State of Idaho
DEPARTMENT OF WATER RESOURCES
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Phone: (208) 287-4800 • Fax: (208) 287-6700 • Web Site: www.idwr.idaho.gov

C. L. "BUTCH" OTTER
Governor

DAVID R. TUTHILL, JR.
Director

April 6, 2009

Charles G. Brockway
Brockway Engineering
2016 N Washington St, Suite 4
Twin Falls, ID 83301

Re: Your Correspondence Dated February 23, 2009 Concerning Water Right 37-7822, South Gimlet Water Users

Dear Dr. Brockway,

I have reviewed your above referenced correspondence and information in support of your request that the Idaho Department of Water Resources (Department or IDWR) revise its' recent guidance to the Water District 37 watermaster concerning administration and regulation of water right 37-7822. Specifically, you have requested that the Department determine that the right be regulated "as a non-consumptive right without curtailment by priority, even if the inflow exceeds the outflow." You also asked that the Department make this determination prior to the 2009 irrigation season.

In response to your request and the general question of whether the use of water under right 37-7822 is consumptive and/or causes injury to other water rights, we asked staff from our Hydrology Section to review your letter and supporting information as well as all other available data. A copy of the review from our Hydrology Section is included for your reference.

The Department also contacted the watermaster to discuss the measurements that he took last year on the diversion channels as well as his general knowledge of the channels, including the condition of the required measuring devices and headgates. This discussion resulted in the following concerns:

- The weir installed on the 11-A diversion (south channel) generally appears to be submerged and therefore not providing accurate measurements. The submergence may be caused by a downstream pond. The watermaster recommends this weir be corrected.
- No measuring device exists to measure the return flows to the river. The watermaster recommends that a measuring device be installed to measure return flows to the river.
- The watermaster last year did not measure or investigate the irrigation pump diversion located between the inflow and outflow points, and he did not investigate any other potential diversions or other problems that might have contributed to some of the documented ditch losses.

Based on our review of your correspondence, our internal technical review, additional discussion with the watermaster and review of our original watermaster guidance, the Department provides the following revised guidance to the watermaster with respect to the regulation of water right 37-7822:

- Water right license 37-7822 has an annual volume limit of 7,300 acre-feet. The watermaster shall annually curtail the diversion of water under this right if and when the diversion of water from the two authorized diversion points reaches 7,300 acre-feet. (Note: This guidance is consistent with the Department's earlier guidance to the watermaster but we suspect based on limited data that the diversions rarely, if ever, exceed 7,300 acre-feet per year.)

- The Department will send notice to the water right owner that requires them to correct, update or replace the measuring device for the 11-A diversion.

- The Department will send notice to the water right owner requiring the installation of a measuring device to measure the return flow to the river. Condition number 9 on the water right license states that "the Director retains jurisdiction of this right to require installation of measuring devices at the points where water returns to the Big Wood River." The Department understands that there is just one return point or location. The return flow measuring device is necessary to determine the losses or gains on the diversion channels and to help address any future determinations related to the consumptive/non-consumptive use of the right, as well as potential injury to other right holders. This requirement is supported by recommendations from both the watermaster and our Hydrology Section.

- The watermaster shall curtail the 11-A diversion if the owner does not correct, update or replace the measuring device on that diversion after the Department sends notice to the owner and after any deadlines established by the Department pursuant to such notice. Similarly, the watermaster shall curtail both the 11-A and 11 diversions if the owner does not install a measuring device to measure return flows to the Big Wood River after the Department sends notice to the owner and after any deadlines established by the Department pursuant to such notice.

- The Department directs the watermaster to continue measurement and monitoring of inflows and outflows using existing measuring devices and/or his own equipment as necessary until the 11-A and return flow measuring devices are installed. The watermaster must also measure and account for any diversions or uses of water on the channels between the diversion and return flow points. The authorized irrigation pump diversion can be measured using the installed flow meter but the meter should be calibrated by the watermaster, the owner's consultant or IDWR staff. The Department requests the watermaster to make a thorough investigation of the channels to verify that there are no unauthorized diversions or other physical structures on the channels that might contribute to documented channel losses. The watermaster is asked to regulate and report to IDWR any potential unauthorized diversion that may be found on the channels.

- The Department further directs the watermaster to continue delivery of water to the 11 and 11-A points of diversions as long as the owner complies with the measuring device requirements described above pursuant to further notice from the Department. The Department will delay any determination regarding consumptive use and/or potential injury under water right 37-7822 until additional data can be collected and reviewed. If the owner complies with all measurement requirements, the watermaster shall not curtail the right by priority, even if inflows exceed outflows, until further notice is provided by the Department.

- Consistent with the Department's earlier direction, the total combined maximum diversion rate to diversion points 11 and 11-A under rights 37-7822, 37-8838, 37-21329, 37-21330, 37-21331 and 37-21332 is 20.32 cfs and 7,317.5 acre-feet per year. Rights 37-21329, 37-21330, 37-21331 and 37-21332 shall not exceed a combined rate of diversion of 0.32 cfs and 17.5 acre-feet per year.

Finally, you state in your letter that "evaporation has always occurred along the channels due to the high ground water table, and should not be counted against the water users." If changes in the water table and/or river reach and channel gains/losses are seasonal, then the existence of the channels may subject the diverted water to consumption at times when water would not otherwise be available near the surface for evaporation and plant growth. Consumption may be significant due to the size and length of the channels and could be part of the reason for reduced return flows. This issue should be considered in the future along with other possible explanations for reduced flows.

Please contact me directly at 208-287-4959 if you have further questions regarding this matter. A copy of this letter has been sent to Kevin Lakey, Water District 37 watermaster. By copy of this letter, the Department requests the watermaster to follow the guidance provided herein with respect to delivery of right 37-7822. This guidance updates the previous guidance sent to the watermaster regarding delivery of right 37-7822 on June 16, 2008 and October 6, 2008.

Regards,

Tim Luke
Water Distribution Section

Enclosure: Memorandum Regarding Seepage Evaluation on the South Gimlet Water Users' Aesthetic Channels, by Mike McVay, April 1, 2009

Cc: Kevin Lakey, Water District 37 Watermaster
South Gimlet Water Users Association
Allen Merritt, IDWR Southern Region Manager
Mike McVay, IDWR Hydrology Section

M:\Water Districts by Basin\Basin 37\WD 37\Correspondence\2009\Brockway-Gimlet37-7822Response040309.doc

MEMO

State of Idaho
Department of Water Resources
322 E Front Street, P.O. Box 83720, Boise, Idaho 83720-0098
Phone: (208) 287-4800 Fax: (208) 287-6700

Date: April 1, 2009

To: Tim Luke

From: Mike McVay

cc: Sean Vincent, Rick Raymondi, and Lin Campbell

Subject: Seepage evaluation on the South Gimlet Water User's aesthetic channels.

Introduction

Per you request, I have reviewed the information submitted by Brockway Engineering regarding the South Gimlet Water User's aesthetic-use channels. This information was reviewed in an effort to assess the impacts of seepage from the channels, in particular:

1) Are reported seepage losses from the channels consistent?
2) What is the fate of seepage water?
3) Do the seepage losses from the channels cause injury to other users?

IDWR Review

The aesthetic-use channels are located in the Big Wood River Valley, approximately four miles south of Ketchum, Idaho. The site is situated in a narrow bedrock canyon, and the channels are adjacent (less than 1000 feet) and roughly parallel to the Big Wood River, (Figure 1). The valley in this area is filled with interbedded Quaternary lacustrine, fluvial, and proglacial sediments which host an unconfined aquifer that is closely linked to surface water. Depth to water in this aquifer is typically less than 10 feet (Skinner et. al., 2007).

This reach of the Big Wood River is assumed to be gaining because previous research has indicated increasing river flows. However, incomplete accounting of surface water inflows and measurement error may mask the true nature of the ground water-surface water interaction in this area (Skinner, et. al., 2007). Big Wood River flow measurements have not been collected upstream of this site since 1971, and no

information has been found that addresses seasonal changes in gains and losses along this reach of the river.

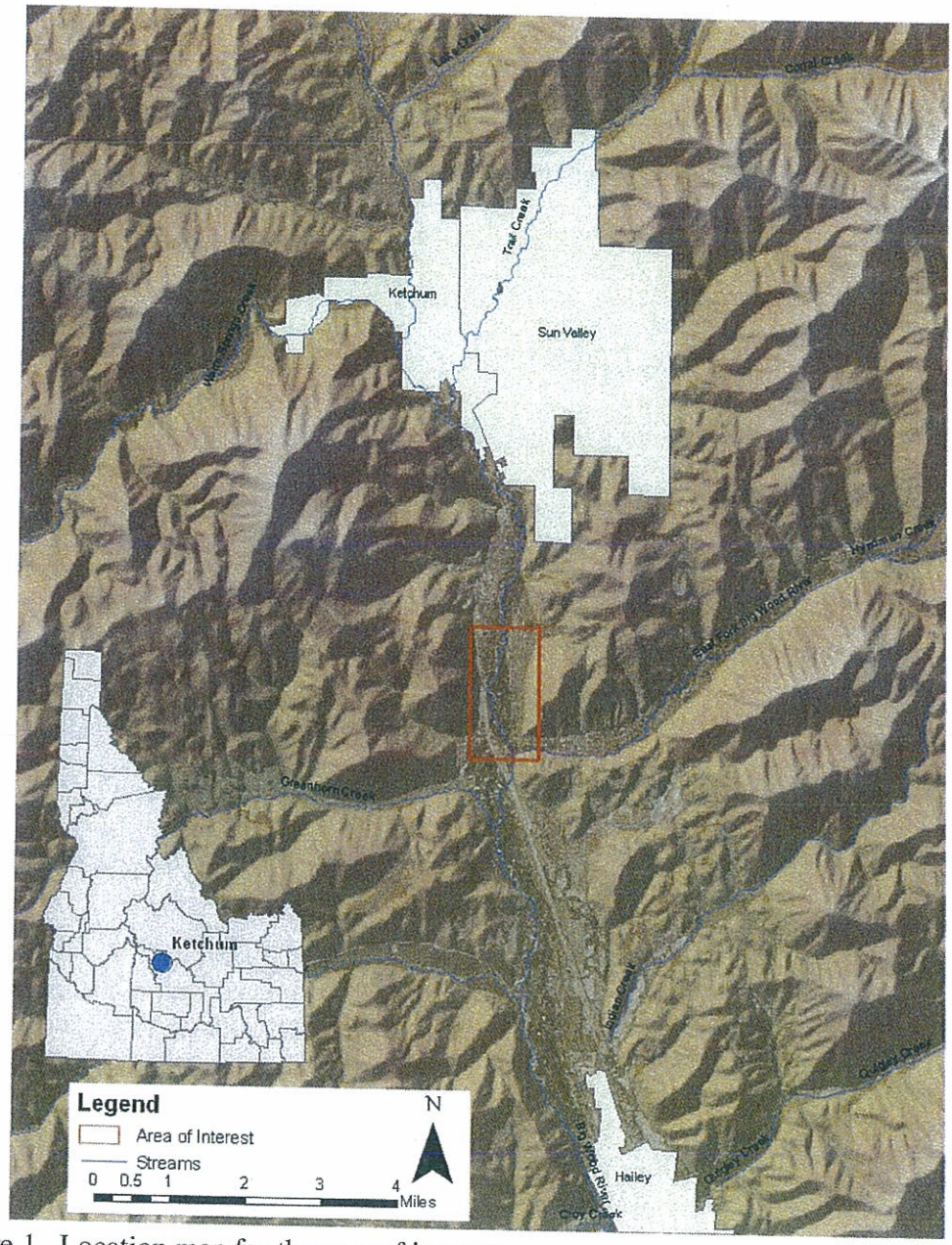


Figure 1. Location map for the area of interest.

Channel Seepage

Flow measurements were first taken on the two authorized points of diversion (Rinker 11 and Rinker 11A) and on the diversion return point in June of 1988 by C.E. Brockway as

part of the water right field examination (Figure 2). These measurements indicated that the channels were gaining flow from ground water discharge.

Figure 2. Approximate locations of aesthetic-diversion features in reference to the Big Wood River. Adapted from Brockway Engineering Memo dated February 23, 2009.

Subsequent measurements were collected at the same locations by the Water District 37 Watermaster in the fall of 2008, which indicated that the channels were losing water to the aquifer (Table 1).

Table 1. Diversion measurements on aesthetic-use channels

Collected	Date	Combined Rinker 11 and 11A Diversion (cfs)	Return (cfs)	Gain/Loss (cfs)
Brockway	June 28, 1988	21.93	22.27	0.34
Watermaster	August 11, 2008	4.41	0.55	-3.86
Watermaster	August 13, 2008	3.96	0.52	-3.44
Watermaster	August 15, 2008	3.64	0.58	-3.06
Watermaster	September 9, 2008	2.48	"Approx the same"	--

A review of nearby water level data suggests that the local water table drops approximately one to six feet between June and September. If the water table drops below the bottom of the channels, there is a potential for loss in flow as channel water is lost to the aquifer. Although it appears that the channels may gain water from the aquifer when the water table is high and lose water when the water table is low, other water diversions have been reported nearby. Without confirmation of all withdrawals in the vicinity of the channels, the impacts of the aesthetic-use diversions cannot be assessed. It is important to note that lower ground water levels may also induce leakage from the Big Wood River during part of the year.

Fate of Seepage Water

The fate of channel leakage is unknown. Water level records are sparse in this area, and as such, the local direction of ground water flow is also unknown. Although a ground water contour map was presented by Brockway, the water level data were obtained from driller's reports that give approximate water depths over multiple years during various seasons. It is possible that the map may not be representative of current subsurface conditions (Appendix A). However, unconfined ground water within an alluvium-filled valley would be expected to move in a down-valley direction (Castelin, 1975). This general flow pattern is seen in the October 2006 water table map created by Skinner, et. al., 2007 (Figure 3 and Appendix B).

If the ground water flow in the vicinity of the site does conform to this pattern, it is reasonable to expect that some ground water would discharge to the Big Wood River near the diversion's return location. Discharge at this location is inferred based on the west-to-east river meander which is perpendicular to the ground water flow path. The impermeable eastern aquifer boundary and water level elevations in the East Fork Wood River alluvial aquifer also suggest that some seepage water will discharge to the Big Wood River because water cannot flow to the east (Figures 2 and 3).

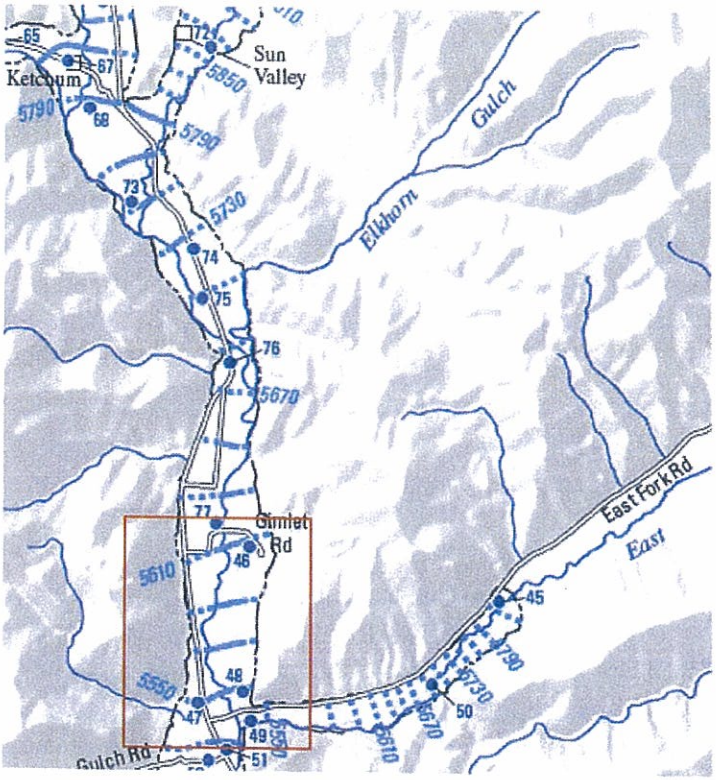


Figure 3. Ground water contour map adapted from Skinner, et. al., 2007. See legend and scale in Appendix B.

Brockway Engineering estimated no more than 15 days for seepage water to re-enter the river. This estimate is based on unreferenced modeling "for similar situations" to this site. Without more data and a peer-reviewed model, the lag time between ditch losses and river gains cannot be accurately estimated.

In order to understand the fate of channel seepage water, the following hydrologic activities should be implemented:

- Measurement of the channel diversions inflows and return to estimate the rate, volume and timing of channel losses.
- Upstream and downstream flow measurements on the Big Wood River to determine the nature of the river-aquifer relationship in this area.
- Upstream and downstream flow measurements on the Big Wood River to assess impacts to the river due to the aesthetic-use diversion.
- Identification and measurement of nearby withdrawals to differentiate the impacts of the aesthetic-use channels from other uses.
- Water level monitoring in nearby wells to estimate ground water flow directions and further characterize the nature of the surface water-ground water interactions in the area.

Conclusions

In an effort to evaluate the impacts of the aesthetic-use diversion, this review has been conducted to answer the following questions:

1) Are reported seepage losses from the channels consistent?
2) What is the fate of seepage water?
3) Do the seepage losses from the channels cause injury to other users?

Question 1

Are reported seepage losses from the channels consistent?

It appears that losses from the bottom of the channels may be seasonal. Ground water in this area is typically shallow (less than 10 feet deep) and water levels can drop up to six feet during the irrigation season. Therefore, the aesthetic-use channels may gain water from the aquifer when water levels are high, and may lose water to the aquifer when water levels are low. Changing water levels will also affect flow in the Big Wood River and may cause the river to lose water to the aquifer during low ground water periods. Measurement of the diversions and return are recommended to answer this question.

Question 2

What is the fate of seepage water?

Based on a general understanding of the aquifer system in the Big Wood River Valley, it appears that any water lost due to channel seepage may eventually return to the Wood River. It is hypothesized that at least some of this water would most likely enter the river near the diversion return point, above the confluence with the East Fork Wood River. This is a conceptual understanding, and data is not available to confirm this hypothesis.

It is important to note that additional unmonitored diversions in the area may be affecting the rate of leakage and the ultimate fate of channel losses. Measurements of the channel losses/gains, as well as flow in the Big Wood River above and below the site, are necessary to understanding the fate of seepage water. Well water level monitoring would assist with understanding subsurface flow direction.

Question 3

Do seepage losses from the channels cause injury to other users?

The residence time and ultimate fate of seepage water are unknown, and there is not enough information available to determine if this diversion causes injury to other users. However, based on the conceptual model of the area, it is possible that no injury is

associated with this use because seepage water may re-enter to the river near the diversion return. Measurement of diversion inflows and outflow, in combination with Big Wood River flow measurements above and below the diversion channels, are recommended for assessing injury to other water users.

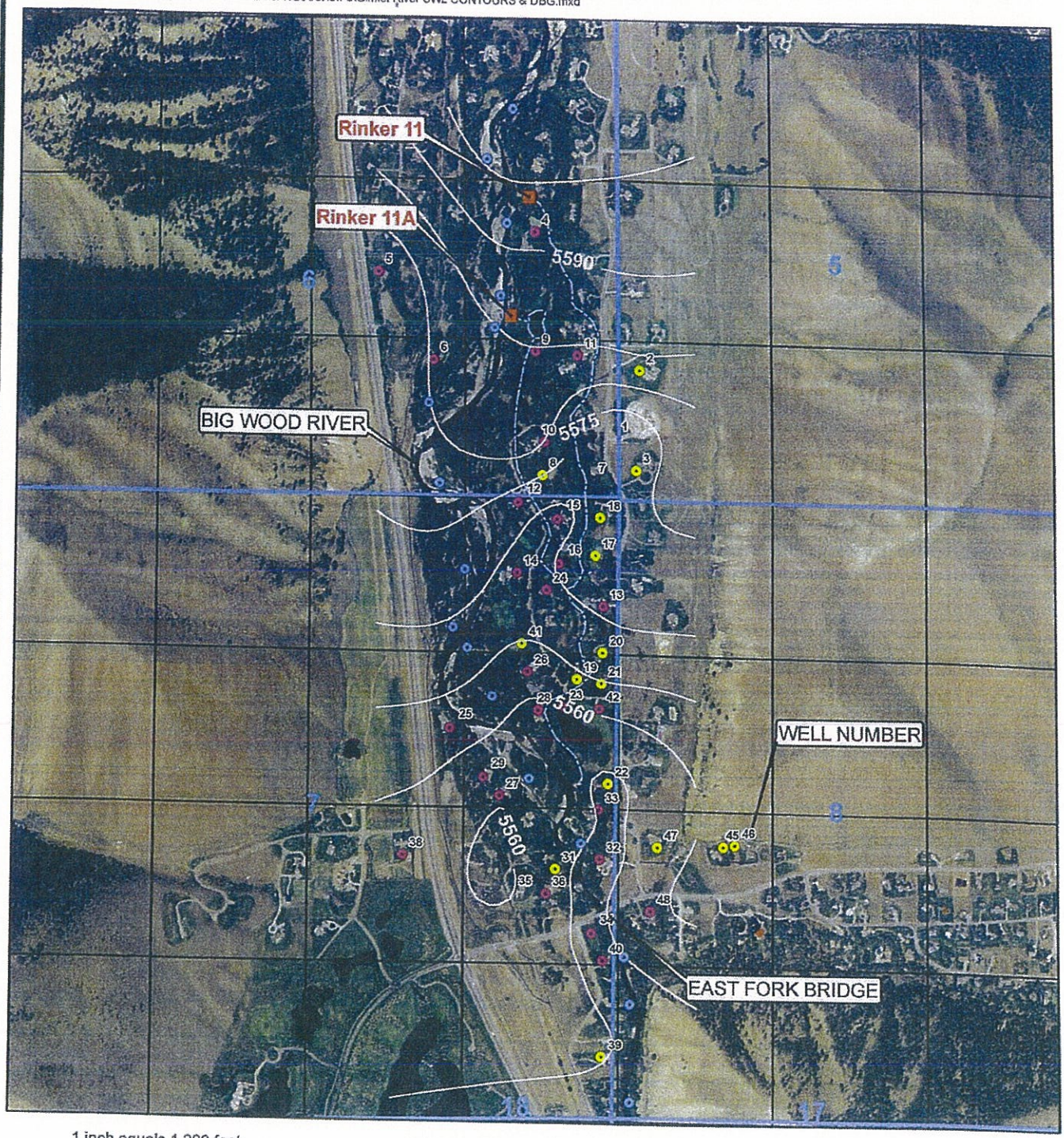
References

Castelin, P.M., Winner, J.E., 1975. Effects of urbanization on the water resources of the Sun Valley – Ketchum area, Blaine County, Idaho. Idaho Department of Water Resources.

Skinner, K.D., Bartolino, J.R., and Tranmer, A.W., 2007. Water-resource trends and comparisons between partial-development and October 2006 hydrologic conditions, Wood River Valley, South-Central Idaho. Us Geological Survey Scientific Investigations Report 2007-5258.

APPENDIX A

F:\Projects\South Gimlet Water Association - Rinker HG\Arcview 9\Gimlet River SWL CONTOURS & DBG.mxd



1 inch equals 1,200 feet

SOUTH GIMLET WATER USERS
GROUND WATER CONTOURS
NAIP 2004 AERIAL

N

Points of Diversion
Sections
t03n18e
Contours
RIVER ELEVATIONS FROM DEM
Ditch
Wells used in Analysis
LOCATED
LOCATED
LOC. UNCERTAIN

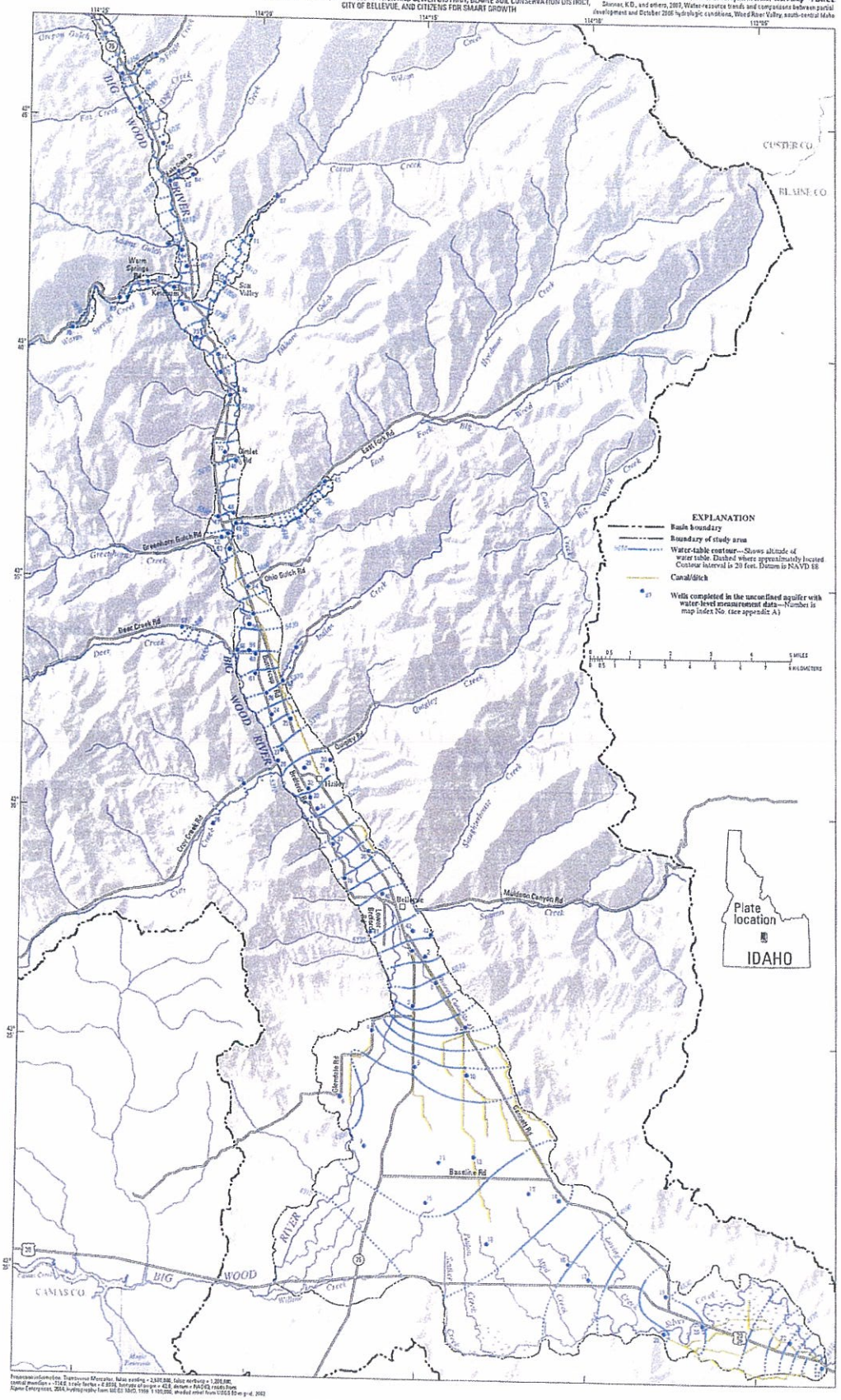
BROCKWAY ENGINEERING, PLLC.
ALR - FEB. 4, 2009

APPENDIX B

USGS U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with the
BLAINE COUNTY, CITY OF HAILEY, CITY OF KETCHUM, THE NATURE CONSERVANCY,
CITY OF SUN VALLEY, SUN VALLEY WATER AND SEWER DISTRICT, BLAINE SOIL CONSERVATION DISTRICT,
CITY OF BELLEVUE, AND CITIZENS FOR SMART GROWTH

SCIENTIFIC INVESTIGATIONS REPORT 2007-5258
October 2006 Partial-development water-table map—PLATE 2
Skinner, K.D., and others, 2007, Water-resource trends and comparisons between partial development and October 2006 hydrologic conditions, Wood River Valley, south-central Idaho



October 2006 Water-Table Map of the Unconfined Aquifer, Wood River Valley, South-Central Idaho, October 23–27, 2006

By
Kenneth D. Skinner, James R. Bartolino, and Andrew W. Tranmer
2007