.66	4.16	
147	8760.00	42.64	4.14	
148	8820.00	42.63	4.13	
149	8880.00	42.62	4.12	
150	8940.00	42.60	4.10	

AquA Hydrogeologic Consulting P.O. Box 18793 Reno, Nevada 89511 ph.(775) 250-9700	Pumping test analysis Time-Drawdown plot with discharge	Date: Dec. 9, 2001	Page 5
		Project: Herlong Test/Production Well	
		Evaluated by: David Carlson	

Pumping Test No. 2 and 3	Test conducted on: October 16-25, 2001
Monitoring Well (MW-4)	Monitoring Well (MW-4)
	Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	9000.00	42.58	4.08	
152	9060.00	42.57	4.07	
153	9120.00	42.55	4.05	
154	9180.00	42.54	4.04	
155	9240.00	42.53	4.03	
156	9300.00	42.51	4.01	
157	9360.00	42.49	3.99	
158	9420.00	42.47	3.97	
159	9480.00	42.45	3.95	
160	9540.00	42.42	3.92	
161	9600.00	42.40	3.90	
162	9660.00	42.38	3.88	
163	9720.00	42.36	3.86	
164	9780.00	42.34	3.84	
165	9840.00	42.33	3.83	
166	9900.00	42.31	3.81	
167	9960.00	42.30	3.80	
168	10020.00	42.29	3.79	
169	10080.00	42.28	3.78	
170	10140.00	42.28	3.78	
171	10200.00	42.27	3.77	
172	10260.00	42.26	3.76	
173	10320.00	42.25	3.75	
174	10380.00	42.25	3.75	
175	10440.00	42.24	3.74	
176	10500.00	42.23	3.73	
177	10560.00	42.23	3.73	
178	10620.00	42.22	3.72	
179	10680.00	42.21	3.71	
180	10740.00	42.21	3.71	
181	10800.00	42.19	3.69	
182	10860.00	42.18	3.68	
183	10920.00	42.17	3.67	
184	10980.00	42.15	3.65	
185	11040.00	42.14	3.64	
186	11100.00	42.12	3.62	
187	11160.00	42.11	3.61	
188	11220.00	42.10	3.60	
189	11280.00	42.09	3.59	
190	11340.00	42.08	3.58	
191	11400.00	42.07	3.57	
192	11460.00	42.06	3.56	
193	11520.00	42.06	3.56	
194	11580.00	42.09	3.59	
195	11640.00	42.14	3.64	
196	11700.00	42.21	3.71	
197	11760.00	42.31	3.81	
198	11820.00	42.41	3.91	
199	11880.00	42.52	4.02	
200	11940.00	42.62	4.12	

AquA Hydrogeologic Consulting
P.O. Box 18793
Reno, Nevada 89511
ph.(775) 250-9700

Pumping test analysis
Time-Drawdown plot
with discharge

Date: Dec. 9, 2001 | Page 6

Project: Herlong Test/Production Well

Evaluated by: David Carlson

Pumping Test No. 2 and 3

Test conducted on: October 16-25, 2001

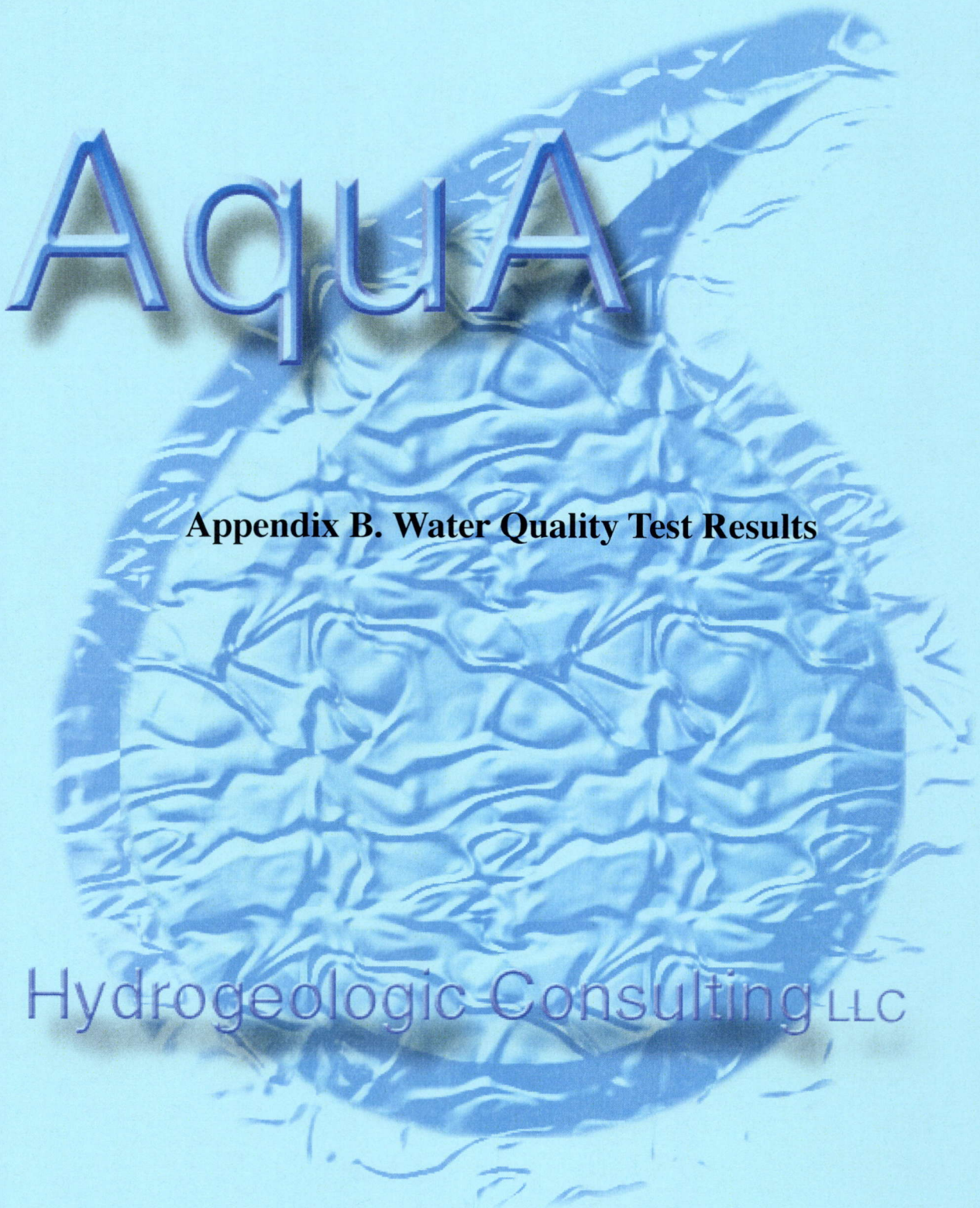
Monitoring Well (MW-4)

Monitoring Well (MW-4)

Distance from the pumping well 1728.00 ft

Static water level: 38.50 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	12000.00	42.73	4.23	
202	12060.00	42.82	4.32	
203	12120.00	42.92	4.42	
204	12180.00	43.01	4.51	
205	12240.00	43.10	4.60	
206	12300.00	43.17	4.67	
207	12360.00	43.25	4.75	
208	12420.00	43.32	4.82	
209	12480.00	43.39	4.89	
210	12540.00	43.47	4.97	
211	12600.00	43.53	5.03	
212	12660.00	43.60	5.10	
213	12720.00	43.67	5.17	
214	12780.00	43.74	5.24	
215	12840.00	43.82	5.32	
216	12900.00	43.88	5.38	
217	12960.00	43.95	5.45	
218	13020.00	44.01	5.51	
219	13080.00	44.02	5.52	



Appendix B. Water Quality Test Results

Herlong Utilities Cooperative

Comparison of Water Quality Parameter Concentration

Water Quality Parameter	SIAD 1999 CCR[a]	Regulatory Limit	Allen Farms Well[b]	**HUC Well No. 1[c]**
Primary Drinking Water Standards				
Arsenic	3-5 ppb	10 ppb	4.1 ppb	**<1 ppb**
Beryllium		4 ppb	<2.5 ppb	**<2.5 ppb**
Cadmium		5 ppb	<2 ppb	**<2.5 ppb**
Chromium, total		50 ppb	<5 ppb	**<5 ppb**
Fluoride	340-530 ppb	1,400 ppb	110 ppb	**240 ppb**
Nitrate (NO_3)	5.3-26.3 ppm	45 ppm	NR	**NR**
Nitrate/Nitrate as N		10 ppm	0.28 ppm	**0.35 ppm**
Selenium	nd-6ppb	50 ppb	<1 ppb	**<1 ppb**
Silver		5 ppb	<5 ppb	**<5 ppb**
Thallium		2 ppb	<1 ppb	**<1 ppb**
Gross Alpha	nd-22 pCi/L	15 pCi/L[d]	4.34 pCi/L	**4.56pCi/L**
MTBE[g]		13 ppb	<0.5 ppb	**<0.5 ppb**
Trichloroethene (TCE)		5 ppb	<0.5 ppb	**<0.5 ppb**
TTHM		80ppb		**1.8 ppb**
No regulated organic parameters were observed from measurements at or below the regulated concentrations.				
Secondary Drinking Water Standards and Water Characteristics				
Chloride	13.5-75.8 ppm	250 ppm[h]	9.9 ppm	**21 ppm**
Iron	nd-156 ppb	300 ppb	<50 ppb	**<50 ppb**
Manganese	265-2,611 ppb	50 ppb	<5 ppb	**13 ppb**
Sulfate	52-450 ppm	250 ppm[h]	41 ppm	**47 ppm**
Specific Conductance	350-750 umho/cm	900 us/cm[h]	280 us/cm	**470 us/cm**
Total Dissolved Solids	274->825 ppm	500 ppm[h]	270 ppm	**330 ppm**
Hardness	116-416 ppm	No Limit	140 ppm	**100 ppm**
Sodium	61-110 ppm	No Limit	26 ppm	
Perchlorate		No Limit	<4 ppb	

[a] Sierra Army Depot 1999 Water Quality Consumer Confidence Report

[b] Samples taken 4/30/01

[c] Samples taken 10/11/01

[d] pCi/L = pico curries per liter

[e] < means less than; > means greater than

[g] methyl tert butyl ether

[h] Recommended Limit

nd = not detected

ppb = parts per billion, micrograms per liter

ppm = parts per million, milligrams per liter

Summary provided by the
Herlong Utilities Cooperative,
Herlong, California