STATE OF OREGON
Water Resources Department
725 Summer St. N.E.
Salem, OR 97301

MEMORANDUM

DATE: 2/26/08

TO: File T-10240, Salmon Valley

FROM: Donn Miller, Hydrogeologist (503.986.0845)

SUBJECT: Same Source Comments

I have studied the Newton Consultants report dated 10/3/2007 and conferred with Doug Woodcock, my manager. The application seeks to amend permit G-11534 by adding an additional points of appropriation (wells).

One additional well is currently under review for the necessary same source confirmation.

I conclude that completing a well into the deep zone of test hole, CLAC 63420, develops the same source as CLAC 50441 (previously authorized). This conclusion is specific to this particular setting. The decision was based on what appeared to be some connection across the clay layer that separates the deep and shallow zones locally.

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900
www.wrd.state.or.us

Application for Water Right
Transfer

Please type or print legibly in dark ink. If your application is incomplete or inaccurate, we will return it to you. If any requested information does not apply to your application, insert "n/a". Please read and refer to the instructions when completing your application. A summary of review criteria and procedures that are generally applicable to these applications is available at www.wrd.state.or.us/publication/reports/index.shtml.

APPLICATION FOR:

Please check one

- ☐ Water Right Transfer
  - ☐ Historic Change in POD
  - ☐ To Instream Use
  - ☐ Other Transfer
- ☐ Temporary Transfer (number of years ____)
- ☑ Permit Amendment
- ☐ Drought Transfer
- ☐ Point of Diversion Change Due to Government Action

1. APPLICANT INFORMATION

Name: Salmon Valley Water Company - Michael Bowman
(First / Last)

Address: PO Box 205

Welches (City) | Oregon (State) | 97067 (Zip)

Phone: ____ (Home) | 503-622-4083 (Work) | ____ (Other)

*Fax: ____ *E-Mail address: bowman.michael@verizon.net

**Optional information*

2. AGENT INFORMATION

(The agent listed is authorized to represent the applicant in all matters relating to this transfer application)

Name: David J. (First) Newton (Last)

Address: 521 SW 6th Street, Suite 100

Redmond (City) | Oregon (State) | 97756 (Zip)

Phone: ____ (Home) | 541-504-9960 (Work) | ____ (Other)

*Fax: 541-504-9961 *E-Mail address: dnewton@newtonconsultants.com

**Optional information*

T 10240

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3. TYPE OF CHANGE PROPOSED

Please check all that apply

Point of Diversion or Appropriation	Place of Use	Character of Use (n/a for Permit Amendments)
☐ Change (The old point of diversion or appropriation will **not** be used for the portion of the water right affected by the transfer.) ☑ Additional (Both the old and new points of diversion or appropriation will be used for the portion of the water right affected by the transfer.) ☐ Historic Point of Diversion (Unauthorized point of diversion used for more than 10 years.) ☐ Surface Water to Ground Water (A new point of appropriation will be used **instead of** the old point of diversion and not as an additional point of appropriation.)	☐ All, or a portion, of the right will be exercised at a different location than currently authorized. (Use of water at the current location will be discontinued.) ☐ Exchange (Water from another source will be used in exchange for supplying an equal amount of replacement water to that source.)	Proposed new use: ☐ Irrigation ☐ Municipal ☐ Quasi-municipal ☐ Commercial ☐ Industrial ☐ Instream (complete **Supplemental Form B**) ☐ Domestic (indicate number of households) _____ ☐ Other _____ ☐ Substitution (A supplemental ground water right will be substituted for a primary surface water right.)

Reason for changes: Well yield limitations restrict actual peak pumping rate to 0.29 cfs (130 gpm). New points of appropriation are proposed in order to more fully ~~develop Permit G-11534~~

Describe the ***current*** water delivery system. Include information on the pumps, canals, pipelines and sprinklers used to divert, convey and apply the water at the authorized place of use.

The description must be sufficient to demonstrate that the full quantity of water to be transferred can be conveyed from the authorized source and applied at the authorized location and that the applicant is ready, willing, and able to exercise the right. (Not applicable to applications for Permit Amendments.)

N/A

System capacity: 0.29 cubic feet per second (cfs)

*Attach one or more **Evidence of Use Affidavits** (Supplemental Form A) demonstrating that each of the right(s) involved in the transfer have been exercised in the last five years or that a presumption of forfeiture for non-use could be rebutted. (Not applicable to applications for Permit Amendments.)*

4. CURRENT WATER RIGHT INFORMATION

*A separate page providing the information in this section must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Water Right Subject to Transfer (check and complete **one** of the following):

☐	Certificated Right	Certificate Number	Permit Number or Decree Name
☐	Adjudicated, Un-certificated Right	Name of Decree	Page Number
☐	Permit for which Proof has been Approved	Permit Number	Date Claim of Beneficial Use Submitted
☐	Transferred Right for which Proof has been Filed	Previous Transfer Number	Date Claim of Beneficial Use Submitted
☑	Permit for which an Amendment is Requested	G-11534 Permit Number	10/01/2030 Completion Date of Permit

Name on Permit, Certificate, or Decree: Salmon Valley Water Company

County: Clackamas Authorized Use(s): Quasi-Municipal

Are there multiple **Priority Dates** identified on the water right? ☐ Yes ☑ No
*If "**Yes**", any information provided on **Page 4 must** identify which priority date is associated with each of the proposed points of diversion/appropriation and places of use. In addition, list those priority dates:* _____

Source(s) of Water Listed on Right: Ground Water

Tributary to: Salmon River Basin

Are there other **Sources** listed on the water right? ☐ Yes ☑ No
*If "**Yes**", any information provided on **Page 4 must** identify which source is associated with each of the proposed points of diversion/appropriation and proposed places of use. In addition, list those other sources:* _____

Are there **Other Water Rights** or permits associated with this land? ☑ Yes ☐ No

*If "**Yes**", what are the Permit or Certificate Numbers?* G-11335, G-11422, G13176, G-15209, 61982
Pursuant to ORS 540.510, any right that is supplemental to a primary right proposed for transfer must be included in the transfer or be cancelled.

Remarks: Certificate 61982 is for both irrigation and domestic use. Other listed permits are for Quasi-Municipal use.

Certificate Number or other identifying number from ***Page 3***: G-11534

*A separate page providing the following information must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Is the entire water right identified on ***Page 3*** affected by this transfer? ☐ Yes ☑ No

*If "**Yes**", the remainder of **this page** need **not** be completed.*
*If "**No**", the following information **must be provided** only for those points of diversion/appropriation and places of use that are **involved in the transfer**.*

Government lot and donation land claim numbers must be included in the tables below only if the information is reflected on the existing water right.

Location of Existing Authorized Point(s) of Diversion or Appropriation to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
3	S	7	E	W.M.	4	SW NW		2205 feet South & 295 feet East from NW Corner, Section 4

Location of Existing Authorized Place of Use to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					No	Change In	Place of	Use

6. AFFECTED DISTRICTS AND LOCAL GOVERNMENTS

Are any of the water rights proposed for transfer located within or served by an irrigation or other water district? ☑ Yes ☐ No

Will any of the water rights be located within or served by an irrigation or other water district after the proposed transfer? ☑ Yes ☐ No

Is water for any of the rights supplied under a water service agreement or other contract for stored water with a Federal agency? ☐ Yes ☑ No

*If "**Yes**", for any of the above, list the name and mailing address of the district and/or agency:*

Salmon Valley Water Company
PO Box 205
Welches, Oregon 97067

List the name and mailing address of all affected local governments (e.g., county, city, municipal corporation, and tribal governments within whose jurisdiction the rights are located).

Clackamas County-Administration; 2051 Kaen Road; Oregon City, OR 97045

7. LAND OWNERSHIP

Does the applicant own the lands **FROM** which the right is being transferred? ☐ Yes ☐ No
*If "**No**", provide the following information. For Temporary Transfers, also include a notarized statement granting consent to the transfer from each of the landowners:*

Names of Current Landowner(s): N/A (Permit amendment. Not a Transfer)
First Last

Address:

City State Zip

Does the applicant own the lands **TO** which the right is being transferred? ☐ Yes ☑ No
*If "**No**", provide the following information:*

Names of Receiving Landowner(s): SEE ATTACHED FORM
First Last

Address:

City State Zip

Check one of the following:

☐ The receiving landowner will be responsible for completion of the proposed changes after the final order is issued. All notices and correspondence should be sent to this landowner.

☑ The applicant will remain responsible for completion of changes. Notices and correspondence should continue to be sent to the applicant and applicant's agent.

7. LAND OWNERSHIP

Does the applicant own the lands TO which the right is being transferred? NO
If "NO" provide the following information:

Names of receiving Landowner(s):

Ed Hopper
68010 East Fairway Avenue
Welches, OR 97067

5. PROPOSED CHANGES TO THE WATER RIGHT

*A separate page providing the information in this section must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Certificate Number or other identifying number from ***Section 4***: G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
								See Attached Form

Attach additional copies as necessary to describe locations of other proposed points of diversion or appropriation. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Location of Proposed Place of Use:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					SEE	ATTACHED	FORM	

Attach additional copies as necessary to describe locations of other proposed places of use. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Remarks: _____

_____

_____

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5. PROPOSED CHANGES TO THE WATER RIGHT

Certificate Number or other identifying number : G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Section	Qtr160	Qtr40	Gov't Lot or DLC	Survey Coordinates	
3	S	7	E	W.M.	5	NW	NE		1270 ft south and 1554 feet west from NE corner, Section 5	2
3	S	7	E	W.M.	5	NW	NE		210 ft south and 2360 feet west from NE corner, Section 5	3
3	S	7	E	W.M.	5	SE	NE		2046 ft south and 1260 feet west from NE corner, Section 5	4
3	S	7	E	W.M.	5	SE	NE		2580 ft south and 845 feet west from NE corner, Section 5	5
3	S	7	E	W.M.	5	SE	NE		1822 ft south and 60 feet west from NE corner, Section 5	6

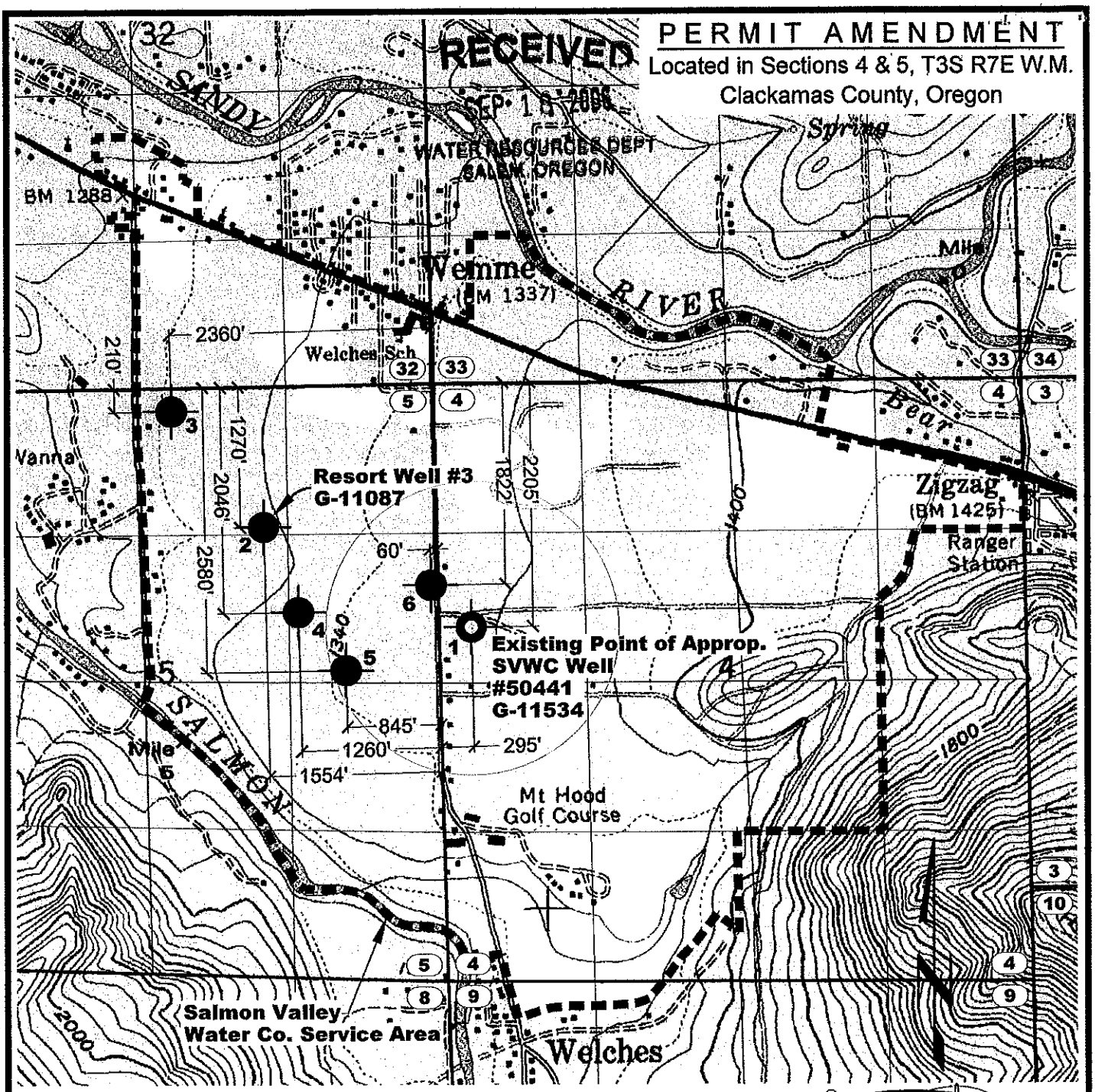
Note: proposed POA No. 2 (see map) is existing Resort at Mountain well No. 3. Data on the well is attached

Location of Proposed Place of Use:

Township		Range		Mer	Section	1/4 1/4 Section		Gov't Lot or DLC
2	S	7	E	W.M.	32	NE	SW	
2	S	7	E	W.M.	32	NW	SE	
2	S	7	E	W.M.	32	SW	SE	
2	S	7	E	W.M.	32	SE	SE	
2	S	7	E	W.M.	33	SW	SW	
2	S	7	E	W.M.	33	SE	SW	
2	S	7	E	W.M.	33	SW	SE	
3	S	7	E	W.M.	4	NE	NE	
3	S	7	E	W.M.	4	NW	NE	
3	S	7	E	W.M.	4	SW	NE	
3	S	7	E	W.M.	4	SE	NE	
3	S	7	E	W.M.	4	NE	NW	
3	S	7	E	W.M.	4	NW	NW	
3	S	7	E	W.M.	4	SW	NW	
3	S	7	E	W.M.	4	SE	NW	
3	S	7	E	W.M.	4	NE	SW	
3	S	7	E	W.M.	4	NW	SW	
3	S	7	E	W.M.	4	SW	SW	
3	S	7	E	W.M.	4	SE	SW	
3	S	7	E	W.M.	4	NW	SE	
3	S	7	E	W.M.	5	NE	NE	
3	S	7	E	W.M.	5	NW	NE	
3	S	7	E	W.M.	5	SW	NE	
3	S	7	E	W.M.	5	SE	NE	
3	S	7	E	W.M.	5	NE	SE	
3	S	7	E	W.M.	5	NW	SE	
3	S	7	E	W.M.	5	SW	SE	
3	S	7	E	W.M.	5	SE	SE	
3	S	7	E	W.M.	9	NE	NW	
3	S	7	E	W.M.	9	NW	NW	

PERMIT AMENDMENT

Located in Sections 4 & 5, T3S R7E W.M.
Clackamas County, Oregon



NOTES

1. This map was prepared for the purpose of identifying the location of water rights only and is not intended to provide legal dimensions or locations of property ownership lines.

LEGEND

1 — Existing Point of Appropriation.

2-6 — Additional Proposed Point of Appropriation.

Point of Appropriation Coordinates are Referenced to NE Corner of Section 5.

Certified Water Rights Examiner
419 WRE
DAVID J. NEWTON
JAN. 16, 1996
STATE OF OREGON

0' 1320' 2640'

SCALE: 1" = 1320'

NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Permit Amendment Map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
D.Newton	S.Schenck	Sept 2006	1036-101	1

G:\1000\1036\101\Cad\Water\W1036101_F1_PermAmdMp 09:41 09/15/2006 SS

8. ATTACHMENTS

Check each of the following attachments included with this application. The application will be returned if all required attachments are not included.

Form A – Evidence of Use Affidavits

☐ At least one Evidence of Use Affidavit documenting that the right has been used during the last five years or that the right is not subject to forfeiture under ORS 540.610 is attached. The affidavit provided must be the original, not a copy.

Form B – Instream Water Right Transfer

☐ Required for instream transfers only.

Map

☐ Permanent Water Right Transfer
The map must be prepared by a Certified Water Right Examiner and meet the requirements of OAR 690-380-3100 unless a waiver has been granted. The map provided must be the original, not a copy.

☑ Permit Amendment, Temporary Transfer, or Other Application
A map meeting the requirements of OAR 690-380-3100 must be included but need not be prepared by a Certified Water Right Examiner.

Evidence of Lien Holder Notification

☐ Copies of the written notification of the proposed transfer provided by the applicant to each lien holder, unless the water right has been quit claimed.

Recorded Deed

☐ Required for temporary transfers only.

Land Use Information Form:

☐ Enclosed

☐ Not Required if all of the following are met:
1. In EFU zone or irrigation district,
2. Change in place of use only,
3. No structural changes needed, including diversion works, delivery facilities, other structures, and
4. Irrigation only.

Water Well Reports/Well Logs:

☑ The application is for a change in point of appropriation or change from surface water to ground water and copies of all water well reports are attached.

☑ Water well reports are not available and a description of construction details including well depth, static water level, and information necessary to establish the ground water body developed or proposed to be developed is attached.

☐ The application is for a surface water transfer and water well reports are not required.

Fees:

☑ Amount enclosed: $ 350.00
See the Department's Fee Schedule at www.wrd.state.or.us or call (503) 986-0900.

9. SIGNATURES

I (we) understand that prior to approval of a permanent transfer and after issuance of a draft preliminary determination by the Department, I (we) must submit:

(1) A report on ownership and lien information prepared by a title company within the last three months if required under OAR 690-380-3000(13), and

(2) If I (we) are not the landowners, proof that the landowner or entity to which the water right has been quitclaimed consents to the transfer or that ownership information is not required.

I (we) affirm that the information contained in this application is true and accurate.

applicant signature	name (print)	date
	Michael Bowman	9/15/06

Before submitting your application, be sure you have:

- Answered each question completely.
- Included the required attachments.
- Provided original signatures for all named deed holders or other parties with an interest in the right.
- Included a check payable to the Oregon Water Resources Department for the appropriate amount.

(2) The permittee/appropriator shall install a meter or other measuring device suitable to the Director, and shall keep a complete record of water uses.

(3) The permittee/appropriator shall be responsible for complying with each of the following requirements for measuring water levels in the well.

(a) Use of water from a new well shall not begin until the initial water level in the well has been measured. A measurement of initial water level shall be made at the time a pump is installed, but before pumping begins.

(b) In addition to the measurement required in subsection (a) of this section, a water level measurement shall be made each year at the time of spring high water during the period March 15 through April 15.

(c) All water level measurements shall be made by a qualified individual. Qualified individuals include certified water rights examiners, licensed water well drillers, registered geologists, registered professional engineers, registered land surveyors, or the permittee/appropriator.

(d) Any qualified individual measuring a well shall use standard methods of procedure and equipment designed for the purpose of well measurement. The equipment used shall be well suited to the conditions of construction at the well. A list of standard methods of procedure and suitable equipment shall be available from the Department.

(e) The permittee/appropriator shall submit a record of the measurement to the Department on a form available from the Department. The record of measurement shall be received not later than 30 days from the date of measurement.

(4) The Department shall determine when any of the declines cited in section (1) are evidenced by the well measurement required in section (3).

Within one year from the date the Water Resources Commission adopts rules describing the schedules, standards and procedures for water conservation management plans by water suppliers, Salmon Valley Water Company shall submit a plan which is consistent with said rules.

Within one year of permit issuance, the Salmon Valley Water Company shall prepare a plan/timetable for the Water Resources Commission which shall indicate the steps which Salmon Valley Water Company intends to pursue to obtain a long-term water supply.

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Actual construction work shall begin on or before August 17, 1993, and shall be completed on or before October 1, 1995. Complete application of the water shall be made on or before October 1, 1996.

BC ext. 10-1-97

STATE OF OREGON

COUNTY OF CLACKAMAS

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

SALMON VALLEY WATER COMPANY
P.O. BOX 205
WELCHES, OREGON 97067

503-622-4083

to use the waters of ONE WELL in the SALMON RIVER BASIN for QUASI-MUNICIPAL USE.

This permit is issued approving Application G-12785. The date of priority is FEBRUARY 21, 1992. The use is limited to not more than 1.0 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the well.

The wells are located as follows:

SW 1/4 NW 1/4, SECTION 4, T 3 S, R 7 E, W.M.; 2205 FEET SOUTH AND 295 FEET EAST FROM NW CORNER, SECTION 4.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the proposed place of use under this permit is as follows:

SE 1/4
SECTION 32
NW 1/4 SW 1/4
S 1/2 SW 1/4
SW 1/4 SE 1/4
SECTION 33
TOWNSHIP 2 SOUTH, RANGE 7 EAST, W.M.

N 1/2
SW 1/4
NW 1/4 SE 1/4
SECTION 4
E 1/2
SECTION 5
N 1/2 NW 1/4
SECTION 9
TOWNSHIP 3 SOUTH, RANGE 7 EAST, W.M.

(1) Use of water from the well, as allowed herein, shall be regulated if the well displays:

(a) An average water level decline of three or more feet per year for five consecutive years; or

(b) A total water level decline of fifteen or more feet; or

(c) A hydraulic interference decline of fifteen or more feet in any neighboring well providing water for senior exempt uses or wells covered by prior rights.

CLAC
50441

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

(START CARD) # 80419

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number 344
Name Salmon Valley Water
Address P.O. Box 205
City Welches State OR. Zip 97067

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 100 ft.
Explosives used [ ] Yes [X] No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	22	bentonite	0	22	50
8	22	100				

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[ ] Other
Backfill placed from ____ ft. to ____ ft. Material ____
Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8	+2	100	1/4	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Final location of shoe(s) 100 under

(7) PERFORATIONS/SCREENS:
[X] Perforations Method air
[ ] Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
75	80	1/4	80	8		[X]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
300		100	1 hr.

Temperature of water 54 Depth Artesian Flow Found ____
Was a water analysis done? [ ] Yes By whom ____
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other ____
Depth of strata: ____

(9) LOCATION OF WELL by legal description:
County Clack. Latitude ____ Longitude ____
Township 3 N or S Range 7 E or W. WM.
Section 14 SW 1/4 NW 1/4
Tax Lot 4300 Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 150 yards off Welch Rd. on Routedge Rd.

(10) STATIC WATER LEVEL:
19 ft. below land surface. Date 4/1/96
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 50

From	To	Estimated Flow Rate	SWL
50	80	300	19

(12) WELL LOG:
Ground Elevation ____

Material	From	To	SWL
gravel/boulders clay	0	30	
sand/gravel gray	30	50	
gravel/bolders gray	50	80	19
clay/gravel gray	80	90	
sand/gravel gray	90	100	

APR 0 9 1996
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SALEM, OREGON

Date started 3/26/96 Completed 4/1/96

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number 1622
Signed ____ Date 4/2/96

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 663
Signed Rodney C. Eck Date 4/2/96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for beneficial use of water without waste. The water user is advised that new regulations may require use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Issued this date, AUGUST 17, 1992.

/s/ MARTHA O. PAGEL

Water Resources Department
Martha O. Pagel
Director

"B" Ext to: 10-1-2030

"C" Ext to: 10-1-2030

We know from prior hydrogeologic work that water levels in wells are subject to seasonal fluctuations. The following table provides available water level measurements with dates.

WELL IDENTIFICATION	STATIC WATER LEVEL		PUMPING WATER LEVEL	
Well Number 1	4-29-89 4-15-93	72.75 Feet 72.60 Feet	4-29-89	142.10 Feet
Well Number 2	4-29-89	70.00 Feet		
Well Number 3	-------	----------	-------	----------

Because all wells utilize submersible pumps, I did not attempt to obtain probe measurements. Probe measurement is typically not possible in a well with a submersible pump, due to probe entanglements in the conductor and column.

V. PUMPS AND MOTORS:

Three horsepower submersible pumps are utilized in wells 2 and 3. In each case, a galvanized steel column has been installed to the ground surface.

A 20 horsepower submersible pump is utilized in well number 1. The top of the pump is 164 feet below the top of the well casing. A 4-inch galvanized steel column has been installed to the ground surface. The pump was designed to deliver 250 gallons per minute at 240 feet of head.

The design discharge rate for well number 1 is 250 gpm into the irrigation system. The design discharge rate for wells number 2 and 3 is 50 gpm each, at open discharge to the storage lake. In both cases, I calculated the static lift and column friction losses, to estimate total dynamic head conditions. I then estimated the discharge capacity from well number 1 at 380 gpm and wells number 2 and number 3 at 85 gpm. These numbers do <u>not</u> compare closely with the design discharge rates, but demonstrate adequate capacity to pump the authorized diversion rate.

It is important to note that all wells were constructed in an alluvial aquifer, that is subject to seasonal recharge. The static water level is expected to fluctuate with the season of the year, with this period of the year being the expected lowest water level. As the water level declines, due to expected seasonal fluctuations, the well pump discharge rate will diminish. The final proof survey however, should be based upon the highest pumping water level, observed during development of the supply wells. In this case however, the authorized diversion rate is restricted by acres irrigated and not well pump capacity.

III. SOURCE:

The source, under permit G-11087, includes three groundwater wells located within golf course fairways. Three additional wells, located on the easterly 18-hole golf course, also provide irrigation water and serve other uses. The easterly 18-hole golf course, and the westerly 9-hole golf course, are inter-tied with 2-inch PVC main line piping under Welches Road. This inter-tie improves the efficiency of the underground irrigation system and dramatically improves the reliability of the entire irrigation system. Typically this inter-tie would only be utilized in an emergency, such as failure of a project pump.

The easterly 18-hole golf course is irrigated under permit G-11283 and certificate numbers 61983 and 7895.

Permit G-11087, includes irrigation and recreation as the only uses. It appears appropriate therefore to establish the acres of irrigated turf on the west 9-hole golf course, and the acres of surface water ponds and apply the specified maximum duty of 1/80 cfs per acre. It is also necessary to determine the total maximum pumping rate from the three wells on the west 9-hole golf course, and complete a comparison of the actual beneficial use of the water to the original permit stipulations. The capacity of the irrigation booster pump, drawing water from the storage ponds must equal or exceed the well pump capacity. The final water right certificate will be restricted to 1) the actual quantity of water beneficially utilized in conformance with the permit, or 2) the total quantity of water allowed under the original permit, whichever is less.

IV. DIVERSION POINTS:

As noted, three groundwater wells are included under permit G-11087. Well number 3 was constructed to a total depth of 138 feet below the ground surface. 6-5/8-inch diameter casing was installed to 128 feet. At the time of well construction the static water level was measured at ±70 feet.

Well number 2 was constructed to 154 feet and 6-5/8 inch steel casing installed to 154 feet. The static water level at the time of construction was ±70 feet.

Well number 1 was constructed by Staco Well Services Inc. in April and May, 1989. Well number 1 included an 18-inch diameter bore to a depth of 32 feet and a ±12-inch diameter bore to a total depth of 217 feet. 12-inch diameter casing was installed to 177 feet and a 10-inch diameter liner was installed to 177 feet. A screen was installed from 177 feet to 217 feet. A&H Pump Service completed a test pumping on April 29, 1989. Generally, A&H Pump recorded a draw down of 70 feet after 42 hours of pumping at a rate of 250 gpm. Pump test results for well number 1 are enclosed. The static water level at the start of the test was 72 feet 9 inches.

Wells 1 and 2 were equipped with air lines and I completed water level measurements during my site inspection. Well number 1 was not running, but had been operated for approximately 12 hours, the night before. A static water level of 100 feet was measured on a direct reading gage, after pumping air into the air tube. Well number 2 had been off for approximately 30 days, but would have been influenced by well number 1 due to the close proximity. A static water level of 90 feet was measured using the same procedure. There was no air tube in well number 3.

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Fax (503) 388-4229
• Planning
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• Landscape Architecture

EDWIN A. HOPPER
THE RESORT AT THE MOUNTAIN
FOX GLOVE GOLF COURSE
FINAL PROOF SURVEY - PERMIT G-11087
WELL AND BOOSTER PUMP DIVERSION RATE CALCULATIONS

① WELL NUMBER ONE - 20 HP SUBMERSIBLE

DESIGN FLOW RATE: 250 gpm at 240 Ft TDH
PUMP SET CONDITIONS:
164 LINEAL FEET (LF) 4" GALVANIZED STEEL PIPE
PUMPING WATER LEVEL: ±142 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 225 GPM)

VERTICAL LIFT: 142 Ft
H_f 164 LF 4" G.S. PIPE: 7.7 Ft
H_f 67 LF 4" PVC PIPE: 3.1 Ft
MISC. MINOR LOSSES: 3.0 Ft
ESTIMATED TDH: 156 Ft

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33{,}000)(Hp)(Ep)}{W \quad h} = \frac{(33{,}000)(20)(.75)}{(8.34)(156)} = 380 \text{ gpm}$$

CONCLUSION: PUMP CLEARLY HAS CAPACITY TO MEET THE SPECIFIED DIVERSION RATE. THROTTLING OF THE PUMP WILL BE REQUIRED TO RESTRICT THE PUMPING RATE TO THE AUTHORIZED DIVERSION RATE.

② WELLS NUMBER TWO AND THREE: - 3 HP SUBMERSIBLE
DESIGN FLOW RATE: 50 GPM AT 120 FT TDH
PUMP SET: 110 TO 120 FT 2 INCH GALVANIZED STEEL COLUMN
PUMPING WATER LEVEL: ± 100 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 50 GPM)

VERTICAL LIFT: 100 FT
H_f 120 LF 3" G.S. PIPE: 1.5
H_f 100 LF 3" PVC PIPE: 1.2
MISC LOSSES: 2.0
ESTIMATED TDH: 105 FT

As noted, wells 1 and 2 discharge directly to the storage pond on fairway number five, located in the NW1/4 NE1/4 and the SW1/4 NE1/4 of Section 5. Well 3 discharges into the pond on fairway number seven, located in the SW1/4 NE1/4 of Section 5. Excess water from the fairway seven pond runs through a surface ditch to the fairway number five pond. A centrifugal pump on the lower fairway number five pond pumps into the irrigation main line system. The centrifugal repump station must have a capacity equal to or greater than the final proof diversion rate to assure water can be beneficially utilized.

The centrifugal pump is a single 60 horsepower Gould Century pump and motor. The pump name plate had been removed and The Resort at the Mountain personnel had no record of pump model numbers or characteristic curves. Utilizing standard horsepower/discharge formulas, I calculated a capacity of 880 gpm, which exceeds the water right diversion rate, as expected. Calculations are attached. Typically, water from wells is stored during the day and then pumped from storage ponds at night, at a higher rate, to prevent irrigation impacts on golf play.

VI. PIPE:

Construction record drawings for The Resort at the Mountain golf course irrigation system are not readily available. Golf course maintenance personnel however indicated 2-inch to 6-inch diameter main line pipe has been installed down all fairways. I have estimated approximately 18,000 lineal feet of main line has been installed on the golf course for irrigation.

VII. USES:

As noted, uses observed during my site inspection include irrigation and recreation. The extent of these uses were determined from high quality aerial photography.

During my site inspection I walked each golf course fairway with Mr. Edwin Hopper and golf course personnel. I marked the limits of irrigation, on the aerial map, throughout the project. Typically, the limits of irrigation were determined by the edge of maintained turf. The maintained turf typically transitioned into native brush and vegetation. The brush line was typically accepted as the limits of beneficial use. In some cases, permanent set irrigation sprinklers did not reach to the limits of the maintained turf. Mr. Tony Lasher however, demonstrated irrigation of those areas with hoses and sprinklers, attached to the irrigation system at quick couplers.

Similarly, I compared surface water ponds in the field to the aerial photography and found the aerial photography to be very accurate. The total acreage for surface water ponds was then digitized from the aerial maps.

The following table documents the results of area calculations for both the irrigation and recreation uses on the Fox Glove golf course. All use is within Sections 4 and 5, Township 3 South, Range 7 East, Willamette Meridian.

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(2) WELLS NUMBER TWO AND THREE - CONTINUED

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33{,}000)(Hp)(E_p)}{w \quad h} = \frac{(33{,}000)(3)(.75)}{(8.34)(105)} = 85 \text{ gpm}$$

CONCLUSION: EACH WELL PUMP SHOULD BE CAPABLE OF PROVIDING 50 TO 80 gpm.

(3) LAKE BOOSTER PUMP - 60 HP CENTRIFICAL PUMP

FRICTION LOSS AND TDH CALCULATION

SUCTION LIFT: 1.5 FT
DISCHARGE PRESSURE: 80PSI ⇒ 185 FT
MISC LOSSES: ± 2.0 FT
ESTIMATED TDH: 189 FT

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{33{,}000 \quad Hp \quad Ep}{w \quad h} = \frac{(33{,}000)(60)(.70)}{(8.34)(189)} = 880 \text{ gpm}$$

CONCLUSION: THE CENTRIFICAL PUMP HAS ADEQUATE CAPACITY TO RE-PUMP THE AUTHORIZED DIVERSION. THE CENTRIFICAL PUMP WOULD NORMALLY OPERATE AT NIGHT ONLY, BY DRAWING STORED WATER FROM PONDS

Project: THE RESORT AT THE MTN. PERMIT G-11087 Date: 9-27-93 Sheet No. 2 of 2
Prepared by: JAW Checked by: Job No: 345-02-01

NEWTON CONSULTANTS INC.

August 25, 2006
Project No. 1036-101

Mr. Mike Bowman, President
Salmon Valley Water Company
P.O. Box 205
Welches, OR 97067

WATER SUPPLY DEVELOPMENT
HYDROGEOLOGIC FEASIBILITY OF ADDING ADDITIONAL WELLS AS POINTS OF APPROPRIATION; PERMIT G-11534

Dear Mr. Bowman:

This document presents the results of a preliminary review of geologic and hydrogeologic data in the area of the Salmon Valley Water Company (SVWC) Well No. 50441, Well No. 3 owned by RRR Golf, Inc. (RRR) and the site of a new well proposed by RRR, near Welches, Oregon. The location of the review area and wells is shown on Figure 1. The purpose of the review was to investigate the possibility that the SVWC Well No. 50441, RRR Well No. 3 and proposed RRR well withdraw water from a source aquifer system common to all three wells. If this possibility exists, it could then be possible to add the RRR wells as additional points of appropriation under a SVWC ground water permit. This, in turn, provides a timely method to help the SVWC maintain pace with water needs of new development within its service area.

The SVWC currently holds five ground water permits for quasi-municipal use. Ground water permits presently held by the SVWC are summarized below.

PERMIT NO.	MAX RATE (CFS)	USE	PRIORITY DATE
G-11335	0.37	Quasi-Municipal	06/03/1991
G-11422	0.50	Quasi-Municipal	10/03/1991
G-11534	1.0	Quasi-Municipal	02/21/1992
G-13176	0.501	Quasi-Municipal	03/13/1996
G-15209	0.334	Quasi-Municipal	03/27/2001
TOTAL	**2.705**		

Ground water is used to supply needs of the SVWC's present customer base, consisting of approximately 800 service connections in the Welches area. The quasi-municipal permits authorize a total maximum combined appropriation rate of 2.705 cubic feet per second (cfs). However, yield limitations and iron, in some cases, restrict the actual total peak pumping rate to about 0.8 cfs (360 gpm), substantially less than the authorized maximum rate. The SVWC customer base is growing rapidly and additional capacity is needed soon to maintain pace with water demand for new development in the SVWC service area.

52nd SW 6th Street, Suite 100 ■ Redmond, Oregon 97756 ■ 541 504-9960 ■ fax 541 504-9961 ■ www.newtonconsultants.com

A practical and relatively expeditious solution for additional capacity is being developed collaboratively between the SVWC and RRR. This arrangement would allow SVWC use of the RRR Well No. 3 associated with RRR water right permit G-11087 and a new well proposed by RRR to keep pace with new demand. This arrangement would require amendment of a SVWC permit, or permits, to include RRR well No. 3 and the new proposed well as additional points of appropriation. Evaluation of opportunities for this arrangement indicates that the SVWC permit G-11534 is a more practical choice. Permit G-11534 authorizes a maximum appropriation of 1 cfs (449 gallons per minute) for quasi-municipal use from Well No. 50411 located at:

> SW ¼ NW ¼, Section 4, T 3S, R 7 E, W.M.' 2205 feet south and 295 feet east from NW corner, Section 4.

The approximate location of Well No. 50441, other SVWC wells and RRR wells are shown on Figure 2. The maximum achievable pumping rate from well No. 50441 is approximately 130 gpm. The proposed amendment to SVWC permit G-11534 adding additional points of appropriation will allow SVWC to more fully develop its maximum permit rate of 449 gpm and respond to increasing demand in a time and cost-effective manner. A regulatory provision for such permit amendments is that the involved wells withdraw water from the same source aquifer system as those existing wells approved under the permit.

The purpose of this review was to determine if hydraulic continuity exists between SVWC Well No. 50441 associated with ground water permit G-11534, RRR well No. 3 associated with RRR ground water permit G-11087 and the new well proposed by RRR (Figure 2). A key objective for the proposed new well is that it is completed in the same source aquifer system as SVWC Well No. 50441 and RRR Well No. 3.

Results from our study indicate that RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from the same source alluvial aquifer system. Evaluation of well log data also shows the proposed new well at the location shown on Figure 2 will also withdraw water from the same source alluvial aquifer system. The aquifer is an alluvial system between the Salmon and Sandy Rivers. The ground water flow diagram on Figure 2 illustrates the approximate ground water elevations.

The location of the proposed well shown in Figure 2, if completed in the same source aquifer system as RRR well No. 3 would also draw from the same source aquifer system as SVWC well No. 50441.

METHODS

A previous Kleinfelder report completed in September, 2005, in connection with well exploration was reviewed to avoid duplication of services. Well logs for RRR wells, SVWC wells and wells within a half mile of RRR well No. 3 and proposed new well were obtained from the Oregon Water Resources Department (OWRD). These logs were used to gather information on geology, water levels and yields in area wells.

Available Oregon Water Resources Department (OWRD) well log data and piezometric information from a previous Newton investigation and ModFlow model analysis of stream depletion potential by wells for RRR in 1989 were used to develop a generalized ground water elevation diagram as shown on Figure 2. The diagram reflects the differences in ground water elevations as one moves down the valley.

Well log data was also used to generate two cross sections. Cross section A-A' runs longitudinal down the valley and passes through SVWC and RRR wells. Cross section B-B' runs laterally across the valley and passes through the proposed new well location. Well locations and both cross section locations are shown on Figure 3.

FINDINGS

Geologic information gathered from driller's logs indicated that the valley floor is underlain with an alluvial aquifer system comprised of stream deposits and glacial till in mixed beds of sands, gravels, boulders and clays to depths of approximately 200-230 ft below the surface. Geologic cross sections A-A' and B-B' are shown in Figures 4 and 5. This alluvium is underlain by volcanic mudflows, lavas, tuffs, volcanic breccias, cobbly conglomerates and occasional non-carbonized woody materials generally believed to be part of the Sardine Formation.

Cross section A-A' (Figure 4) shows that the majority of the wells in the valley are completed in the alluvial deposits consisting of inter-bedded layers of sand, gravel, clay and conglomerates. Clay and ash lenses which act as local confining layers and partial boundaries to groundwater flow are considered semi-continuous longitudinally down the valley. One such clay lens appears to run semi-continuously through locations of all RRR wells No. 1, 2 and 3 and SVWC well No. 50441. This clay lens which is approximately 10-20 feet thick ranges in depths from 100-120 feet below the surface to 60-80 feet below the surface.

Cross section B-B' (Figure 5) shows very similar deposits as those shown in cross section A-A' (Figure 4). A lateral clay lens appears to lay in a partially continuous manner across the valley, varying in thickness from approximately 10-30 feet. The assumption is made that the clay lens is continuous between Welches Road and Highway 26 (Figure 4). However, no driller's logs were available for wells completed deeper than 50 feet below the surface between Welches Road and Highway 26.

Depth to first water and static water levels were recorded by well constructors. These water levels were also plotted on cross section A-A' and B-B' (Figure 4 and 5). In some cases first water is found deeper than static water level. This disparity in water levels suggests a certain

amount of confinement in the alluvial system. In other cases only static water levels are recorded. A few wells have also shown static water levels to be lower than first water levels. This could be explained by the presence of localized shallow perched water tables.

When looking at cross section A-A', it is apparent that static water levels in the RRR wells No. 1 through No. 3 are lower than those found in the SVWC well No. 50441. This can be explained by the fact that the overall ground water elevation between these wells changes depending on location within the alluvial valley. This is illustrated on the ground water elevation diagram of Figure 2. Ground water elevations are highest in the center of the valley between the Sandy and Salmon Rivers and lower in the proximity of the rivers near the outside edges of the valley. The ground water elevation contours on the diagram illustrate ground water flow in the downstream direction, along the longitudinal centerline of the valley and toward each river flanking the valley. The ground water elevation difference between SVWC well No. 50441 and the RRR wells No. 1 through 3 is approximately 50'. When these ground water elevations are plotted on a vertical 2 dimensional surface as they are plotted in Figure 4, it could appear as if the water table is not continuous. However Figure 2 shows that static water levels of wells along cross section A-A' will vary depending on where they intersect the cross section and where they are located laterally across the valley.

Review of geologic and hydrogeologic information indicates that the aquifer in the valley surrounding the RRR site is an alluvial aquifer system, unconfined, to partially-confined, with laterally discontinuous lenses of clay, tuffacaceous or ash materials. One such lens appears to underlay RRR wells No. 1 through 3 and SVWC well No. 50441. Driller's logs for RRR well No. 1 and SVWC well No. 50441 also indicate that the wells are all completed below this clay lens. We have also noted that the highest pumping rates (100-300 gallons per minute) are recorded on driller's logs for wells completed below this clay layer. Despite the partially-confined nature of the aquifer system in the valley and the presence of potential localized perched ground water tables, ground water elevations recorded by driller's logs do indicate a relatively continuous gradient in water levels with general direction of flow toward either the Sandy or Salmon Rivers (Figure 2).

CONCLUSIONS

Based on the information provided above, RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from a common source aquifer system that is partially-confined by a layer of clay or tuffaceous material that could be continuous between the wells. The location of the proposed well shown on Figure 3, if completed to similar depths and similar geologic materials as RRR well No. 3 would draw from the same source aquifer system as both RRR well No. 3 and SVWC well No. 50441.

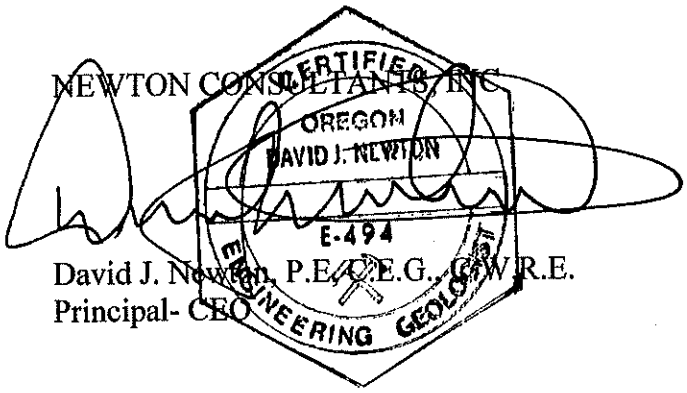
We appreciate the opportunity to be of service to Salmon Valley Water Company. Please call me if you have any questions concerning this report.

Sincerely,

NEWTON CONSULTANTS, INC.

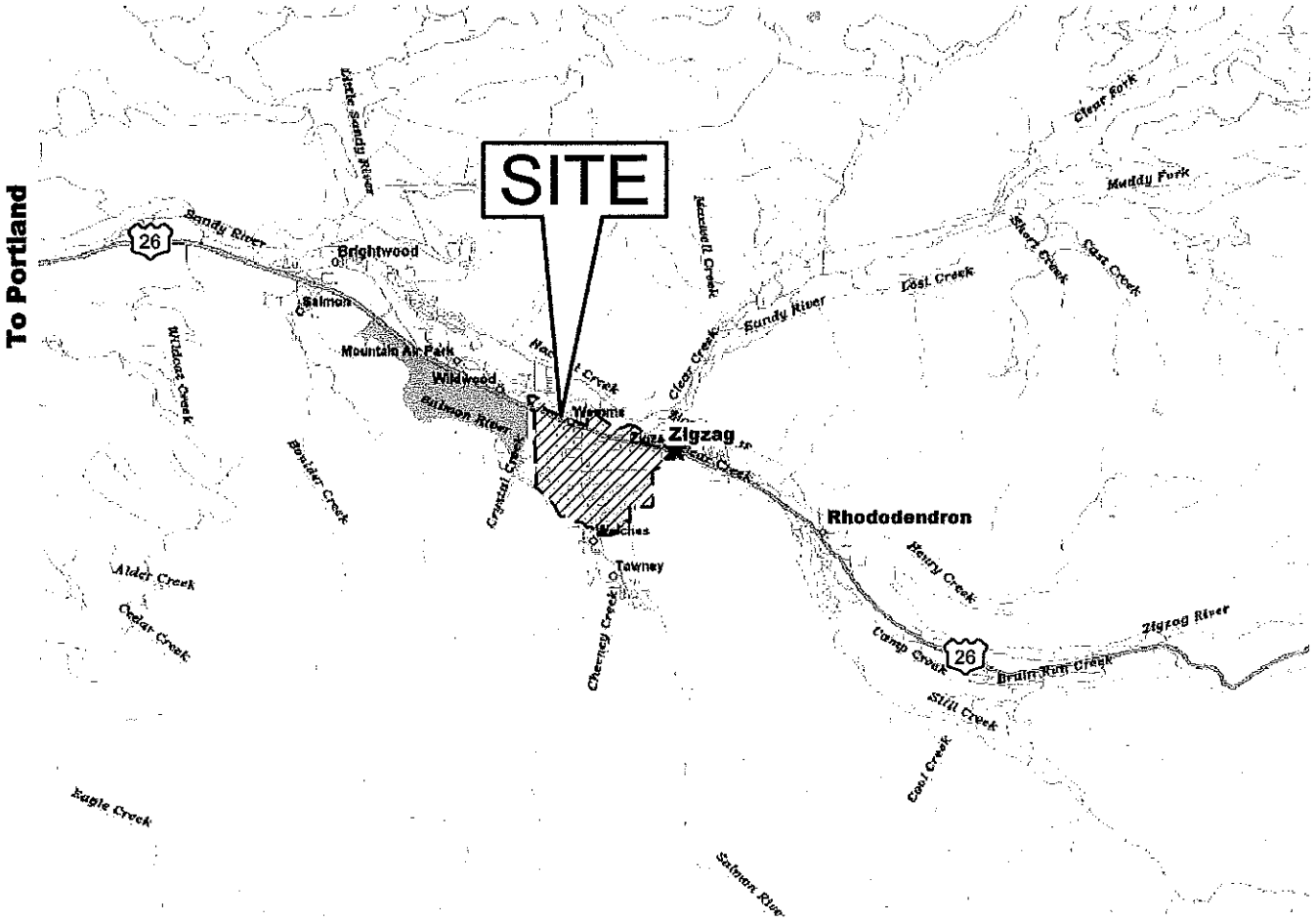
Mathias Perle
Hydrologic / Engineering Technician

NEWTON CONSULTANTS, INC.



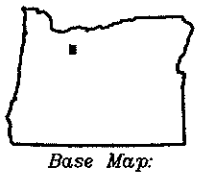
David J. Newton, P.E., C.E.G., C.W.R.E.
Principal- CEO

Cc: Ed Hopper, RRR Golf, Inc.



0' 2 Mile 4 Mile

SCALE: 1" = 2 Miles



Base Map:
Map Qwest Street Atlas USA

NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Vicinity map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
M.Perle	S.Schenck	Sept 2006	1036-101	1

G:\1000\1036\101\Cad\Water\W1036101_F1_VicMap 11:54 07/20/2006 SS

Oregon
Theodore R. Kulongoski, Governor

Water Resources Department
North Mall Office Building
725 Summer Street NE, Suite A
Salem, OR 97301-1266
503-986-0900
FAX 503-986-0904

October 13, 2006

SALMON VALLEY WATER CO.
PO BOX 205
WELCHES OR 97067

Reference: Permit Amendment Transfer 10240

On September 18, 2006 we received your request for permit amendment additional point of appropriation for use of water from A WELL, tributary to SALMON RIVER. The application was accompanied by $350. Our receipt 84156 is enclosed.

By copy of this letter, we are asking the Watermaster for his report regarding the potential for injury to existing water rights which may be caused by the change.

Except as provided under ORS 540.510(3) for municipalities, you may not use water in the new place of use, or from the new point of appropriation, until 60 days after we received your notice (application) and the permit amendment has been approved.

We will notify you if additional information or corrections to the application or map are required.

If you have any questions, please call the Transfer Section, (503)986-0900.

cc: Watermaster **#20**
David Newton, CWRE
Groundwater
Ed Hopper
Daniel & Melinda Minch
Robert & Margaret Thurman
Clackamas County, Administration

enclosure

PUBLIC NOTICED ON 10/17/2006

County:	CLACKAMAS
Transfer:	10240
Water Right:	PERMIT G 11534
Priority Date:	02/21/1992
Name:	SALMON VALLEY WATER CO
Address:	PO BOX 205; WELCHES OR 97067
Change:	APOA
Source:	WELL
Authorized APOA:	T3S R7E 4
Proposed APOA:	T3S R7E 5

3. TYPE OF CHANGE PROPOSED

Please check all that apply

Point of Diversion or Appropriation	Place of Use	Character of Use (n/a for Permit Amendments)
☐ Change (The old point of diversion or appropriation will **not** be used for the portion of the water right affected by the transfer.) ☑ Additional (Both the old and new points of diversion or appropriation will be used for the portion of the water right affected by the transfer.) ☐ Historic Point of Diversion (Unauthorized point of diversion used for more than 10 years.) ☐ Surface Water to Ground Water (A new point of appropriation will be used **instead of** the old point of diversion and not as an additional point of appropriation.)	☐ All, or a portion, of the right will be exercised at a different location than currently authorized. (Use of water at the current location will be discontinued.) ☐ Exchange (Water from another source will be used in exchange for supplying an equal amount of replacement water to that source.)	Proposed new use: ☐ Irrigation ☐ Municipal ☐ Quasi-municipal ☐ Commercial ☐ Industrial ☐ Instream (complete **Supplemental Form B**) ☐ Domestic (indicate number of households) _____ ☐ Other _____ ☐ Substitution (A supplemental ground water right will be substituted for a primary surface water right.)

Reason for changes: Well yield limitations restrict actual peak pumping rate to 0.29 cfs (130 gpm). New points of appropriation are proposed in order to more fully develop Permit G-11534

Describe the ***current*** water delivery system. Include information on the pumps, canals, pipelines and sprinklers used to divert, convey and apply the water at the authorized place of use.

The description must be sufficient to demonstrate that the full quantity of water to be transferred can be conveyed from the authorized source and applied at the authorized location and that the applicant is ready, willing, and able to exercise the right. (Not applicable to applications for Permit Amendments.)

N/A

System capacity: 0.29 cubic feet per second (cfs)

*Attach one or more **Evidence of Use Affidavits** (Supplemental Form A) demonstrating that each of the right(s) involved in the transfer have been exercised in the last five years or that a presumption of forfeiture for non-use could be rebutted. (Not applicable to applications for Permit Amendments.)*

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900
www.wrd.state.or.us

Application for Water Right
Transfer

Please type or print legibly in dark ink. If your application is incomplete or inaccurate, we will return it to you. If any requested information does not apply to your application, insert "n/a". Please read and refer to the instructions when completing your application. A summary of review criteria and procedures that are generally applicable to these applications is available at www.wrd.state.or.us/publication/reports/index.shtml.

APPLICATION FOR:

Please check one

☐ Water Right Transfer	☐ Temporary Transfer	☐ Drought Transfer
☐ Historic Change in POD	(number of years _____)	☐ Point of Diversion Change
☐ To Instream Use	☑ Permit Amendment	Due to Government Action
☐ Other Transfer		

1. APPLICANT INFORMATION

Name: Salmon Valley Water Company - Michael Bowman
(First / Last)

Address: PO Box 205

Welches (City) | Oregon (State) | 97067 (Zip)

Phone: 503-622-4083 (Work)

*Fax: _____ (Home) *E-Mail address: bowman.michael@verizon.net (Other)

**Optional information*

2. AGENT INFORMATION

(The agent listed is authorized to represent the applicant in all matters relating to this transfer application)

Name: David J. (First) Newton (Last)

Address: 521 SW 6th Street, Suite 100

Redmond (City) | Oregon (State) | 97756 (Zip)

Phone: 541-504-9960 (Work)

*Fax: 541-504-9961 (Home) *E-Mail address: dnewton@newtonconsultants.com (Other)

**Optional information*

T 10240

Certificate Number or other identifying number from ***Page 3***: G-11534

*A separate page providing the following information must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Is the entire water right identified on ***Page 3*** affected by this transfer? ☐ Yes ☑ No

*If "**Yes**", the remainder of **this page** need **not** be completed.*
*If "**No**", the following information **must be provided** only for those points of diversion/appropriation and places of use that are **involved in the transfer**.*

Government lot and donation land claim numbers must be included in the tables below only if the information is reflected on the existing water right.

Location of Existing Authorized Point(s) of Diversion or Appropriation to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
3	S	7	E	W.M.	4	SW NW		2205 feet South & 295 feet East from NW Corner, Section 4

Location of Existing Authorized Place of Use to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					No	Change In	Place of	Use

4. CURRENT WATER RIGHT INFORMATION

*A separate page providing the information in this section must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Water Right Subject to Transfer (check and complete **one** of the following):

☐	Certificated Right	Certificate Number	Permit Number or Decree Name
☐	Adjudicated, Un-certificated Right	Name of Decree	Page Number
☐	Permit for which Proof has been Approved	Permit Number	Date Claim of Beneficial Use Submitted
☐	Transferred Right for which Proof has been Filed	Previous Transfer Number	Date Claim of Beneficial Use Submitted
☑	Permit for which an Amendment is Requested	G-11534 Permit Number	10/01/2030 Completion Date of Permit

Name on Permit, Certificate, or Decree: Salmon Valley Water Company

County: Clackamas Authorized Use(s): Quasi-Municipal

Are there multiple **Priority Dates** identified on the water right? ☐ Yes ☑ No

*If "**Yes**", any information provided on **Page 4 must** identify which priority date is associated with each of the proposed points of diversion/appropriation and places of use. In addition, list those priority dates:* _____

Source(s) of Water Listed on Right: Ground Water

Tributary to: Salmon River Basin

Are there other **Sources** listed on the water right? ☐ Yes ☑ No

*If "**Yes**", any information provided on **Page 4 must** identify which source is associated with each of the proposed points of diversion/appropriation and proposed places of use. In addition, list those other sources:* _____

Are there **Other Water Rights** or permits associated with this land? ☑ Yes ☐ No

*If "**Yes**", what are the Permit or Certificate Numbers?* G-11335, G-11422, G13176, G-15209, 61982

Pursuant to ORS 540.510, any right that is supplemental to a primary right proposed for transfer must be included in the transfer or be cancelled.

Remarks: Certificate 61982 is for both irrigation and domestic use. Other listed permits are for Quasi-Municipal use.

5. PROPOSED CHANGES TO THE WATER RIGHT

Certificate Number or other identifying number : G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Section	Qtr160	Qtr40	Gov't Lot or DLC	Survey Coordinates
3	S	7	E	W.M.	5	NW	NE		1270 ft south and 1554 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	NW	NE		210 ft south and 2360 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		2046 ft south and 1260 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		2580 ft south and 845 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		1822 ft south and 60 feet west from NE corner, Section 5

Note: proposed POA No. 2 (see map) is existing Resort at Mountain well No. 3. Data on the well is attached

Location of Proposed Place of Use:

Township		Range		Mer	Section	1/4 1/4 Section		Gov't Lot or DLC
2	S	7	E	W.M.	32	NE	SW	
2	S	7	E	W.M.	32	NW	SE	
2	S	7	E	W.M.	32	SW	SE	
2	S	7	E	W.M.	32	SE	SE	
2	S	7	E	W.M.	33	SW	SW	
2	S	7	E	W.M.	33	SE	SW	
2	S	7	E	W.M.	33	SW	SE	
3	S	7	E	W.M.	4	NE	NE	
3	S	7	E	W.M.	4	NW	NE	
3	S	7	E	W.M.	4	SW	NE	
3	S	7	E	W.M.	4	SE	NE	
3	S	7	E	W.M.	4	NE	NW	
3	S	7	E	W.M.	4	NW	NW	
3	S	7	E	W.M.	4	SW	NW	
3	S	7	E	W.M.	4	SE	NW	
3	S	7	E	W.M.	4	NE	SW	
3	S	7	E	W.M.	4	NW	SW	
3	S	7	E	W.M.	4	SW	SW	
3	S	7	E	W.M.	4	SE	SW	
3	S	7	E	W.M.	4	NW	SE	
3	S	7	E	W.M.	5	NE	NE	
3	S	7	E	W.M.	5	NW	NE	
3	S	7	E	W.M.	5	SW	NE	
3	S	7	E	W.M.	5	SE	NE	
3	S	7	E	W.M.	5	NE	SE	
3	S	7	E	W.M.	5	NW	SE	
3	S	7	E	W.M.	5	SW	SE	
3	S	7	E	W.M.	5	SE	SE	
3	S	7	E	W.M.	9	NE	NW	
3	S	7	E	W.M.	9	NW	NW	

5. PROPOSED CHANGES TO THE WATER RIGHT

A separate page providing the information in this section must be completed for ***each*** *certificate, permit, decree, or other right involved in the proposed transfer.*

Certificate Number or other identifying number from ***Section 4***: G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
								See Attached Form

Attach additional copies as necessary to describe locations of other proposed points of diversion or appropriation. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Location of Proposed Place of Use:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					SEE	ATTACHED	FORM	

Attach additional copies as necessary to describe locations of other proposed places of use. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Remarks: _____

7. LAND OWNERSHIP

Does the applicant own the lands TO which the right is being transferred? NO
If "NO" provide the following information:

Names of receiving Landowner(s):

Ed Hopper
68010 East Fairway Avenue
Welches, OR 97067

Daniel G. Minch and Melinda K. Minch
25325 E Welches Road
Welches, OR 97067

Daniel G. Minch and Melinda K. Minch
P.O. Box 265
Rhododendron, OR 97049

Robert W. Thurman and Margaret A. Thurman
P.O. Box 65
Welches, OR 97067

6. AFFECTED DISTRICTS AND LOCAL GOVERNMENTS

Are any of the water rights proposed for transfer located within or served by an irrigation or other water district? ☑ Yes ☐ No

Will any of the water rights be located within or served by an irrigation or other water district after the proposed transfer? ☑ Yes ☐ No

Is water for any of the rights supplied under a water service agreement or other contract for stored water with a Federal agency? ☐ Yes ☑ No

*If "**Yes**", for any of the above, list the name and mailing address of the district and/or agency:*

Salmon Valley Water Company
PO Box 205
Welches, Oregon 97067

List the name and mailing address of all affected local governments (e.g., county, city, municipal corporation, and tribal governments within whose jurisdiction the rights are located).

Clackamas County-Administration; 2051 Kaen Road; Oregon City, OR 97045

7. LAND OWNERSHIP

Does the applicant own the lands **FROM** which the right is being transferred? ☐ Yes ☐ No
*If "**No**", provide the following information. For Temporary Transfers, also include a notarized statement granting consent to the transfer from each of the landowners:*

Names of Current Landowner(s): N/A (Permit amendment. Not a Transfer)
First Last

Address: _____

City State Zip

Does the applicant own the lands **TO** which the right is being transferred? ☐ Yes ☑ No
*If "**No**", provide the following information:*

Names of Receiving Landowner(s): SEE ATTACHED FORM
First Last

Address: _____

City State Zip

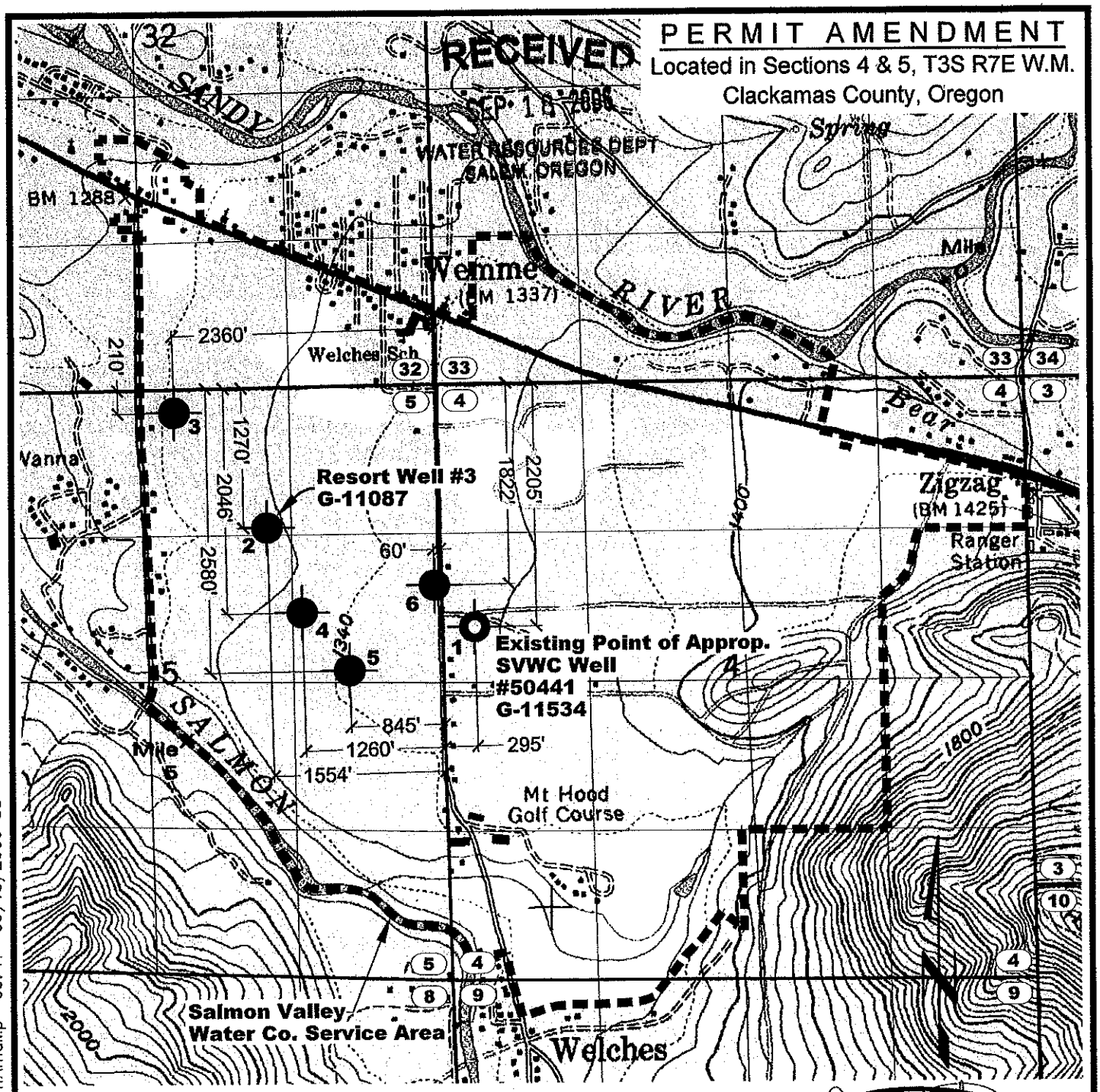
Check one of the following:

☐ The receiving landowner will be responsible for completion of the proposed changes after the final order is issued. All notices and correspondence should be sent to this landowner.

☑ The applicant will remain responsible for completion of changes. Notices and correspondence should continue to be sent to the applicant and applicant's agent.

PERMIT AMENDMENT

Located in Sections 4 & 5, T3S R7E W.M.
Clackamas County, Oregon



NOTES

1. This map was prepared for the purpose of identifying the location of water rights only and is not intended to provide legal dimensions or locations of property ownership lines.

LEGEND

1 — Existing Point of Appropriation.

2-6 — Additional Proposed Point of Appropriation.

Point of Appropriation Coordinates are Referenced to NE Corner of Section 5.

Certified Water Rights Examiner
#19 WRE
DAVID J. NEWTON
JAN. 16, 1996
STATE OF OREGON

0' 1320' 2640'

SCALE: 1" = 1320'

NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Permit Amendment Map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
D.Newton	S.Schenck	Sept 2006	1036-101	1

G:\1000\1036\101\Cad\Water\W1036101_F1_PermAmdMp 09:41 09/15/2006 SS

8. ATTACHMENTS

Check each of the following attachments included with this application. The application will be returned if all required attachments are not included.

Form A – Evidence of Use Affidavits

☐ At least one Evidence of Use Affidavit documenting that the right has been used during the last five years or that the right is not subject to forfeiture under ORS 540.610 is attached. The affidavit provided must be the original, not a copy.

Form B – Instream Water Right Transfer

☐ Required for instream transfers only.

Map

☐ Permanent Water Right Transfer
The map must be prepared by a Certified Water Right Examiner and meet the requirements of OAR 690-380-3100 unless a waiver has been granted. The map provided must be the original, not a copy.

☑ Permit Amendment, Temporary Transfer, or Other Application
A map meeting the requirements of OAR 690-380-3100 must be included but need not be prepared by a Certified Water Right Examiner.

Evidence of Lien Holder Notification

☐ Copies of the written notification of the proposed transfer provided by the applicant to each lien holder, unless the water right has been quit claimed.

Recorded Deed

☐ Required for temporary transfers only.

Land Use Information Form:

☐ Enclosed

☐ Not Required if all of the following are met:
1. In EFU zone or irrigation district,
2. Change in place of use only,
3. No structural changes needed, including diversion works, delivery facilities, other structures, and
4. Irrigation only.

Water Well Reports/Well Logs:

☑ The application is for a change in point of appropriation or change from surface water to ground water and copies of all water well reports are attached.

☑ Water well reports are not available and a description of construction details including well depth, static water level, and information necessary to establish the ground water body developed or proposed to be developed is attached.

☐ The application is for a surface water transfer and water well reports are not required.

Fees:

☑ Amount enclosed: $ 350.00
See the Department's Fee Schedule at www.wrd.state.or.us or call (503) 986-0900.

9. SIGNATURES

I (we) understand that prior to approval of a permanent transfer and after issuance of a draft preliminary determination by the Department, I (we) must submit:

(1) A report on ownership and lien information prepared by a title company within the last three months if required under OAR 690-380-3000(13), and

(2) If I (we) are not the landowners, proof that the landowner or entity to which the water right has been quitclaimed consents to the transfer or that ownership information is not required.

I (we) affirm that the information contained in this application is true and accurate.

applicant signature	name (print)	date
	Michael Bowman	9/15/06
applicant signature	name (print)	date

Before submitting your application, be sure you have:

- Answered each question completely.
- Included the required attachments.
- Provided original signatures for all named deed holders or other parties with an interest in the right.
- Included a check payable to the Oregon Water Resources Department for the appropriate amount.

(2) The permittee/appropriator shall install a meter or other measuring device suitable to the Director, and shall keep a complete record of water uses.

(3) The permittee/appropriator shall be responsible for complying with each of the following requirements for measuring water levels in the well.

(a) Use of water from a new well shall not begin until the initial water level in the well has been measured. A measurement of initial water level shall be made at the time a pump is installed, but before pumping begins.

(b) In addition to the measurement required in subsection (a) of this section, a water level measurement shall be made each year at the time of spring high water during the period March 15 through April 15.

(c) All water level measurements shall be made by a qualified individual. Qualified individuals include certified water rights examiners, licensed water well drillers, registered geologists, registered professional engineers, registered land surveyors, or the permittee/appropriator.

(d) Any qualified individual measuring a well shall use standard methods of procedure and equipment designed for the purpose of well measurement. The equipment used shall be well suited to the conditions of construction at the well. A list of standard methods of procedure and suitable equipment shall be available from the Department.

(e) The permittee/appropriator shall submit a record of the measurement to the Department on a form available from the Department. The record of measurement shall be received not later than 30 days from the date of measurement.

(4) The Department shall determine when any of the declines cited in section (1) are evidenced by the well measurement required in section (3).

Within one year from the date the Water Resources Commission adopts rules describing the schedules, standards and procedures for water conservation management plans by water suppliers, Salmon Valley Water Company shall submit a plan which is consistent with said rules.

Within one year of permit issuance, the Salmon Valley Water Company shall prepare a plan/timetable for the Water Resources Commission which shall indicate the steps which Salmon Valley Water Company intends to pursue to obtain a long-term water supply.

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Actual construction work shall begin on or before August 17, 1993, and shall be completed on or before October 1, 1995. Complete application of the water shall be made on or before October 1, 1996.

BC ext. 10-1-97

STATE OF OREGON

COUNTY OF CLACKAMAS

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

SALMON VALLEY WATER COMPANY
P.O. BOX 205 503-622-4083
WELCHES, OREGON 97067

to use the waters of ONE WELL in the SALMON RIVER BASIN for QUASI-MUNICIPAL USE.

This permit is issued approving Application G-12785. The date of priority is FEBRUARY 21, 1992. The use is limited to not more than 1.0 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the well.

The wells are located as follows:

SW 1/4 NW 1/4, SECTION 4, T 3 S, R 7 E, W.M.; 2205 FEET SOUTH AND 295 FEET EAST FROM NW CORNER, SECTION 4.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the proposed place of use under this permit is as follows:

SE 1/4
SECTION 32
NW 1/4 SW 1/4
S 1/2 SW 1/4
SW 1/4 SE 1/4
SECTION 33
TOWNSHIP 2 SOUTH, RANGE 7 EAST, W.M.

N 1/2
SW 1/4
NW 1/4 SE 1/4
SECTION 4
E 1/2
SECTION 5
N 1/2 NW 1/4
SECTION 9
TOWNSHIP 3 SOUTH, RANGE 7 EAST, W.M.

(1) Use of water from the well, as allowed herein, shall be regulated if the well displays:

(a) An average water level decline of three or more feet per year for five consecutive years; or

(b) A total water level decline of fifteen or more feet; or

(c) A hydraulic interference decline of fifteen or more feet in any neighboring well providing water for senior exempt uses or wells covered by prior rights.

CLAC
50441

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

(START CARD) # 80419

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number 344
Name Salmon Valley Water
Address P.O. Box 205
City Welches State OR. Zip 97067

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 100 ft.
Explosives used [ ] Yes [X] No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	22	bentonite	0	22	50
8	22	100				

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[ ] Other
Backfill placed from ____ ft. to ____ ft. Material ____
Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8	+2	100	1/4	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Final location of shoe(s) 100 under

(7) PERFORATIONS/SCREENS:
[X] Perforations Method air
[ ] Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
75	80	1/4/1	80	8		[X]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
300		100	1 hr.

Temperature of water 54 Depth Artesian Flow Found ____
Was a water analysis done? [ ] Yes By whom ____
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other ____
Depth of strata: ____

(9) LOCATION OF WELL by legal description:
County Clack. Latitude ____ Longitude ____
Township 3 N or S Range 7 E or W. WM.
Section 14 SW 1/4 NW 1/4
Tax Lot 4300 Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 150 yards off Welch Rd. on Routedge Rd.

(10) STATIC WATER LEVEL:
19 ft. below land surface. Date 4/1/96
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 50

From	To	Estimated Flow Rate	SWL
50	80	300	19

(12) WELL LOG:
Ground Elevation ____

Material	From	To	SWL
gravel/boulders clay	0	30	
sand/gravel gray	30	50	
gravel/bolders gray	50	80	19
clay/gravel gray	80	90	
sand/gravel gray	90	100	

APR 09 1996
WATER RESOURCES DEPT.
SALEM, OREGON

RECEIVED
SEP 18 2006
WATER RESOURCES DEPT
SALEM, OREGON

Date started 3/26/96 Completed 4/1/96

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number 1622
Signed ____ Date 4/2/96

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 663
Signed Rocky C Eaton Date 4/2/96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for beneficial use of water without waste. The water user is advised that new regulations may require use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Issued this date, AUGUST 17, 1992.

/s/ MARTHA O. PAGEL

Water Resources Department
Martha O. Pagel
Director

"B" Ext to: 10-1-2030

"C" Ext to: 10-1-2030

We know from prior hydrogeologic work that water levels in wells are subject to seasonal fluctuations. The following table provides available water level measurements with dates.

WELL IDENTIFICATION	STATIC WATER LEVEL		PUMPING WATER LEVEL	
Well Number 1	4-29-89 4-15-93	72.75 Feet 72.60 Feet	4-29-89	142.10 Feet
Well Number 2	4-29-89	70.00 Feet		
Well Number 3	-------	----------	-------	----------

Because all wells utilize submersible pumps, I did not attempt to obtain probe measurements. Probe measurement is typically not possible in a well with a submersible pump, due to probe entanglements in the conductor and column.

V. PUMPS AND MOTORS:

Three horsepower submersible pumps are utilized in wells 2 and 3. In each case, a galvanized steel column has been installed to the ground surface.

A 20 horsepower submersible pump is utilized in well number 1. The top of the pump is 164 feet below the top of the well casing. A 4-inch galvanized steel column has been installed to the ground surface. The pump was designed to deliver 250 gallons per minute at 240 feet of head.

The design discharge rate for well number 1 is 250 gpm into the irrigation system. The design discharge rate for wells number 2 and 3 is 50 gpm each, at open discharge to the storage lake. In both cases, I calculated the static lift and column friction losses, to estimate total dynamic head conditions. I then estimated the discharge capacity from well number 1 at 380 gpm and wells number 2 and number 3 at 85 gpm. These numbers do <u>not</u> compare closely with the design discharge rates, but demonstrate adequate capacity to pump the authorized diversion rate.

It is important to note that all wells were constructed in an alluvial aquifer, that is subject to seasonal recharge. The static water level is expected to fluctuate with the season of the year, with this period of the year being the expected lowest water level. As the water level declines, due to expected seasonal fluctuations, the well pump discharge rate will diminish. The final proof survey however, should be based upon the highest pumping water level, observed during development of the supply wells. In this case however, the authorized diversion rate is restricted by acres irrigated and not well pump capacity.

III. SOURCE:

The source, under permit G-11087, includes three groundwater wells located within golf course fairways. Three additional wells, located on the easterly 18-hole golf course, also provide irrigation water and serve other uses. The easterly 18-hole golf course, and the westerly 9-hole golf course, are inter-tied with 2-inch PVC main line piping under Welches Road. This inter-tie improves the efficiency of the underground irrigation system and dramatically improves the reliability of the entire irrigation system. Typically this inter-tie would only be utilized in an emergency, such as failure of a project pump.

The easterly 18-hole golf course is irrigated under permit G-11283 and certificate numbers 61983 and 7895.

Permit G-11087, includes irrigation and recreation as the only uses. It appears appropriate therefore to establish the acres of irrigated turf on the west 9-hole golf course, and the acres of surface water ponds and apply the specified maximum duty of 1/80 cfs per acre. It is also necessary to determine the total maximum pumping rate from the three wells on the west 9-hole golf course, and complete a comparison of the actual beneficial use of the water to the original permit stipulations. The capacity of the irrigation booster pump, drawing water from the storage ponds must equal or exceed the well pump capacity. The final water right certificate will be restricted to 1) the actual quantity of water beneficially utilized in conformance with the permit, or 2) the total quantity of water allowed under the original permit, whichever is less.

IV. DIVERSION POINTS:

As noted, three groundwater wells are included under permit G-11087. Well number 3 was constructed to a total depth of 138 feet below the ground surface. 6-5/8-inch diameter casing was installed to 128 feet. At the time of well construction the static water level was measured at ±70 feet.

Well number 2 was constructed to 154 feet and 6-5/8 inch steel casing installed to 154 feet. The static water level at the time of construction was ±70 feet.

Well number 1 was constructed by Staco Well Services Inc. in April and May, 1989. Well number 1 included an 18-inch diameter bore to a depth of 32 feet and a ±12-inch diameter bore to a total depth of 217 feet. 12-inch diameter casing was installed to 177 feet and a 10-inch diameter liner was installed to 177 feet. A screen was installed from 177 feet to 217 feet. A&H Pump Service completed a test pumping on April 29, 1989. Generally, A&H Pump recorded a draw down of 70 feet after 42 hours of pumping at a rate of 250 gpm. Pump test results for well number 1 are enclosed. The static water level at the start of the test was 72 feet 9 inches.

Wells 1 and 2 were equipped with air lines and I completed water level measurements during my site inspection. Well number 1 was not running, but had been operated for approximately 12 hours, the night before. A static water level of 100 feet was measured on a direct reading gage, after pumping air into the air tube. Well number 2 had been off for approximately 30 days, but would have been influenced by well number 1 due to the close proximity. A static water level of 90 feet was measured using the same procedure. There was no air tube in well number 3.

W&H PACIFIC
Creative Solutions . . . Superior Service
155 N.E. Revere
Bend, Oregon 97701
(503) 388-4255
Fax (503) 388-4229
• Planning
• Engineering
• Surveying
• Landscape Architecture

EDWIN A. HOPPER
THE RESORT AT THE MOUNTAIN
FOX GLOVE GOLF COURSE
FINAL PROOF SURVEY - PERMIT G-11087
WELL AND BOOSTER PUMP DIVERSION RATE CALCULATIONS

① WELL NUMBER ONE - 20 HP SUBMERSIBLE

DESIGN FLOW RATE: 250 gpm at 240 Ft TDH
PUMP SET CONDITIONS:

164 LINEAL FEET (LF) 4" GALVANIZED STEEL PIPE
PUMPING WATER LEVEL: ±142 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 225 GPM)

VERTICAL LIFT: 142 Ft
H_f 164 LF 4" G.S. PIPE: 7.7 Ft
H_f 67 LF 4" PVC PIPE: 3.1 Ft
MISC. MINOR LOSSES: 3.0 Ft
ESTIMATED TDH: 156 Ft

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33{,}000)(H_p)(E_p)}{w\ h} = \frac{(33{,}000)(20)(.75)}{(8.34)(156)} = 380 \text{ gpm}$$

CONCLUSION: PUMP CLEARLY HAS CAPACITY TO MEET THE SPECIFIED DIVERSION RATE. THROTTLING OF THE PUMP WILL BE REQUIRED TO RESTRICT THE PUMPING RATE TO THE AUTHORIZED DIVERSION RATE.

② WELLS NUMBER TWO AND THREE: - 3 HP SUBMERSIBLE

DESIGN FLOW RATE: 50 GPM AT 120 FT TDH
PUMP SET: 110 TO 120 FT 2 INCH GALVANIZED STEEL COLUMN
PUMPING WATER LEVEL: ± 100 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 50 GPM)

VERTICAL LIFT: 100 FT
H_f 120 LF 3" G.S. PIPE: 1.5
H_f 100 LF 3" PVC PIPE: 1.2
MISC LOSSES: 2.0
ESTIMATED TDH: 105 FT

As noted, wells 1 and 2 discharge directly to the storage pond on fairway number five, located in the NW1/4 NE1/4 and the SW1/4 NE1/4 of Section 5. Well 3 discharges into the pond on fairway number seven, located in the SW1/4 NE1/4 of Section 5. Excess water from the fairway seven pond runs through a surface ditch to the fairway number five pond. A centrifugal pump on the lower fairway number five pond pumps into the irrigation main line system. The centrifugal repump station must have a capacity equal to or greater than the final proof diversion rate to assure water can be beneficially utilized.

The centrifugal pump is a single 60 horsepower Gould Century pump and motor. The pump name plate had been removed and The Resort at the Mountain personnel had no record of pump model numbers or characteristic curves. Utilizing standard horsepower/discharge formulas, I calculated a capacity of 880 gpm, which exceeds the water right diversion rate, as expected. Calculations are attached. Typically, water from wells is stored during the day and then pumped from storage ponds at night, at a higher rate, to prevent irrigation impacts on golf play.

VI. PIPE:

Construction record drawings for The Resort at the Mountain golf course irrigation system are not readily available. Golf course maintenance personnel however indicated 2-inch to 6-inch diameter main line pipe has been installed down all fairways. I have estimated approximately 18,000 lineal feet of main line has been installed on the golf course for irrigation.

VII. USES:

As noted, uses observed during my site inspection include irrigation and recreation. The extent of these uses were determined from high quality aerial photography.

During my site inspection I walked each golf course fairway with Mr. Edwin Hopper and golf course personnel. I marked the limits of irrigation, on the aerial map, throughout the project. Typically, the limits of irrigation were determined by the edge of maintained turf. The maintained turf typically transitioned into native brush and vegetation. The brush line was typically accepted as the limits of beneficial use. In some cases, permanent set irrigation sprinklers did not reach to the limits of the maintained turf. Mr. Tony Lasher however, demonstrated irrigation of those areas with hoses and sprinklers, attached to the irrigation system at quick couplers.

Similarly, I compared surface water ponds in the field to the aerial photography and found the aerial photography to be very accurate. The total acreage for surface water ponds was then digitized from the aerial maps.

The following table documents the results of area calculations for both the irrigation and recreation uses on the Fox Glove golf course. All use is within Sections 4 and 5, Township 3 South, Range 7 East, Willamette Meridian.

W&H PACIFIC
Creative Solutions . . . Superior Service
155 N.E. Revere
Bend, Oregon 97701
(503) 388-4255
Fax (503) 388-4229
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• Landscape Architecture
Environmental Services

② WELLS NUMBER TWO AND THREE - CONTINUED

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33{,}000)(Hp)(Ep)}{W \quad h} = \frac{(33{,}000)(3)(.75)}{(8.34)(105)} = 8.5 \text{ gpm}$$

CONCLUSION: EACH WELL PUMP SHOULD BE CAPABLE OF PROVIDING 50 TO 80 gpm.

③ LAKE BOOSTER PUMP - 60 HP CENTRIFICAL PUMP

FRICTION LOSS AND TDH CALCULATION

SUCTION LIFT: 1.5 Ft
DISCHARGE PRESSURE: 80PSI => 185 FT
MISC LOSSES: +2.0 Ft
ESTIMATED TDH: 189 Ft

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{33{,}000 \quad Hp \quad Ep}{W \quad h} = \frac{(33{,}000)(60)(.70)}{(8.34)(189)} = 880 \text{ gpm}$$

CONCLUSION: THE CENTRIFICAL PUMP HAS ADEQUATE CAPACITY TO RE-PUMP THE AUTHORIZED DIVERSION. THE CENTRIFICAL PUMP WOULD NORMALLY OPERATE AT NIGHT ONLY, BY DRAWING STORED WATER FROM PONDS

Project: THE RESORT AT THE MTN. PERMIT G-11087 Date: 9-27-93 Sheet No. 2 of 2
Prepared by: TNW Checked by: Job No: 345-02-01

NEWTON CONSULTANTS INC.

August 25, 2006
Project No. 1036-101

Mr. Mike Bowman, President
Salmon Valley Water Company
P.O. Box 205
Welches, OR 97067

WATER SUPPLY DEVELOPMENT
HYDROGEOLOGIC FEASIBILITY OF ADDING ADDITIONAL WELLS AS POINTS OF APPROPRIATION; PERMIT G-11534

Dear Mr. Bowman:

This document presents the results of a preliminary review of geologic and hydrogeologic data in the area of the Salmon Valley Water Company (SVWC) Well No. 50441, Well No. 3 owned by RRR Golf, Inc. (RRR) and the site of a new well proposed by RRR, near Welches, Oregon. The location of the review area and wells is shown on Figure 1. The purpose of the review was to investigate the possibility that the SVWC Well No. 50441, RRR Well No. 3 and proposed RRR well withdraw water from a source aquifer system common to all three wells. If this possibility exists, it could then be possible to add the RRR wells as additional points of appropriation under a SVWC ground water permit. This, in turn, provides a timely method to help the SVWC maintain pace with water needs of new development within its service area.

The SVWC currently holds five ground water permits for quasi-municipal use. Ground water permits presently held by the SVWC are summarized below.

PERMIT NO.	MAX RATE (CFS)	USE	PRIORITY DATE
G-11335	0.37	Quasi-Municipal	06/03/1991
G-11422	0.50	Quasi-Municipal	10/03/1991
G-11534	1.0	Quasi-Municipal	02/21/1992
G-13176	0.501	Quasi-Municipal	03/13/1996
G-15209	0.334	Quasi-Municipal	03/27/2001
TOTAL	**2.705**		

Ground water is used to supply needs of the SVWC's present customer base, consisting of approximately 800 service connections in the Welches area. The quasi-municipal permits authorize a total maximum combined appropriation rate of 2.705 cubic feet per second (cfs). However, yield limitations and iron, in some cases, restrict the actual total peak pumping rate to about 0.8 cfs (360 gpm), substantially less than the authorized maximum rate. The SVWC customer base is growing rapidly and additional capacity is needed soon to maintain pace with water demand for new development in the SVWC service area.

52nd SW 6th Street, Suite 100 ■ Redmond, Oregon 97756 ■ 541 504-9960 ■ fax 541 504-9961 ■ www.newtonconsultants.com

A practical and relatively expeditious solution for additional capacity is being developed collaboratively between the SVWC and RRR. This arrangement would allow SVWC use of the RRR Well No. 3 associated with RRR water right permit G-11087 and a new well proposed by RRR to keep pace with new demand. This arrangement would require amendment of a SVWC permit, or permits, to include RRR well No. 3 and the new proposed well as additional points of appropriation. Evaluation of opportunities for this arrangement indicates that the SVWC permit G-11534 is a more practical choice. Permit G-11534 authorizes a maximum appropriation of 1 cfs (449 gallons per minute) for quasi-municipal use from Well No. 50411 located at:

> SW ¼ NW ¼, Section 4, T 3S, R 7 E, W.M.' 2205 feet south and 295 feet east from NW corner, Section 4.

The approximate location of Well No. 50441, other SVWC wells and RRR wells are shown on Figure 2. The maximum achievable pumping rate from well No. 50441 is approximately 130 gpm. The proposed amendment to SVWC permit G-11534 adding additional points of appropriation will allow SVWC to more fully develop its maximum permit rate of 449 gpm and respond to increasing demand in a time and cost-effective manner. A regulatory provision for such permit amendments is that the involved wells withdraw water from the same source aquifer system as those existing wells approved under the permit.

The purpose of this review was to determine if hydraulic continuity exists between SVWC Well No. 50441 associated with ground water permit G-11534, RRR well No. 3 associated with RRR ground water permit G-11087 and the new well proposed by RRR (Figure 2). A key objective for the proposed new well is that it is completed in the same source aquifer system as SVWC Well No. 50441 and RRR Well No. 3.

Results from our study indicate that RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from the same source alluvial aquifer system. Evaluation of well log data also shows the proposed new well at the location shown on Figure 2 will also withdraw water from the same source alluvial aquifer system. The aquifer is an alluvial system between the Salmon and Sandy Rivers. The ground water flow diagram on Figure 2 illustrates the approximate ground water elevations.

The location of the proposed well shown in Figure 2, if completed in the same source aquifer system as RRR well No. 3 would also draw from the same source aquifer system as SVWC well No. 50441.

METHODS

A previous Kleinfelder report completed in September, 2005, in connection with well exploration was reviewed to avoid duplication of services. Well logs for RRR wells, SVWC wells and wells within a half mile of RRR well No. 3 and proposed new well were obtained from the Oregon Water Resources Department (OWRD). These logs were used to gather information on geology, water levels and yields in area wells.

Available Oregon Water Resources Department (OWRD) well log data and piezometric information from a previous Newton investigation and ModFlow model analysis of stream depletion potential by wells for RRR in 1989 were used to develop a generalized ground water elevation diagram as shown on Figure 2. The diagram reflects the differences in ground water elevations as one moves down the valley.

Well log data was also used to generate two cross sections. Cross section A-A' runs longitudinal down the valley and passes through SVWC and RRR wells. Cross section B-B' runs laterally across the valley and passes through the proposed new well location. Well locations and both cross section locations are shown on Figure 3.

FINDINGS

Geologic information gathered from driller's logs indicated that the valley floor is underlain with an alluvial aquifer system comprised of stream deposits and glacial till in mixed beds of sands, gravels, boulders and clays to depths of approximately 200-230 ft below the surface. Geologic cross sections A-A' and B-B' are shown in Figures 4 and 5. This alluvium is underlain by volcanic mudflows, lavas, tuffs, volcanic breccias, cobbly conglomerates and occasional non-carbonized woody materials generally believed to be part of the Sardine Formation.

Cross section A-A' (Figure 4) shows that the majority of the wells in the valley are completed in the alluvial deposits consisting of inter-bedded layers of sand, gravel, clay and conglomerates. Clay and ash lenses which act as local confining layers and partial boundaries to groundwater flow are considered semi-continuous longitudinally down the valley. One such clay lens appears to run semi-continuously through locations of all RRR wells No. 1, 2 and 3 and SVWC well No. 50441. This clay lens which is approximately 10-20 feet thick ranges in depths from 100-120 feet below the surface to 60-80 feet below the surface.

Cross section B-B' (Figure 5) shows very similar deposits as those shown in cross section A-A' (Figure 4). A lateral clay lens appears to lay in a partially continuous manner across the valley, varying in thickness from approximately 10-30 feet. The assumption is made that the clay lens is continuous between Welches Road and Highway 26 (Figure 4). However, no driller's logs were available for wells completed deeper than 50 feet below the surface between Welches Road and Highway 26.

Depth to first water and static water levels were recorded by well constructors. These water levels were also plotted on cross section A-A' and B-B' (Figure 4 and 5). In some cases first water is found deeper than static water level. This disparity in water levels suggests a certain

amount of confinement in the alluvial system. In other cases only static water levels are recorded. A few wells have also shown static water levels to be lower than first water levels. This could be explained by the presence of localized shallow perched water tables.

When looking at cross section A-A', it is apparent that static water levels in the RRR wells No. 1 through No. 3 are lower than those found in the SVWC well No. 50441. This can be explained by the fact that the overall ground water elevation between these wells changes depending on location within the alluvial valley. This is illustrated on the ground water elevation diagram of Figure 2. Ground water elevations are highest in the center of the valley between the Sandy and Salmon Rivers and lower in the proximity of the rivers near the outside edges of the valley. The ground water elevation contours on the diagram illustrate ground water flow in the downstream direction, along the longitudinal centerline of the valley and toward each river flanking the valley. The ground water elevation difference between SVWC well No. 50441 and the RRR wells No. 1 through 3 is approximately 50'. When these ground water elevations are plotted on a vertical 2 dimensional surface as they are plotted in Figure 4, it could appear as if the water table is not continuous. However Figure 2 shows that static water levels of wells along cross section A-A' will vary depending on where they intersect the cross section and where they are located laterally across the valley.

Review of geologic and hydrogeologic information indicates that the aquifer in the valley surrounding the RRR site is an alluvial aquifer system, unconfined, to partially-confined, with laterally discontinuous lenses of clay, tuffacaceous or ash materials. One such lens appears to underlay RRR wells No. 1 through 3 and SVWC well No. 50441. Driller's logs for RRR well No. 1 and SVWC well No. 50441 also indicate that the wells are all completed below this clay lens. We have also noted that the highest pumping rates (100-300 gallons per minute) are recorded on driller's logs for wells completed below this clay layer. Despite the partially-confined nature of the aquifer system in the valley and the presence of potential localized perched ground water tables, ground water elevations recorded by driller's logs do indicate a relatively continuous gradient in water levels with general direction of flow toward either the Sandy or Salmon Rivers (Figure 2).

CONCLUSIONS

Based on the information provided above, RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from a common source aquifer system that is partially-confined by a layer of clay or tuffaceous material that could be continuous between the wells. The location of the proposed well shown on Figure 3, if completed to similar depths and similar geologic materials as RRR well No. 3 would draw from the same source aquifer system as both RRR well No. 3 and SVWC well No. 50441.

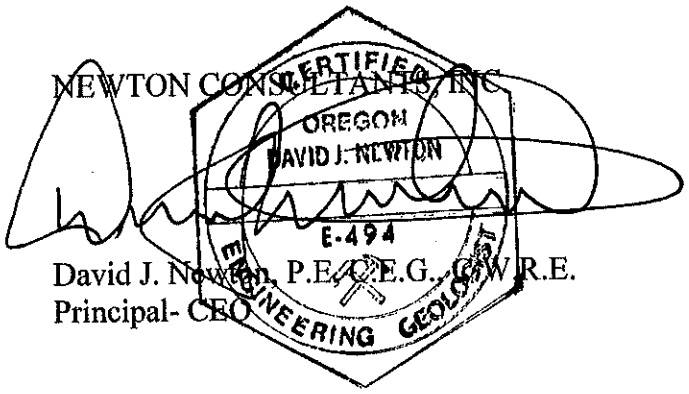
We appreciate the opportunity to be of service to Salmon Valley Water Company. Please call me if you have any questions concerning this report.

Sincerely,

NEWTON CONSULTANTS, INC.

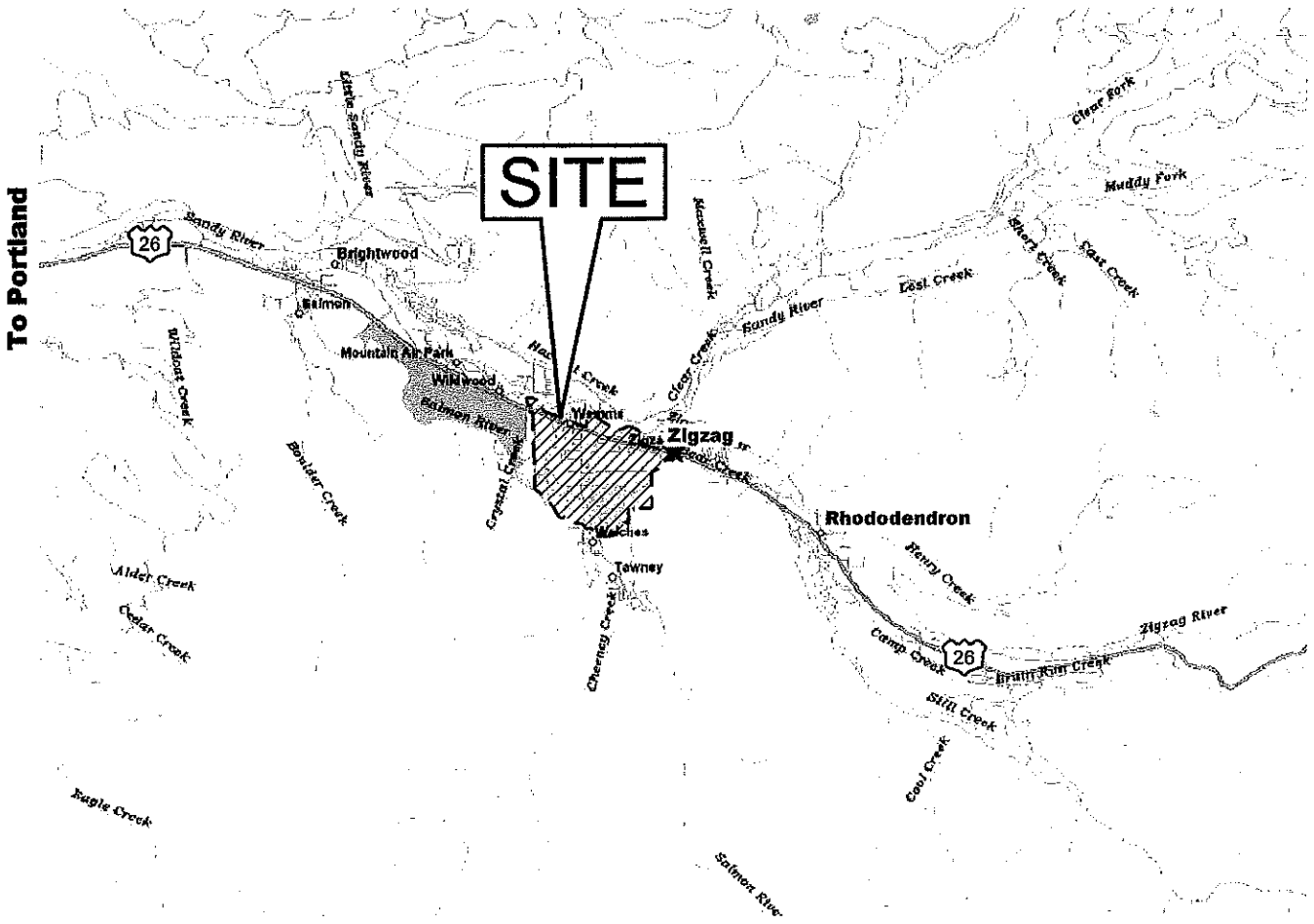
Mathias Perle
Hydrologic / Engineering Technician

NEWTON CONSULTANTS, INC.



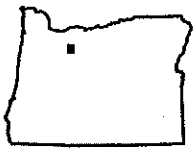
David J. Newton, P.E./C.E.G., C.W.R.E.
Principal- CEO

Cc: Ed Hopper, RRR Golf, Inc.



0' 2 Mile 4 Mile

SCALE: 1" = 2 Miles



Base Map:
Map Quest Street Atlas USA

NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Vicinity map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
M.Perle	S.Schenck	Sept 2006	1036-101	1

G:\1000\1036\101\Cad\Water\W1036101_F1_VicMap 11:54 07/20/2006 SS

Oregon
Theodore R. Kulongoski, Governor

Water Resources Department
North Mall Office Building
725 Summer Street NE, Suite A
Salem, OR 97301-1266
503-986-0900
FAX 503-986-0904

March 2, 2007

SALMON VALLEY WATER CO.
PO BOX 205
WELCHES OR 97067

Reference: Permit Amendment Transfer 10240

Enclosed is a copy of the order approving your Permit Amendment transfer application.

YOU SHOULD GIVE PARTICULAR ATTENTION TO THE CONDITIONS OUTLINED IN THE ORDER. All other terms and conditions of the permit remain the same.

If you have any questions, please call the Transfer Section, (503)986-0900.

Sincerely,

Sarah Henderson

Doug Parrow
Natural Resource Specialist

DP:sh

cc: Watermaster **#20**
Mathias Perle, Agent

Enclosure

Authorized Place of Use:

Township		Range		Meridian	Sec	¼	¼
2	S	7	E	W.M.	32	NE	SE
2	S	7	E	W.M.	32	NW	SE
2	S	7	E	W.M.	32	SW	SE
2	S	7	E	W.M.	32	SE	SE
2	S	7	E	W.M.	33	NW	SW
2	S	7	E	W.M.	33	SW	SW
2	S	7	E	W.M.	33	SE	SW
2	S	7	E	W.M.	33	SW	SE
3	S	7	E	W.M.	4	NE	NE
3	S	7	E	W.M.	4	NW	NE
3	S	7	E	W.M.	4	SW	NE
3	S	7	E	W.M.	4	SE	NE
3	S	7	E	W.M.	4	NE	NW
3	S	7	E	W.M.	4	NW	NW
3	S	7	E	W.M.	4	SW	NW
3	S	7	E	W.M.	4	SE	NW
3	S	7	E	W.M.	4	NE	SW
3	S	7	E	W.M.	4	NW	SW
3	S	7	E	W.M.	4	SW	SW
3	S	7	E	W.M.	4	SE	SW
3	S	7	E	W.M.	4	NW	SE
3	S	7	E	W.M.	5	NE	NE
3	S	7	E	W.M.	5	NW	NE
3	S	7	E	W.M.	5	SW	NE
3	S	7	E	W.M.	5	SE	NE
3	S	7	E	W.M.	5	NE	SE
3	S	7	E	W.M.	5	NW	SE
3	S	7	E	W.M.	5	SW	SE
3	S	7	E	W.M.	5	SE	SE
3	S	7	E	W.M.	9	NE	NW
3	S	7	E	W.M.	9	NW	NW

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of Permit Amendment T-10240, Clackamas County	)))	**FINAL ORDER** APPROVING ADDITIONAL POINTS OF APPROPRIATION

ORS 537.211 establishes the process in which a water right permit holder may submit a request to change the point of appropriation and/or place of use authorized under an existing water right permit.

Applicant

SALMON VALLEY WATER COMPANY
P. O. BOX 205
WELCHES, OREGON 97067

Findings of Fact

1. On September, 18, 2006, Salmon Valley Water Company filed an application for additional points of appropriation under Permit G-11534. The Department assigned the application number T-10240.

2. The permit to be amended is as follows:

Permit: G-11534, in the name of Salmon Valley Water Company;
Use: Quasi-municipal
Priority Date: February 21, 1992
Quantity: 1.0 cubic foot per second
Source: A well, in the Salmon River Basin.
Date of Complete Application of Water: October 1, 2030

Authorized Point of Appropriation:

Township		Range		Meridian	Sec	¼ ¼		Location
3	S	7	E	W.M.	4	SW	NW	2205 FEET SOUTH AND 295 FEET EAST FROM THE NW CORNER OF SECTION 4.

This is a final order in other than contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-080 and OAR 690-01-005 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

2. The permittee/appropriator shall install a meter or other measuring device suitable to the Director, and shall keep a complete record of water uses.

3. Water shall be acquired from the same aquifer as the original point of appropriation.

4. All other terms and conditions of Permit G-11534 remain the same.

5. Permit G-11534, in the name of Salmon Valley Water Company, is amended as described herein.

Dated at Salem, Oregon this 28th day of February, 2007.

Phillip C. Ward,
Director

Mailing Date: MAR 0 6 2007

3. Application T-10240 proposes additional points of appropriation located:

Township		Range		Meridian	Sec	¼ ¼		Location
3	S	7	E	W.M.	5	NW	NE	WELL 2 – 1270 FEET SOUTH AND 1554 FEET WEST FROM THE NE CORNER OF SECTION 5.
3	S	7	E	W.M.	5	NW	NE	WELL 3 – 210 FEET SOUTH AND 2360 FEET WEST FROM THE NE CORNER OF SECTION 5.
3	S	7	E	W.M.	5	SE	NE	WELL 4 – 2046 FEET SOUTH AND 1260 FEET WEST FROM THE NE CORNER OF SECTION 5.
3	S	7	E	W.M.	5	SE	NE	WELL 5 -2580 FEET SOUTH AND 845 FEET WEST FROM THE NE CORNER OF SECTION 5.
3	S	7	E	W.M.	5	SE	NE	WELL 6 -1822 FEET SOUTH AND 60 FEET WEST FROM THE NE CORNER OF SECTION 5.

4. Notice of the application for the permit amendment was published in the Department's weekly notice on October 17, 2006, and in the Sandy Post Newspaper on January 24 and 31, and February 7, 2007, pursuant to ORS 540.520(5). No comments were filed in response to the notices.

5. The change would not result in injury to other water rights.

6. The change does not enlarge the permit.

7. The change does not alter any other terms of the permit.

Conclusions of Law

The additional points of appropriation proposed by Permit Amendment Application T-10240 are consistent with the requirements of ORS 537.211.

Now, therefore, it is ORDERED:

The change and subsequent use of water shall be subject to the following conditions:

1. The combined quantity of water diverted at the proposed additional points of appropriation (wells), together with that diverted at the authorized point of appropriation, shall not exceed the maximum rate and duty allowed under Permit G-11534.

Permit Amendment Completion Checklist

T-10240 **Transfer Specialist:** pks

Water Rights Affected

App File No.	Permit No.
G-12785	G-11534

Copies Needed

Watermaster District: 20

Agent: Mathias Perle, Newton Consultants, Inc., 521 SW 6th Street, Suite 100, Redmond, OR, 97067

Commentors Name/Address: _____

_____

_____

Preliminary Determination

X Electronic Files uploaded

☐ Fee Refund Due

Comments/Special Issues: Additional points of appropriation needed to fully develop permit.

~~**Draft Order Review** (If needed)~~	**Final Order Review** (Salem)
Reviewer: _____ Date: _____	Reviewer: _____ Date: _____
Coordinator: _____ Date: _____	Coordinator: pks Date: 3/27/07

Comments/Special Issues:

Special Order Volume: 71, Pages 248 Final Order Signature Date: 2-28-07

☐ WRIS clone correction needed

Kelly

STATE OF OREGON

COUNTY OF CLACKAMAS

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

SALMON VALLEY WATER COMPANY
P.O. BOX 205 503-622-4083
WELCHES, OREGON 97067

to use the waters of ONE WELL in the SALMON RIVER BASIN for QUASI-MUNICIPAL USE.

This permit is issued approving Application G-12785. The date of priority is FEBRUARY 21, 1992. The use is limited to not more than 1.0 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the well.

The wells are located as follows:

SW 1/4 NW 1/4, SECTION 4, T 3 S, R 7 E, W.M.; 2205 FEET SOUTH AND 295 FEET EAST FROM NW CORNER, SECTION 4.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the proposed place of use under this permit is as follows:

SE 1/4
SECTION 32
NW 1/4 SW 1/4
S 1/2 SW 1/4
SW 1/4 SE 1/4
SECTION 33
TOWNSHIP 2 SOUTH, RANGE 7 EAST, W.M.

N 1/2
SW 1/4
NW 1/4 SE 1/4
SECTION 4
E 1/2
SECTION 5
N 1/2 NW 1/4
SECTION 9
TOWNSHIP 3 SOUTH, RANGE 7 EAST, W.M.

(1) Use of water from the well, as allowed herein, shall be regulated if the well displays:

(a) An average water level decline of three or more feet per year for five consecutive years; or

(b) A total water level decline of fifteen or more feet; or

(c) A hydraulic interference decline of fifteen or more feet in any neighboring well providing water for senior exempt uses or wells covered by prior rights.

(2) The permittee/appropriator shall install a meter or other measuring device suitable to the Director, and shall keep a complete record of water uses.

(3) The permittee/appropriator shall be responsible for complying with each of the following requirements for measuring water levels in the well.

(a) Use of water from a new well shall not begin until the initial water level in the well has been measured. A measurement of initial water level shall be made at the time a pump is installed, but before pumping begins.

(b) In addition to the measurement required in subsection (a) of this section, a water level measurement shall be made each year at the time of spring high water during the period March 15 through April 15.

(c) All water level measurements shall be made by a qualified individual. Qualified individuals include certified water rights examiners, licensed water well drillers, registered geologists, registered professional engineers, registered land surveyors, or the permittee/appropriator.

(d) Any qualified individual measuring a well shall use standard methods of procedure and equipment designed for the purpose of well measurement. The equipment used shall be well suited to the conditions of construction at the well. A list of standard methods of procedure and suitable equipment shall be available from the Department.

(e) The permittee/appropriator shall submit a record of the measurement to the Department on a form available from the Department. The record of measurement shall be received not later than 30 days from the date of measurement.

(4) The Department shall determine when any of the declines cited in section (1) are evidenced by the well measurement required in section (3).

Within one year from the date the Water Resources Commission adopts rules describing the schedules, standards and procedures for water conservation management plans by water suppliers, Salmon Valley Water Company shall submit a plan which is consistent with said rules.

Within one year of permit issuance, the Salmon Valley Water Company shall prepare a plan/timetable for the Water Resources Commission which shall indicate the steps which Salmon Valley Water Company intends to pursue to obtain a long-term water supply.

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Actual construction work shall begin on or before August 17, 1993, and shall be completed on or before October 1, 1995. Complete application of the water shall be made on or before October 1, 1996.

BC ext. 10-1-97

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for beneficial use of water without waste. The water user is advised that new regulations may require use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Issued this date, AUGUST 17, 1992.

/s/ MARTHA O. PAGEL

Water Resources Department
Martha O. Pagel
Director

"B" Ext to: 10-1-2030

"C" Ext to: 10-1-2030

Sandy Post Newspaper
1190 NE Division St.
Gresham, Oregon 97030
503-665-2181

AFFIDAVIT OF PUBLICATION

State of Oregon, County of **Clackamas**, SS

I, Dawn Wiek, being the first duly sworn depose and say that I am the Customer Service Representative of ***The Sandy Post***, a newspaper of general circulation, published at Sandy, in the aforesaid county and state, as defined by ORS 193.010 and 193.020, that

SP 0107-08

A copy of which is hereto attached, was published in the entire issue of said newspaper for 3 successive and consecutive weeks in the following issues:

1/24 - 1/31 - 2/7/07

Dawn Wiek

Dawn Wiek

Subscribed and sworn to before me this 13th Day of February 2007

Deseri Cerruti- Notary Public for Oregon

My Commission expires:
September 25,2009

OFFICIAL SEAL
DESERI CERRUTI
NOTARY PUBLIC - OREGON
COMMISSION NO. A395604
MY COMMISSION EXPIRES SEPTEMBER 25, 2009

Notice of Permit Amendment T-10240

T-10240 filed by Salmon Valley Water Company, P.O. Box 205, Welches, Oregon, 97067, proposes additional points of appropriation under Permit G 11534. The permit allows the use of 1.0 cfs (priority date February 21, 1992) from a well in Sec. 4, T 3 S, R 7 E, W.M. (Salmon River Basin) for quasi municipal use in Sects. 32 and 33, T 2 S, R 7 E, W.M. and Sects. 4, 5, and 9, T 3 S, R 7 E, W.M. The applicant proposes additional points of appropriation from 500 feet to approximately 0.5 mile west northwest (Sec. 5, T 3 S, R 7 E, W.M.). The Water Resources Department has concluded that the proposed permit amendment appears to be consistent with the requirements of ORS 537.211.

The last date of newspaper publication is 02/07/07.

SP0107-08
01/24/07, 01/31/07, 02/07/07

Notice of Permit Amendment T-10240

T-10240 filed by Salmon Valley Water Company, P.O. Box 205, Welches, Oregon, 97067, proposes additional points of appropriation under Permit G 11534. The permit allows the use of 1.0 cfs (priority date February 21, 1992) from a well in Sec. 4, T 3 S, R 7 E, W.M. (Salmon River Basin) for quasi municipal use in Sects. 32 and 33, T 2 S, R 7 E, W.M. and Sects. 4, 5, and 9, T 3 S, R 7 E, W.M. The applicant proposes additional points of appropriation from 500 feet to approximately 0.5 mile west northwest (Sec. 5, T 3 S, R 7 E, W.M.). The Water Resources Department has concluded that the proposed permit amendment appears to be consistent with the requirements of ORS 537.211.

The last date of newspaper publication is 02/07/07.

SP0107-08
01/24/07, 01/31/07, 02/07/07

Notice of Permit Amendment T-10240

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The last date of newspaper publication is 02/07/07.

SP0107-08
01/24/07, 01/31/07, 02/07/07

Oregon
Theodore R. Kulongoski, Governor

Water Resources Department
North Mall Office Building
725 Summer Street NE, Suite A
Salem, OR 97301-1266
503-986-0900
FAX 503-986-0904

January 9, 2007

Salmon Valley Water Company
Michael Bowman
P.O. Box 205
Welches, Oregon 97067

Reference: Permit Amendment Application T-10240

Because the proposed points of appropriation are more than ¼ mile from the authorized point of appropriation, the applicant is responsible for giving public notice of the permit amendment change in a local newspaper having a general circulation in the area of the permit (newspapers with statewide circulation such as the Capital Press, Journal of Commerce, etc., do not qualify). The notice must be published at least once a week for three consecutive weeks. We have prepared the notice for you (enclosed). Please have the newspaper insert the date of last publication in the proper place. **After publication, the Department needs to receive an affidavit specifying the dates the notice was published.** Typically, the newspaper will prepare and mail an original *affidavit of publication* to the Department, however you will want to request specifically that they do so. The newspaper can mail the affidavit to me at the address above.

Payment of the cost of publication is your responsibility; please do not send any billing to the Water Resources Department.

Upon receipt of the affidavit, processing will continue on the permit amendment application.

Please do not hesitate to contact me at 503-986-0886 or Patrick.K.Starnes@wrd.state.or.us, if you have questions.

Sincerely,

Kelly Starnes
Permit amendment processor

cc: Mathias Perle, Newton Consultants
enc

Notice of Permit Amendment T-10240

T-10240 filed by Salmon Valley Water Company, P.O. Box 205, Welches, Oregon, 97067, proposes additional points of appropriation under Permit G-11534. The permit allows the use of 1.0 cfs (priority date February 21, 1992) from a well in Sec. 4, T 3 S, R 7 E, W.M. (Salmon River Basin) for quasi-municipal use in Sects. 32 and 33, T 2 S, R 7 E, W.M. and Sects. 4, 5, and 9, T 3 S, R 7 E, W.M. The applicant proposes additional points of appropriation from 500 feet to approximately 0.5 mile west-northwest (Sec. 5, T 3 S, R 7 E, W.M.). The Water Resources Department has concluded that the proposed permit amendment appears to be consistent with the requirements of ORS 537.211.

The last date of newspaper publication is [DATE OF LAST PUBLICATION].

Herb Mosgar

From: Brooke Carlock [brooke@water-law.com]
Sent: Friday, October 27, 2006 11:25 AM
To: Herbert.L.MOSGAR@wrd.state.or.us
Cc: Laura Schroeder; Colm Moore; Pam Van Horn
Subject: RE: T-10240 and G-15460

-->

Herb: We will not need these files at the moment. If we should need them in the future, we will forward OWRD a public records request.

Thank you for your assistance.

Brooke

-----Original Message-----
From: Brooke Carlock
Sent: Thursday, October 26, 2006 12:44 PM
To: 'Herb Mosgar (Herbert.L.MOSGAR@wrd.state.or.us)'
Cc: Pam Van Horn
Subject: T-10240 and G-15460

Dear Herb,

We've inquired to Kelly Starns and Ann Reese regarding this request and were asked that we contact you. Can you forward our office via fax or mail a copy of Permit Amendment T-10240 and the extension of time filed regarding G-15460.

If copying/faxing fees are applicable, please bill our account with the reference # 799.00.

Thank you,

Brooke

Herb Mosgar

From: Brooke Carlock [brooke@water-law.com]
Sent: Thursday, October 26, 2006 12:44 PM
To: Herbert.L.MOSGAR@wrd.state.or.us
Cc: Pam Van Horn
Subject: T-10240 and G-15460

-->

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Thank you,

Brooke

Brooke A. Carlock

Paralegal

Schroeder Law Offices, P.C.

Portland, Oregon

503.281.4100

503.281.4600 fx

www.water-law.com

Herb Mosgar

From: Brooke Carlock [brooke@water-law.com]
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Brooke A. Carlock

Paralegal

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Portland, Oregon

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EDWIN N. HOPPER
THE RESORT AT THE MOUNTAIN
FOX GLOVE GOLF COURSE
FINAL PROOF SURVEY - PERMIT G-11087
WELL AND BOOSTER PUMP DIVERSION RATE CALCULATIONS

① WELL NUMBER ONE - 20 HP SUBMERSIBLE

DESIGN FLOW RATE: 250 gpm at 240 Ft TDH
PUMP SET CONDITIONS:
164 LINEAL FEET (LF) 4" GALVANIZED STEEL PIPE
PUMPING WATER LEVEL: ±142 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 225 GPM)

VERTICAL LIFT: 142 Ft
H_f 164 LF 4" G.S. PIPE: 7.7 Ft
H_f 67 LF 4" PVC PIPE: 3.1 Ft
MISC. MINOR LOSSES: 3.0 Ft
ESTIMATED TDH: 156 Ft

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33{,}000)(H_p)(E_p)}{w\ h} = \frac{(33{,}000)(20)(.75)}{(8.34)(156)} = 380 \text{ gpm}$$

CONCLUSION: PUMP CLEARLY HAS CAPACITY TO MEET THE SPECIFIED DIVERSION RATE. THROTTLING OF THE PUMP WILL BE REQUIRED TO RESTRICT THE PUMPING RATE TO THE AUTHORIZED DIVERSION RATE.

② WELLS NUMBER TWO AND THREE: - 3 HP SUBMERSIBLE

DESIGN FLOW RATE: 50 GPM AT 120 FT TDH
PUMP SET: 110 TO 120 FT 2 INCH GALVANIZED STEEL COLUMN
PUMPING WATER LEVEL: ± 100 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 50 GPM)

VERTICAL LIFT: 100 FT
H_f 120 LF 3" G.S. PIPE: 1.5
H_f 100 LF 3" PVC PIPE: 1.2
MISC LOSSES: 2.0
ESTIMATED TDH: 105 FT

As noted, wells 1 and 2 discharge directly to the storage pond on fairway number five, located in the NW1/4 NE1/4 and the SW1/4 NE1/4 of Section 5. Well 3 discharges into the pond on fairway number seven, located in the SW1/4 NE1/4 of Section 5. Excess water from the fairway seven pond runs through a surface ditch to the fairway number five pond. A centrifugal pump on the lower fairway number five pond pumps into the irrigation main line system. The centrifugal repump station must have a capacity equal to or greater than the final proof diversion rate to assure water can be beneficially utilized.

The centrifugal pump is a single 60 horsepower Gould Century pump and motor. The pump name plate had been removed and The Resort at the Mountain personnel had no record of pump model numbers or characteristic curves. Utilizing standard horsepower/discharge formulas, I calculated a capacity of 880 gpm, which exceeds the water right diversion rate, as expected. Calculations are attached. Typically, water from wells is stored during the day and then pumped from storage ponds at night, at a higher rate, to prevent irrigation impacts on golf play.

VI. PIPE:

Construction record drawings for The Resort at the Mountain golf course irrigation system are not readily available. Golf course maintenance personnel however indicated 2-inch to 6-inch diameter main line pipe has been installed down all fairways. I have estimated approximately 18,000 lineal feet of main line has been installed on the golf course for irrigation.

VII. USES:

As noted, uses observed during my site inspection include irrigation and recreation. The extent of these uses were determined from high quality aerial photography.

During my site inspection I walked each golf course fairway with Mr. Edwin Hopper and golf course personnel. I marked the limits of irrigation, on the aerial map, throughout the project. Typically, the limits of irrigation were determined by the edge of maintained turf. The maintained turf typically transitioned into native brush and vegetation. The brush line was typically accepted as the limits of beneficial use. In some cases, permanent set irrigation sprinklers did not reach to the limits of the maintained turf. Mr. Tony Lasher however, demonstrated irrigation of those areas with hoses and sprinklers, attached to the irrigation system at quick couplers.

Similarly, I compared surface water ponds in the field to the aerial photography and found the aerial photography to be very accurate. The total acreage for surface water ponds was then digitized from the aerial maps.

The following table documents the results of area calculations for both the irrigation and recreation uses on the Fox Glove golf course. All use is within Sections 4 and 5, Township 3 South, Range 7 East, Willamette Meridian.

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• Surveying
• Landscape Architecture
Environmental Services

② WELLS NUMBER TWO AND THREE - CONTINUED

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33{,}000)(Hp)(E_p)}{W \quad H} = \frac{(33{,}000)(3)(.75)}{(8.34)(105)} = 85 \text{ gpm}$$

CONCLUSION: EACH WELL PUMP SHOULD BE CAPABLE OF PROVIDING 50 TO 80 gpm.

③ LAKE BOOSTER PUMP - 60 HP CENTRIFICAL PUMP

FRICTION LOSS AND TDH CALCULATION

SUCTION LIFT: 1.5 FT.
DISCHARGE PRESSURE: 80PSI ⇒ 185 FT
MISC LOSSES: ± 2.0 FT
ESTIMATED TDH: 189 FT

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{33{,}000 \quad Hp \quad Ep}{W \quad h} = \frac{(33{,}000)(60)(.70)}{(8.34)(189)} = 880 \text{ gpm}$$

CONCLUSION: THE CENTRIFICAL PUMP HAS ADEQUATE CAPACITY TO RE-PUMP THE AUTHORIZED DIVERSION. THE CENTRIFICAL PUMP WOULD NORMALLY OPERATE AT NIGHT ONLY, BY DRAWING STORED WATER FROM PONDS

Project: THE RESORT AT THE MTN. PERMIT G-11087 Date: 9-27-93 Sheet No. 2 of 2
Prepared by: TAW Checked by: Job No: 345-02-01

NEWTON CONSULTANTS INC.

August 25, 2006
Project No. 1036-101

Mr. Mike Bowman, President
Salmon Valley Water Company
P.O. Box 205
Welches, OR 97067

WATER SUPPLY DEVELOPMENT
HYDROGEOLOGIC FEASIBILITY OF ADDING ADDITIONAL WELLS AS POINTS OF APPROPRIATION; PERMIT G-11534

Dear Mr. Bowman:

This document presents the results of a preliminary review of geologic and hydrogeologic data in the area of the Salmon Valley Water Company (SVWC) Well No. 50441, Well No. 3 owned by RRR Golf, Inc. (RRR) and the site of a new well proposed by RRR, near Welches, Oregon. The location of the review area and wells is shown on Figure 1. The purpose of the review was to investigate the possibility that the SVWC Well No. 50441, RRR Well No. 3 and proposed RRR well withdraw water from a source aquifer system common to all three wells. If this possibility exists, it could then be possible to add the RRR wells as additional points of appropriation under a SVWC ground water permit. This, in turn, provides a timely method to help the SVWC maintain pace with water needs of new development within its service area.

The SVWC currently holds five ground water permits for quasi-municipal use. Ground water permits presently held by the SVWC are summarized below.

PERMIT NO.	MAX RATE (CFS)	USE	PRIORITY DATE
G-11335	0.37	Quasi-Municipal	06/03/1991
G-11422	0.50	Quasi-Municipal	10/03/1991
G-11534	1.0	Quasi-Municipal	02/21/1992
G-13176	0.501	Quasi-Municipal	03/13/1996
G-15209	0.334	Quasi-Municipal	03/27/2001
TOTAL	**2.705**		

Ground water is used to supply needs of the SVWC's present customer base, consisting of approximately 800 service connections in the Welches area. The quasi-municipal permits authorize a total maximum combined appropriation rate of 2.705 cubic feet per second (cfs). However, yield limitations and iron, in some cases, restrict the actual total peak pumping rate to about 0.8 cfs (360 gpm), substantially less than the authorized maximum rate. The SVWC customer base is growing rapidly and additional capacity is needed soon to maintain pace with water demand for new development in the SVWC service area.

52nd SW 6th Street, Suite 100 ■ Redmond, Oregon 97756 ■ 541 504-9960 ■ fax 541 504-9961 ■ www.newtonconsultants.com

A practical and relatively expeditious solution for additional capacity is being developed collaboratively between the SVWC and RRR. This arrangement would allow SVWC use of the RRR Well No. 3 associated with RRR water right permit G-11087 and a new well proposed by RRR to keep pace with new demand. This arrangement would require amendment of a SVWC permit, or permits, to include RRR well No. 3 and the new proposed well as additional points of appropriation. Evaluation of opportunities for this arrangement indicates that the SVWC permit G-11534 is a more practical choice. Permit G-11534 authorizes a maximum appropriation of 1 cfs (449 gallons per minute) for quasi-municipal use from Well No. 50411 located at:

> SW ¼ NW ¼, Section 4, T 3S, R 7 E, W.M.' 2205 feet south and 295 feet east from NW corner, Section 4.

The approximate location of Well No. 50441, other SVWC wells and RRR wells are shown on Figure 2. The maximum achievable pumping rate from well No. 50441 is approximately 130 gpm. The proposed amendment to SVWC permit G-11534 adding additional points of appropriation will allow SVWC to more fully develop its maximum permit rate of 449 gpm and respond to increasing demand in a time and cost-effective manner. A regulatory provision for such permit amendments is that the involved wells withdraw water from the same source aquifer system as those existing wells approved under the permit.

The purpose of this review was to determine if hydraulic continuity exists between SVWC Well No. 50441 associated with ground water permit G-11534, RRR well No. 3 associated with RRR ground water permit G-11087 and the new well proposed by RRR (Figure 2). A key objective for the proposed new well is that it is completed in the same source aquifer system as SVWC Well No. 50441 and RRR Well No. 3.

Results from our study indicate that RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from the same source alluvial aquifer system. Evaluation of well log data also shows the proposed new well at the location shown on Figure 2 will also withdraw water from the same source alluvial aquifer system. The aquifer is an alluvial system between the Salmon and Sandy Rivers. The ground water flow diagram on Figure 2 illustrates the approximate ground water elevations.

The location of the proposed well shown in Figure 2, if completed in the same source aquifer system as RRR well No. 3 would also draw from the same source aquifer system as SVWC well No. 50441.

METHODS

A previous Kleinfelder report completed in September, 2005, in connection with well exploration was reviewed to avoid duplication of services. Well logs for RRR wells, SVWC wells and wells within a half mile of RRR well No. 3 and proposed new well were obtained from the Oregon Water Resources Department (OWRD). These logs were used to gather information on geology, water levels and yields in area wells.

Available Oregon Water Resources Department (OWRD) well log data and piezometric information from a previous Newton investigation and ModFlow model analysis of stream depletion potential by wells for RRR in 1989 were used to develop a generalized ground water elevation diagram as shown on Figure 2. The diagram reflects the differences in ground water elevations as one moves down the valley.

Well log data was also used to generate two cross sections. Cross section A-A' runs longitudinal down the valley and passes through SVWC and RRR wells. Cross section B-B' runs laterally across the valley and passes through the proposed new well location. Well locations and both cross section locations are shown on Figure 3.

FINDINGS

Geologic information gathered from driller's logs indicated that the valley floor is underlain with an alluvial aquifer system comprised of stream deposits and glacial till in mixed beds of sands, gravels, boulders and clays to depths of approximately 200-230 ft below the surface. Geologic cross sections A-A' and B-B' are shown in Figures 4 and 5. This alluvium is underlain by volcanic mudflows, lavas, tuffs, volcanic breccias, cobbly conglomerates and occasional non-carbonized woody materials generally believed to be part of the Sardine Formation.

Cross section A-A' (Figure 4) shows that the majority of the wells in the valley are completed in the alluvial deposits consisting of inter-bedded layers of sand, gravel, clay and conglomerates. Clay and ash lenses which act as local confining layers and partial boundaries to groundwater flow are considered semi-continuous longitudinally down the valley. One such clay lens appears to run semi-continuously through locations of all RRR wells No. 1, 2 and 3 and SVWC well No. 50441. This clay lens which is approximately 10-20 feet thick ranges in depths from 100-120 feet below the surface to 60-80 feet below the surface.

Cross section B-B' (Figure 5) shows very similar deposits as those shown in cross section A-A' (Figure 4). A lateral clay lens appears to lay in a partially continuous manner across the valley, varying in thickness from approximately 10-30 feet. The assumption is made that the clay lens is continuous between Welches Road and Highway 26 (Figure 4). However, no driller's logs were available for wells completed deeper than 50 feet below the surface between Welches Road and Highway 26.

Depth to first water and static water levels were recorded by well constructors. These water levels were also plotted on cross section A-A' and B-B' (Figure 4 and 5). In some cases first water is found deeper than static water level. This disparity in water levels suggests a certain

amount of confinement in the alluvial system. In other cases only static water levels are recorded. A few wells have also shown static water levels to be lower than first water levels. This could be explained by the presence of localized shallow perched water tables.

When looking at cross section A-A', it is apparent that static water levels in the RRR wells No. 1 through No. 3 are lower than those found in the SVWC well No. 50441. This can be explained by the fact that the overall ground water elevation between these wells changes depending on location within the alluvial valley. This is illustrated on the ground water elevation diagram of Figure 2. Ground water elevations are highest in the center of the valley between the Sandy and Salmon Rivers and lower in the proximity of the rivers near the outside edges of the valley. The ground water elevation contours on the diagram illustrate ground water flow in the downstream direction, along the longitudinal centerline of the valley and toward each river flanking the valley. The ground water elevation difference between SVWC well No. 50441 and the RRR wells No. 1 through 3 is approximately 50'. When these ground water elevations are plotted on a vertical 2 dimensional surface as they are plotted in Figure 4, it could appear as if the water table is not continuous. However Figure 2 shows that static water levels of wells along cross section A-A' will vary depending on where they intersect the cross section and where they are located laterally across the valley.

Review of geologic and hydrogeologic information indicates that the aquifer in the valley surrounding the RRR site is an alluvial aquifer system, unconfined, to partially-confined, with laterally discontinuous lenses of clay, tuffacaceous or ash materials. One such lens appears to underlay RRR wells No. 1 through 3 and SVWC well No. 50441. Driller's logs for RRR well No. 1 and SVWC well No. 50441 also indicate that the wells are all completed below this clay lens. We have also noted that the highest pumping rates (100-300 gallons per minute) are recorded on driller's logs for wells completed below this clay layer. Despite the partially-confined nature of the aquifer system in the valley and the presence of potential localized perched ground water tables, ground water elevations recorded by driller's logs do indicate a relatively continuous gradient in water levels with general direction of flow toward either the Sandy or Salmon Rivers (Figure 2).

CONCLUSIONS

Based on the information provided above, RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from a common source aquifer system that is partially-confined by a layer of clay or tuffaceous material that could be continuous between the wells. The location of the proposed well shown on Figure 3, if completed to similar depths and similar geologic materials as RRR well No. 3 would draw from the same source aquifer system as both RRR well No. 3 and SVWC well No. 50441.

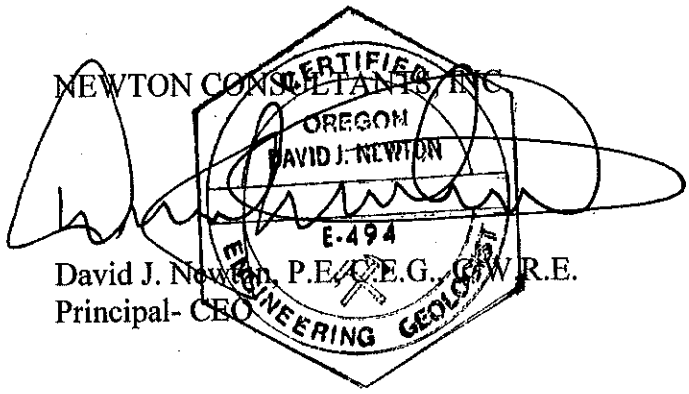
We appreciate the opportunity to be of service to Salmon Valley Water Company. Please call me if you have any questions concerning this report.

Sincerely,

NEWTON CONSULTANTS, INC.

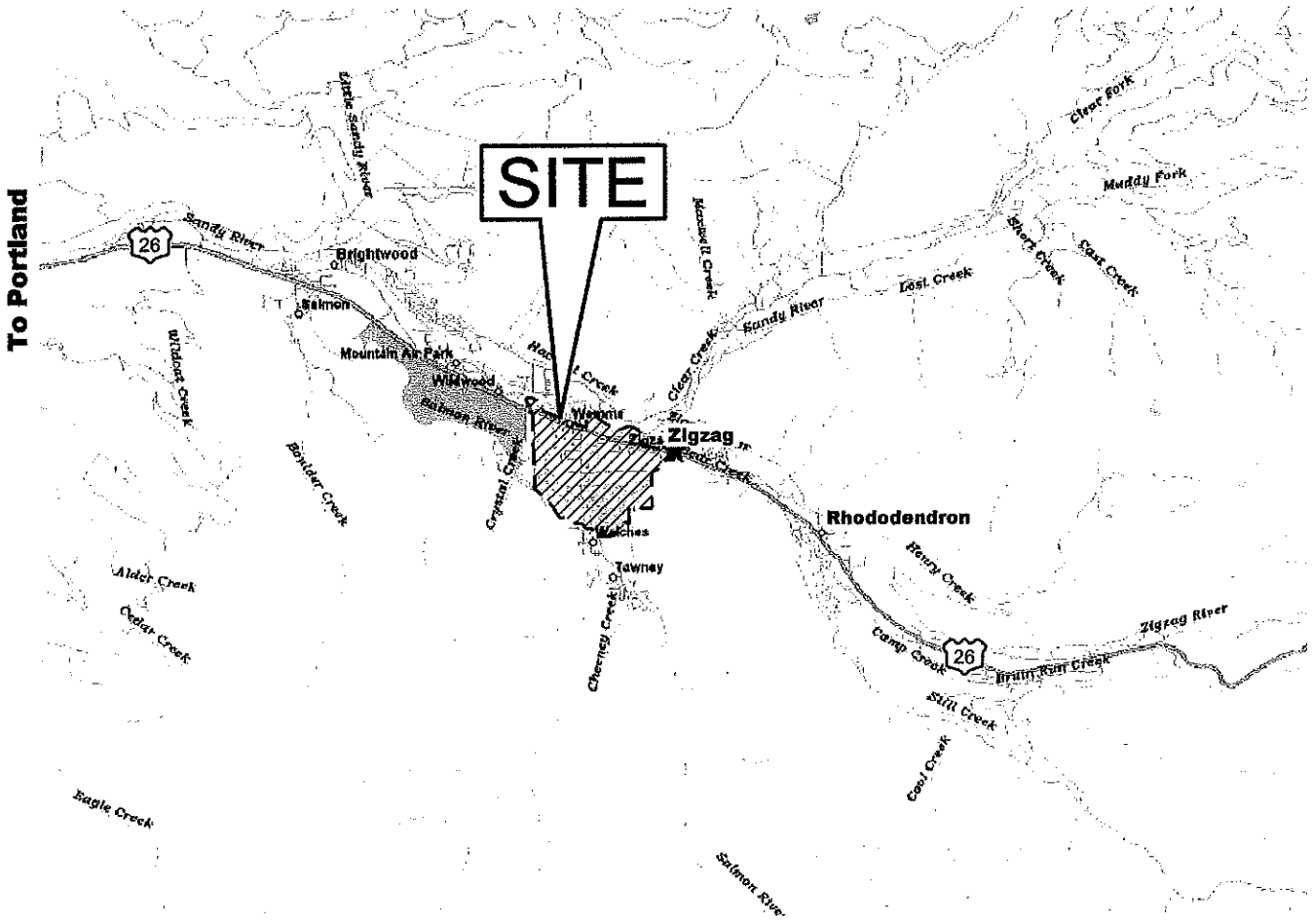
Mathias Perle
Hydrologic / Engineering Technician

NEWTON CONSULTANTS, INC.



David J. Newton, P.E./C.E.G., C.W.R.E.
Principal- CEO

Cc: Ed Hopper, RRR Golf, Inc.



0' 2 Mile 4 Mile

SCALE: 1" = 2 Miles

Base Map:
Map Quest Street Atlas USA

NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Vicinity map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
M.Perle	S.Schenck	Sept 2006	1036-101	1

G:\1000\1036\101\Cad\Water\W1036101_F1_VicMap 11:54 07/20/2006 SS

Kelly

Oregon
John A. Kitzhaber, M.D., Governor

Water Resources Department
Commerce Building
158 12th Street NE
Salem, OR 97310-0210
(503) 378-3739
FAX (503) 378-8130

INTEROFFICE MEMO

TO: TRANSFER SECTION DATE: 10-13-06

FROM: X WATERMASTER, DISTRICT # 20
GROUNDWATER SECTION

(SIGNATURE) [signature] date signed Jan. 5, 20

SUBJECT: **PERMIT AMENDMENT #** 10240

A change in: **POU** **POD** **POA** of water.

In the name(s) of Salmon Valley Water Co.

In my opinion (assuming the right is valid), the proposed change

MAY BE MADE WITHOUT INJURY WOULD RESULT IN INJURY* to an existing water right.

*The approval of this transfer application would result in injury to other water rights because_____

The existing right may not be valid because I have no reason to believe the existing right is not valid

Headgate notices HAVE HAVE NOT Been issued for diversion from the source(s)which serve(s) this right.

If for change in point of diversion, is there any intervening point(s) for diversion between the authorized and proposed points of diversion? (Yes or No) Source = WLD interactive mapping Jan 5, 200

In my opinion, the order approving the subject transfer application should include the following in regard to the appropriator installing suitable measuring devices in the diversion works:

✓ (1) PRIOR to the diverting of water at the new point of diversion . . .

_____ (2) WHEN IN the judgement of the watermaster it becomes necessary . . .

The enclosed copy of the transfer application and map(s) is for your records.

Oregon
John A. Kitzhaber, M.D., Governor

Water Resources Department
Commerce Building
158 12th Street NE
Salmon, OR 97310-0210
(503) 378-3739
FAX (503) 378-8130

INTEROFFICE MEMO

TO: TRANSFER SECTION DATE: 10-13-06

FROM: _____ WATERMASTER, DISTRICT # _____
X GROUNDWATER SECTION

(SIGNATURE) Doug Miller date signed 10/18/06

SUBJECT: **PERMIT AMENDMENT #** 10240

A change in: **POU** **POD** **POA** of water.

In the name(s) of Salmon Valley Water Co.

In my opinion (assuming the right is valid), the proposed change

MAY BE MADE WITHOUT INJURY WOULD RESULT IN INJURY* to an existing water right. Dwm

*The approval of this transfer application would result in injury to other water rights because_____

_____

_____

_____

_____

The existing right may not be valid because _____

_____

_____

Headgate notices HAVE HAVE NOT Been issued for diversion from the source(s)which serve(s) this right.

If for change in point of diversion, is there any intervening point(s) for diversion between the authorized and proposed points of diversion? (Yes or No) _____

In my opinion, the order approving the subject transfer application should include the following in regard to the appropriator installing suitable measuring devices in the diversion works:

_____ (1) PRIOR to the diverting of water at the new point of diversion . . .

_____ (2) WHEN IN the judgement of the watermaster it becomes necessary . . .

The enclosed copy of the transfer application and map(s) is for your records.

STATE OF OREGON
Water Resources Department
725 Summer St. N.E., Ste. A
Salem, OR 97301

MEMORANDUM

DATE: 10/18/2006

TO: File T-10240, Salmon Valley Water Co.
FROM: Donn Miller, Hydrogeologist

SUBJECT: Permit Amendment Comments

The permit amendment seeks to add five additional POA's to the one well that is currently authorized.

The existing well develops water from an alluvial aquifer between the Sandy and Salmon Rivers. The additional wells will also need to develop that source. At the proposed well locations, the aquifer should occur between approximately land surface and 200 feet below land surface.

Quantifying hydraulic impacts to other users is difficult. Given the great thickness of the aquifer in the general area, effecient development should not result in substantial interference to any other well. A worst case simulation results in an interference of about 10 feet after 120 days of pumping at the maximum rate.

The same aquifer conclusion in the application report is reasonable. Head gradients are high in this environment.

CLAC
50441

Existing on right

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

(START CARD) # 80419

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number 344
Name Salmon Valley Water
Address P.O. Box 205
City Welches State OR. Zip 97067

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 100 ft.
Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	22	bentonite	0	22	50
8	22	100				

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[ ] Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8	+2	100	1/4	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Final location of shoe(s) 100 under

(7) PERFORATIONS/SCREENS:
[X] Perforations Method air
[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
75	80	1/4	80	8		[X]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
300		100	1 hr.

Temperature of water 54 Depth Artesian Flow Found
Was a water analysis done? [ ] Yes By whom
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Clack. Latitude Longitude
Township 3 N or S Range 7 E or W. WM.
Section 14 SW 1/4 NW 1/4
Tax Lot 4300 Lot Block Subdivision
Street Address of Well (or nearest address) 150 yards off Welch Rd. on Routedge Rd.

(10) STATIC WATER LEVEL:
19 ft. below land surface. Date 4/1/96
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 50

From	To	Estimated Flow Rate	SWL
50	80	300	19

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
gravel/boulders clay	0	30	
sand/gravel gray	30	50	
gravel/bolders gray	50	80	19
clay/gravel gray	80	90	
sand/gravel gray	90	100	

APR 8 1996 WATER RESOURCES DEPT. SALEM, OREGON

Date started 3/26/96 Completed 4/1/96

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number 1622
Signed Date 4/2/96

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 663
Signed Rodney C. Eck Date 4/2/96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

Perhaps the closest to a new well

CLAC 01865

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM 10, OREGON within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

JUN 2 5 1964

0186

State Well No. 3/7-5H

State Permit No.

(1) OWNER:
Name Hazel Land Acres
Address c/o Wm H Kipp
Welches Oregon

(2) LOCATION OF WELL:
County Clackamas Driller's well number 153
SE ¼ NE ¼ Section 5 T. 3S R. 7E W.M.
Bearing and distance from section or subdivision corner
well is in the East ½ of said location ?

(3) TYPE OF WORK (check):
Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☑
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☑ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☑
8 " Diam. from 0 ft. to 100 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Well seal—Material used in seal Sand + Cement
Depth of seal 21 ft. Was a packer used? no
Diameter of well bore to bottom of seal 10 in.
Were any loose strata cemented off? ☐ Yes ☑ No Depth
Was a drive shoe used? ☑ Yes ☐ No
Was well gravel packed? ☐ Yes ☑ No Size of gravel:
Gravel placed from ft. to ft.
Did any strata contain unusable water? ☑ Yes ☐ No
Type of water? Iron Depth of strata 80
Method of sealing strata off Blank casing

(10) WATER LEVELS:
Static level 16 ft. below land surface Date 4/15/64
Artesian pressure lbs. per square inch Date

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?

Yield:	gal./min. with	ft. drawdown after	hrs.
"	"	"	"
"	"	"	"

Baller test 60 gal./min. with 70 ft. drawdown after 4 hrs.
Artesian flow g.p.m. Date
Temperature of water 53 Was a chemical analysis made? ☑ Yes ☐ No

(12) WELL LOG:
Diameter of well below casing 8
Depth drilled 100 ft. Depth of completed well 100 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand + Boulders	0	14
Silt + Sand	14	45
Sand	45	76
Gravel (water)	76	82
Clay + Gravel	82	96
Gravel (water)	96	100

Work started 4/1 1964. Completed 5/13 1964
Date well drilling machine moved off of well 5/16/64 19

(13) PUMP:
Manufacturer's Name
Type: H.P.

Water Well Contractor's Certification:

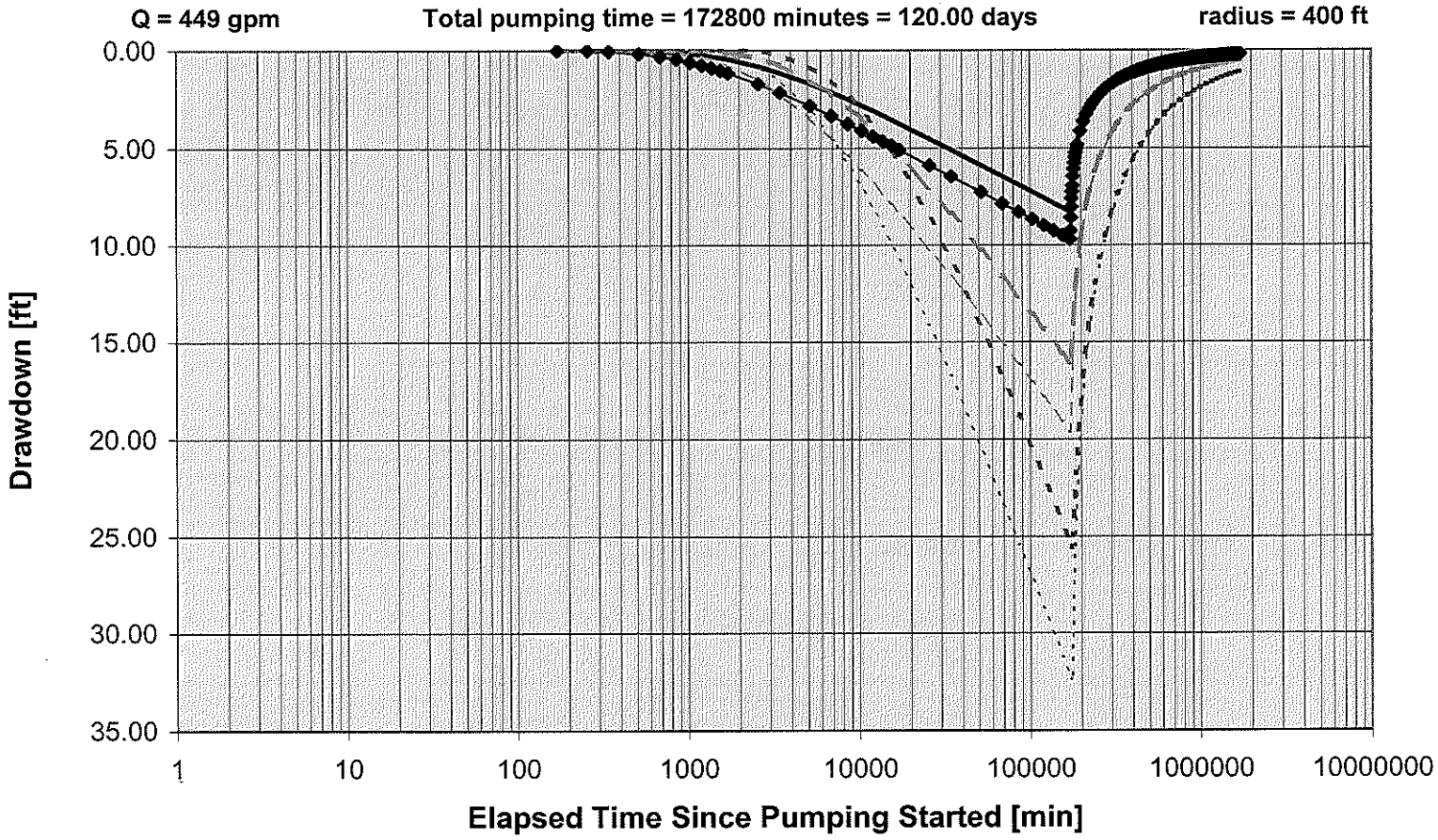
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME American Well Drilling Co
(Person, firm or corporation) (Type or print)
Address 143 S.E. 195th Ave. Portland

Drilling Machine Operator's License No. 175
[Signed] Clary C. Smith
(Water Well Contractor)
Contractor's License No. 375 Date 6-1-64, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

Theis Drawdown and Recovery at r = 400 ft From Pumping Well



T1 = 25,000 gpd/ft **T2 = 10,000 gpd/ft** **T3 = 5,000 gpd/ft**

S1 = 0.10000 **S2 = 0.05000**

Oregon
Theodore R. Kulongoski, Governor

Water Resources Department
North Mall Office Building
725 Summer Street NE, Suite A
Salem, OR 97301-1266
503-986-0900
FAX 503-986-0904

October 13, 2006

SALMON VALLEY WATER CO.
PO BOX 205
WELCHES OR 97067

Reference: Permit Amendment Transfer 10240

On September 18, 2006 we received your request for permit amendment additional point of appropriation for use of water from A WELL, tributary to SALMON RIVER. The application was accompanied by $350. Our receipt 84156 is enclosed.

By copy of this letter, we are asking the Watermaster for his report regarding the potential for injury to existing water rights which may be caused by the change.

Except as provided under ORS 540.510(3) for municipalities, you may not use water in the new place of use, or from the new point of appropriation, until 60 days after we received your notice (application) and the permit amendment has been approved.

We will notify you if additional information or corrections to the application or map are required.

If you have any questions, please call the Transfer Section, (503)986-0900.

cc: Watermaster **#20**
David Newton, CWRE
Groundwater
Ed Hopper
Daniel & Melinda Minch
Robert & Margaret Thurman
Clackamas County, Administration

enclosure

PUBLIC NOTICED ON 10/17/2006

County:	CLACKAMAS
Transfer:	10240
Water Right:	PERMIT G 11534
Priority Date:	02/21/1992
Name:	SALMON VALLEY WATER CO
Address:	PO BOX 205; WELCHES OR 97067
Change:	APOA
Source:	WELL
Authorized APOA:	T3S R7E 4
Proposed APOA:	T3S R7E 5

3. TYPE OF CHANGE PROPOSED

Please check all that apply

Point of Diversion or Appropriation	Place of Use	Character of Use (n/a for Permit Amendments)
☐ Change (The old point of diversion or appropriation will **not** be used for the portion of the water right affected by the transfer.) ☑ Additional (Both the old and new points of diversion or appropriation will be used for the portion of the water right affected by the transfer.) ☐ Historic Point of Diversion (Unauthorized point of diversion used for more than 10 years.) ☐ Surface Water to Ground Water (A new point of appropriation will be used **instead of** the old point of diversion and not as an additional point of appropriation.)	☐ All, or a portion, of the right will be exercised at a different location than currently authorized. (Use of water at the current location will be discontinued.) ☐ Exchange (Water from another source will be used in exchange for supplying an equal amount of replacement water to that source.)	Proposed new use: ☐ Irrigation ☐ Municipal ☐ Quasi-municipal ☐ Commercial ☐ Industrial ☐ Instream (complete **Supplemental Form B**) ☐ Domestic (indicate number of households) _____ ☐ Other _____ ☐ Substitution (A supplemental ground water right will be substituted for a primary surface water right.)

Reason for changes: Well yield limitations restrict actual peak pumping rate to 0.29 cfs (130 gpm). New points of appropriation are proposed in order to more fully develop Permit G-11534

Describe the ***current*** water delivery system. Include information on the pumps, canals, pipelines and sprinklers used to divert, convey and apply the water at the authorized place of use.

The description must be sufficient to demonstrate that the full quantity of water to be transferred can be conveyed from the authorized source and applied at the authorized location and that the applicant is ready, willing, and able to exercise the right. (Not applicable to applications for Permit Amendments.)

N/A

System capacity: 0.29 cubic feet per second (cfs)

*Attach one or more **Evidence of Use Affidavits** (Supplemental Form A) demonstrating that each of the right(s) involved in the transfer have been exercised in the last five years or that a presumption of forfeiture for non-use could be rebutted. (Not applicable to applications for Permit Amendments.)*

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900
www.wrd.state.or.us

Application for Water Right
Transfer

Please type or print legibly in dark ink. If your application is incomplete or inaccurate, we will return it to you. If any requested information does not apply to your application, insert "n/a". Please read and refer to the instructions when completing your application. A summary of review criteria and procedures that are generally applicable to these applications is available at www.wrd.state.or.us/publication/reports/index.shtml.

APPLICATION FOR:

Please check one

- ☐ Water Right Transfer
  - ☐ Historic Change in POD
  - ☐ To Instream Use
  - ☐ Other Transfer
- ☐ Temporary Transfer (number of years _____)
- ☑ Permit Amendment
- ☐ Drought Transfer
- ☐ Point of Diversion Change Due to Government Action

1. APPLICANT INFORMATION

Name: Salmon Valley Water Company - Michael Bowman
(First / Last)

Address: PO Box 205

Welches (City) | Oregon (State) | 97067 (Zip)

Phone: _____ (Home) 503-622-4083 (Work) _____ (Other)

*Fax: _____ *E-Mail address: bowman.michael@verizon.net

**Optional information*

2. AGENT INFORMATION

(The agent listed is authorized to represent the applicant in all matters relating to this transfer application)

Name: David J. (First) Newton (Last)

Address: 521 SW 6th Street, Suite 100

Redmond (City) | Oregon (State) | 97756 (Zip)

Phone: _____ (Home) 541-504-9960 (Work) _____ (Other)

*Fax: 541-504-9961 *E-Mail address: dnewton@newtonconsultants.com

**Optional information*

T 10240

RECEIVED
SEP 18 2006
WATER RESOURCES DEPT FSD
SALEM, OREGON

Certificate Number or other identifying number from ***Page 3***: G-11534

*A separate page providing the following information must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Is the entire water right identified on ***Page 3*** affected by this transfer? ☐ Yes ☑ No

*If "**Yes**", the remainder of **this page** need **not** be completed.*
*If "**No**", the following information **must be provided** only for those points of diversion/appropriation and places of use that are **involved in the transfer**.*

Government lot and donation land claim numbers must be included in the tables below only if the information is reflected on the existing water right.

Location of Existing Authorized Point(s) of Diversion or Appropriation to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
3	S	7	E	W.M.	4	SW NW		2205 feet South & 295 feet East from NW Corner, Section 4

Location of Existing Authorized Place of Use to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					No	Change In	Place of	Use

4. CURRENT WATER RIGHT INFORMATION

*A separate page providing the information in this section must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Water Right Subject to Transfer (check and complete **one** of the following):

☐	Certificated Right	Certificate Number	Permit Number or Decree Name
☐	Adjudicated, Un-certificated Right	Name of Decree	Page Number
☐	Permit for which Proof has been Approved	Permit Number	Date Claim of Beneficial Use Submitted
☐	Transferred Right for which Proof has been Filed	Previous Transfer Number	Date Claim of Beneficial Use Submitted
☑	Permit for which an Amendment is Requested	G-11534 Permit Number	10/01/2030 Completion Date of Permit

Name on Permit, Certificate, or Decree: Salmon Valley Water Company

County: Clackamas Authorized Use(s): Quasi-Municipal

Are there multiple **Priority Dates** identified on the water right? ☐ Yes ☑ No

*If "**Yes**", any information provided on **Page 4 must** identify which priority date is associated with each of the proposed points of diversion/appropriation and places of use. In addition, list those priority dates:* _____

Source(s) of Water Listed on Right: Ground Water

Tributary to: Salmon River Basin

Are there other **Sources** listed on the water right? ☐ Yes ☑ No

*If "**Yes**", any information provided on **Page 4 must** identify which source is associated with each of the proposed points of diversion/appropriation and proposed places of use. In addition, list those other sources:* _____

Are there **Other Water Rights** or permits associated with this land? ☑ Yes ☐ No

*If "**Yes**", what are the Permit or Certificate Numbers?* G-11335, G-11422, G13176, G-15209, 61982

Pursuant to ORS 540.510, any right that is supplemental to a primary right proposed for transfer must be included in the transfer or be cancelled.

Remarks: Certificate 61982 is for both irrigation and domestic use. Other listed permits are for Quasi-Municipal use.

RECEIVED
SEP 18 2006
WATER RESOURCES DEPT
SALEM, OREGON

5. PROPOSED CHANGES TO THE WATER RIGHT

Certificate Number or other identifying number : G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Section	Qtr160	Qtr40	Gov't Lot or DLC	Survey Coordinates
3	S	7	E	W.M.	5	NW	NE		1270 ft south and 1554 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	NW	NE		210 ft south and 2360 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		2046 ft south and 1260 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		2580 ft south and 845 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		1822 ft south and 60 feet west from NE corner, Section 5

Note: proposed POA No. 2 (see map) is existing Resort at Mountain well No. 3. Data on the well is attached

Location of Proposed Place of Use:

Township		Range		Mer	Section	1/4 1/4 Section		Gov't Lot or DLC
2	S	7	E	W.M.	32	NE	SW	
2	S	7	E	W.M.	32	NW	SE	
2	S	7	E	W.M.	32	SW	SE	
2	S	7	E	W.M.	32	SE	SE	
2	S	7	E	W.M.	33	SW	SW	
2	S	7	E	W.M.	33	SE	SW	
2	S	7	E	W.M.	33	SW	SE	
3	S	7	E	W.M.	4	NE	NE	
3	S	7	E	W.M.	4	NW	NE	
3	S	7	E	W.M.	4	SW	NE	
3	S	7	E	W.M.	4	SE	NE	
3	S	7	E	W.M.	4	NE	NW	
3	S	7	E	W.M.	4	NW	NW	
3	S	7	E	W.M.	4	SW	NW	
3	S	7	E	W.M.	4	SE	NW	
3	S	7	E	W.M.	4	NE	SW	
3	S	7	E	W.M.	4	NW	SW	
3	S	7	E	W.M.	4	SW	SW	
3	S	7	E	W.M.	4	SE	SW	
3	S	7	E	W.M.	4	NW	SE	
3	S	7	E	W.M.	5	NE	NE	
3	S	7	E	W.M.	5	NW	NE	
3	S	7	E	W.M.	5	SW	NE	
3	S	7	E	W.M.	5	SE	NE	
3	S	7	E	W.M.	5	NE	SE	
3	S	7	E	W.M.	5	NW	SE	
3	S	7	E	W.M.	5	SW	SE	
3	S	7	E	W.M.	5	SE	SE	
3	S	7	E	W.M.	9	NE	NW	
3	S	7	E	W.M.	9	NW	NW	

5. PROPOSED CHANGES TO THE WATER RIGHT

A separate page providing the information in this section must be completed for ***each*** *certificate, permit, decree, or other right involved in the proposed transfer.*

Certificate Number or other identifying number from ***Section 4***: G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
								See Attached Form

Attach additional copies as necessary to describe locations of other proposed points of diversion or appropriation. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Location of Proposed Place of Use:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					SEE	ATTACHED	FORM	

Attach additional copies as necessary to describe locations of other proposed places of use. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Remarks: _____

7. LAND OWNERSHIP

Does the applicant own the lands TO which the right is being transferred? NO
If "NO" provide the following information:

Names of receiving Landowner(s):

Ed Hopper
68010 East Fairway Avenue
Welches, OR 97067

Daniel G. Minch and Melinda K. Minch
25325 E Welches Road
Welches, OR 97067

Daniel G. Minch and Melinda K. Minch
P.O. Box 265
Rhododendron, OR 97049

Robert W. Thurman and Margaret A. Thurman
P.O. Box 65
Welches, OR 97067

6. AFFECTED DISTRICTS AND LOCAL GOVERNMENTS

Are any of the water rights proposed for transfer located within or served by an irrigation or other water district? ☑ Yes ☐ No

Will any of the water rights be located within or served by an irrigation or other water district after the proposed transfer? ☑ Yes ☐ No

Is water for any of the rights supplied under a water service agreement or other contract for stored water with a Federal agency? ☐ Yes ☑ No

*If "**Yes**", for any of the above, list the name and mailing address of the district and/or agency:*

Salmon Valley Water Company
PO Box 205
Welches, Oregon 97067

List the name and mailing address of all affected local governments (e.g., county, city, municipal corporation, and tribal governments within whose jurisdiction the rights are located).

Clackamas County-Administration; 2051 Kaen Road; Oregon City, OR 97045

7. LAND OWNERSHIP

Does the applicant own the lands **FROM** which the right is being transferred? ☐ Yes ☐ No
*If "**No**", provide the following information. For Temporary Transfers, also include a notarized statement granting consent to the transfer from each of the landowners:*

Names of Current Landowner(s): N/A (Permit amendment. Not a Transfer)
First Last

Address: _____

City State Zip

Does the applicant own the lands **TO** which the right is being transferred? ☐ Yes ☑ No
*If "**No**", provide the following information:*

Names of Receiving Landowner(s): SEE ATTACHED FORM
First Last

Address: _____

City State Zip

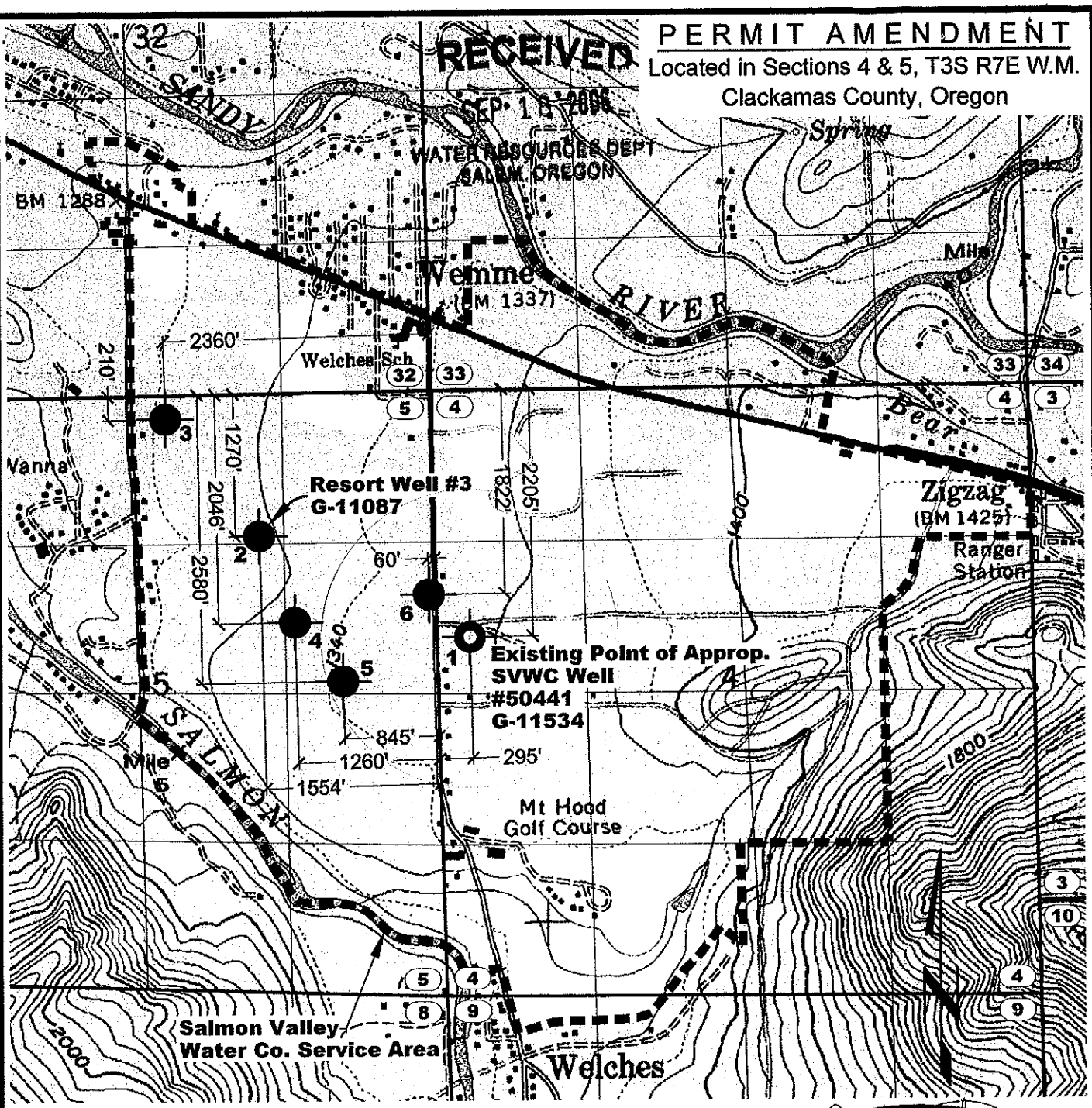
Check one of the following:

☐ The receiving landowner will be responsible for completion of the proposed changes after the final order is issued. All notices and correspondence should be sent to this landowner.

☑ The applicant will remain responsible for completion of changes. Notices and correspondence should continue to be sent to the applicant and applicant's agent.

PERMIT AMENDMENT

Located in Sections 4 & 5, T3S R7E W.M.
Clackamas County, Oregon



NOTES

1. This map was prepared for the purpose of identifying the location of water rights only and is not intended to provide legal dimensions or locations of property ownership lines.

LEGEND

1 — Existing Point of Appropriation.

2-6 — Additional Proposed Point of Appropriation.

Point of Appropriation Coordinates are Referenced to NE Corner of Section 5.

Certified Water Rights Examiner
419 WRE
DAVID J. NEWTON
JAN. 16, 1996
STATE OF OREGON

0' 1320' 2640'

SCALE: 1" = 1320'

NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Permit Amendment Map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
D.Newton	S.Schenck	Sept 2006	1036-101	1

G:\1000\1036\101\Cad\Water\W1036101_F1_PermAmdMp 09:41 09/15/2006 SS

8. ATTACHMENTS

Check each of the following attachments included with this application. The application will be returned if all required attachments are not included.

Form A – Evidence of Use Affidavits

☐ At least one Evidence of Use Affidavit documenting that the right has been used during the last five years or that the right is not subject to forfeiture under ORS 540.610 is attached. The affidavit provided must be the original, not a copy.

Form B – Instream Water Right Transfer

☐ Required for instream transfers only.

Map

☐ Permanent Water Right Transfer
The map must be prepared by a Certified Water Right Examiner and meet the requirements of OAR 690-380-3100 unless a waiver has been granted. The map provided must be the original, not a copy.

☑ Permit Amendment, Temporary Transfer, or Other Application
A map meeting the requirements of OAR 690-380-3100 must be included but need not be prepared by a Certified Water Right Examiner.

Evidence of Lien Holder Notification

☐ Copies of the written notification of the proposed transfer provided by the applicant to each lien holder, unless the water right has been quit claimed.

Recorded Deed

☐ Required for temporary transfers only.

Land Use Information Form:

☐ Enclosed

☐ Not Required if all of the following are met:
1. In EFU zone or irrigation district,
2. Change in place of use only,
3. No structural changes needed, including diversion works, delivery facilities, other structures, and
4. Irrigation only.

Water Well Reports/Well Logs:

☑ The application is for a change in point of appropriation or change from surface water to ground water and copies of all water well reports are attached.

☑ Water well reports are not available and a description of construction details including well depth, static water level, and information necessary to establish the ground water body developed or proposed to be developed is attached.

☐ The application is for a surface water transfer and water well reports are not required.

Fees:

☑ Amount enclosed: $ 350.00
See the Department's Fee Schedule at www.wrd.state.or.us or call (503) 986-0900.

9. SIGNATURES

I (we) understand that prior to approval of a permanent transfer and after issuance of a draft preliminary determination by the Department, I (we) must submit:

(1) A report on ownership and lien information prepared by a title company within the last three months if required under OAR 690-380-3000(13), and

(2) If I (we) are not the landowners, proof that the landowner or entity to which the water right has been quitclaimed consents to the transfer or that ownership information is not required.

I (we) affirm that the information contained in this application is true and accurate.

applicant signature	name (print)	date
	Michael Bowman	9/6/06

Before submitting your application, be sure you have:

- Answered each question completely.
- Included the required attachments.
- Provided original signatures for all named deed holders or other parties with an interest in the right.
- Included a check payable to the Oregon Water Resources Department for the appropriate amount.

(2) The permittee/appropriator shall install a meter or other measuring device suitable to the Director, and shall keep a complete record of water uses.

(3) The permittee/appropriator shall be responsible for complying with each of the following requirements for measuring water levels in the well.

(a) Use of water from a new well shall not begin until the initial water level in the well has been measured. A measurement of initial water level shall be made at the time a pump is installed, but before pumping begins.

(b) In addition to the measurement required in subsection (a) of this section, a water level measurement shall be made each year at the time of spring high water during the period March 15 through April 15.

(c) All water level measurements shall be made by a qualified individual. Qualified individuals include certified water rights examiners, licensed water well drillers, registered geologists, registered professional engineers, registered land surveyors, or the permittee/appropriator.

(d) Any qualified individual measuring a well shall use standard methods of procedure and equipment designed for the purpose of well measurement. The equipment used shall be well suited to the conditions of construction at the well. A list of standard methods of procedure and suitable equipment shall be available from the Department.

(e) The permittee/appropriator shall submit a record of the measurement to the Department on a form available from the Department. The record of measurement shall be received not later than 30 days from the date of measurement.

(4) The Department shall determine when any of the declines cited in section (1) are evidenced by the well measurement required in section (3).

Within one year from the date the Water Resources Commission adopts rules describing the schedules, standards and procedures for water conservation management plans by water suppliers, Salmon Valley Water Company shall submit a plan which is consistent with said rules.

Within one year of permit issuance, the Salmon Valley Water Company shall prepare a plan/timetable for the Water Resources Commission which shall indicate the steps which Salmon Valley Water Company intends to pursue to obtain a long-term water supply.

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Actual construction work shall begin on or before August 17, 1993, and shall be completed on or before October 1, 1995. Complete application of the water shall be made on or before October 1, 1996.

BC ext. 10-1-97

STATE OF OREGON

COUNTY OF CLACKAMAS

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

SALMON VALLEY WATER COMPANY
P.O. BOX 205 503-622-4083
WELCHES, OREGON 97067

to use the waters of ONE WELL in the SALMON RIVER BASIN for QUASI-MUNICIPAL USE.

This permit is issued approving Application G-12785. The date of priority is FEBRUARY 21, 1992. The use is limited to not more than 1.0 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the well.

The wells are located as follows:

SW 1/4 NW 1/4, SECTION 4, T 3 S, R 7 E, W.M.; 2205 FEET SOUTH AND 295 FEET EAST FROM NW CORNER, SECTION 4.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the proposed place of use under this permit is as follows:

SE 1/4
SECTION 32
NW 1/4 SW 1/4
S 1/2 SW 1/4
SW 1/4 SE 1/4
SECTION 33
TOWNSHIP 2 SOUTH, RANGE 7 EAST, W.M.

N 1/2
SW 1/4
NW 1/4 SE 1/4
SECTION 4
E 1/2
SECTION 5
N 1/2 NW 1/4
SECTION 9
TOWNSHIP 3 SOUTH, RANGE 7 EAST, W.M.

(1) Use of water from the well, as allowed herein, shall be regulated if the well displays:

(a) An average water level decline of three or more feet per year for five consecutive years; or

(b) A total water level decline of fifteen or more feet; or

(c) A hydraulic interference decline of fifteen or more feet in any neighboring well providing water for senior exempt uses or wells covered by prior rights.

CLAC
50441

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

(START CARD) # 80419

(1) OWNER: Well Number 344
Name Salmon Valley Water
Address P.O. Box 205
City Welches State OR. Zip 97067

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 100 ft.
Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	22	bentonite	0	22	50
8	22	100				

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[ ] Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8	+2	100	1/4	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Final location of shoe(s) 100 under

(7) PERFORATIONS/SCREENS:
[X] Perforations Method air
[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
75	80	1/4	80	8		[X]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
300		100	1 hr.

Temperature of water 54 Depth Artesian Flow Found
Was a water analysis done? [ ] Yes By whom
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Clack. Latitude Longitude
Township 3 N or S Range 7 E or W. WM.
Section 14 SW 1/4 NW 1/4
Tax Lot 4300 Lot Block Subdivision
Street Address of Well (or nearest address) 150 yards off Welch Rd. on Routedge Rd.

(10) STATIC WATER LEVEL:
19 ft. below land surface. Date 4/1/96
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 50

From	To	Estimated Flow Rate	SWL
50	80	300	19

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
gravel/boulders clay	0	30	
sand/gravel gray	30	50	
gravel/bolders gray	50	80	19
clay/gravel gray	80	90	
sand/gravel gray	90	100	

APR 0 9 1996
WATER RESOURCES DEPT.
SALEM, OREGON

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SEP 18 2006
WATER RESOURCES DEPT
SALEM, OREGON

Date started 3/26/96 Completed 4/1/96

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number 1622
Signed Date 4/2/96

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 663
Signed Rocky C Eck Date 4/2/96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for beneficial use of water without waste. The water user is advised that new regulations may require use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Issued this date, AUGUST 17, 1992.

/s/ MARTHA O. PAGEL

Water Resources Department
Martha O. Pagel
Director

"B" Ext to: 10-1-2030

"C" Ext to: 10-1-2030

We know from prior hydrogeologic work that water levels in wells are subject to seasonal fluctuations. The following table provides available water level measurements with dates.

WELL IDENTIFICATION	STATIC WATER LEVEL		PUMPING WATER LEVEL	
Well Number 1	4-29-89 4-15-93	72.75 Feet 72.60 Feet	4-29-89	142.10 Feet
Well Number 2	4-29-89	70.00 Feet		
Well Number 3	-------	----------	-------	----------

Because all wells utilize submersible pumps, I did not attempt to obtain probe measurements. Probe measurement is typically not possible in a well with a submersible pump, due to probe entanglements in the conductor and column.

V. PUMPS AND MOTORS:

Three horsepower submersible pumps are utilized in wells 2 and 3. In each case, a galvanized steel column has been installed to the ground surface.

A 20 horsepower submersible pump is utilized in well number 1. The top of the pump is 164 feet below the top of the well casing. A 4-inch galvanized steel column has been installed to the ground surface. The pump was designed to deliver 250 gallons per minute at 240 feet of head.

The design discharge rate for well number 1 is 250 gpm into the irrigation system. The design discharge rate for wells number 2 and 3 is 50 gpm each, at open discharge to the storage lake. In both cases, I calculated the static lift and column friction losses, to estimate total dynamic head conditions. I then estimated the discharge capacity from well number 1 at 380 gpm and wells number 2 and number 3 at 85 gpm. These numbers do <u>not</u> compare closely with the design discharge rates, but demonstrate adequate capacity to pump the authorized diversion rate.

It is important to note that all wells were constructed in an alluvial aquifer, that is subject to seasonal recharge. The static water level is expected to fluctuate with the season of the year, with this period of the year being the expected lowest water level. As the water level declines, due to expected seasonal fluctuations, the well pump discharge rate will diminish. The final proof survey however, should be based upon the highest pumping water level, observed during development of the supply wells. In this case however, the authorized diversion rate is restricted by acres irrigated and not well pump capacity.

III. SOURCE:

The source, under permit G-11087, includes three groundwater wells located within golf course fairways. Three additional wells, located on the easterly 18-hole golf course, also provide irrigation water and serve other uses. The easterly 18-hole golf course, and the westerly 9-hole golf course, are inter-tied with 2-inch PVC main line piping under Welches Road. This inter-tie improves the efficiency of the underground irrigation system and dramatically improves the reliability of the entire irrigation system. Typically this inter-tie would only be utilized in an emergency, such as failure of a project pump.

The easterly 18-hole golf course is irrigated under permit G-11283 and certificate numbers 61983 and 7895.

Permit G-11087, includes irrigation and recreation as the only uses. It appears appropriate therefore to establish the acres of irrigated turf on the west 9-hole golf course, and the acres of surface water ponds and apply the specified maximum duty of 1/80 cfs per acre. It is also necessary to determine the total maximum pumping rate from the three wells on the west 9-hole golf course, and complete a comparison of the actual beneficial use of the water to the original permit stipulations. The capacity of the irrigation booster pump, drawing water from the storage ponds must equal or exceed the well pump capacity. The final water right certificate will be restricted to 1) the actual quantity of water beneficially utilized in conformance with the permit, or 2) the total quantity of water allowed under the original permit, whichever is less.

IV. DIVERSION POINTS:

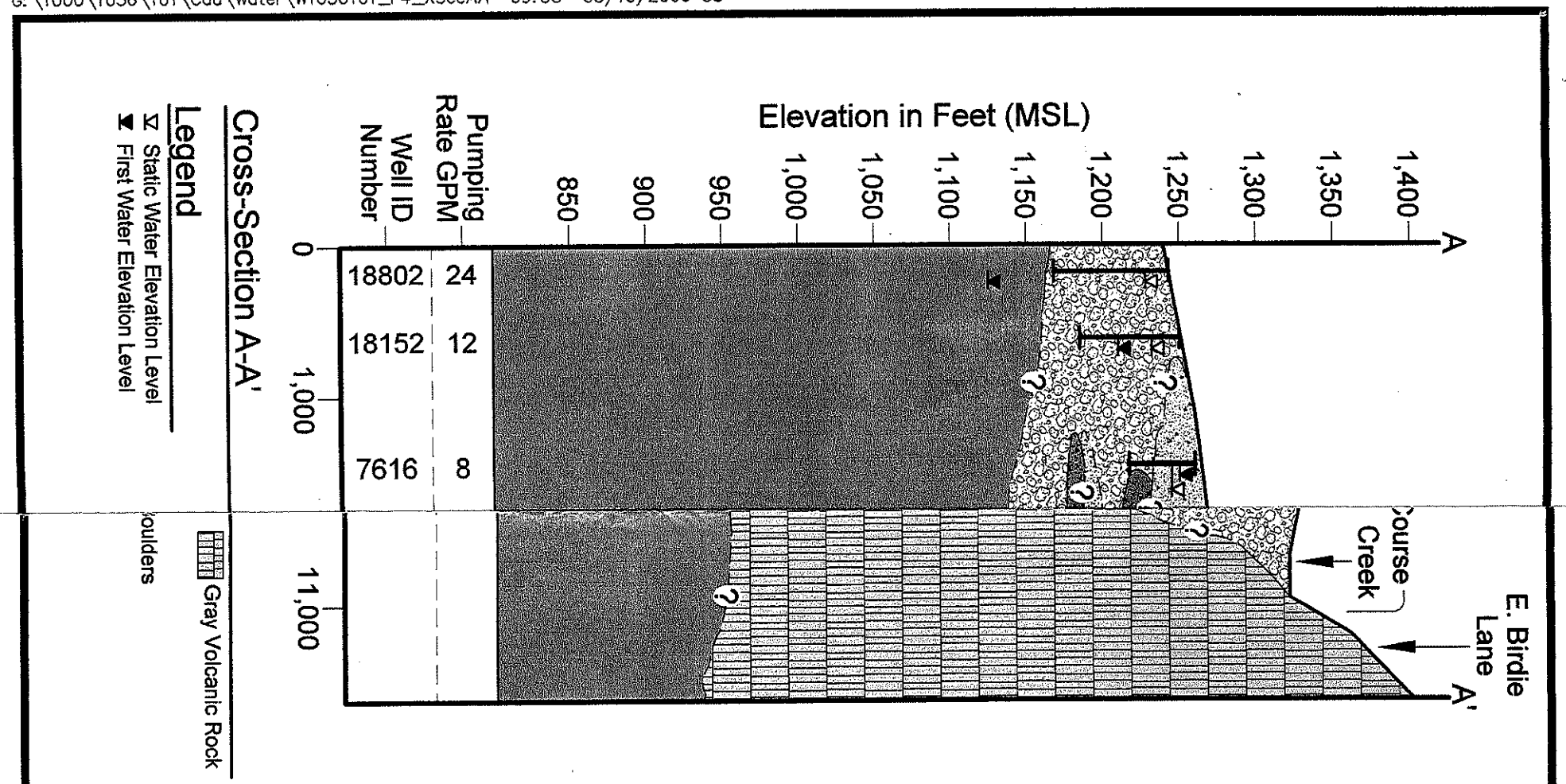
As noted, three groundwater wells are included under permit G-11087. Well number 3 was constructed to a total depth of 138 feet below the ground surface. 6-5/8-inch diameter casing was installed to 128 feet. At the time of well construction the static water level was measured at $\pm$70 feet.

Well number 2 was constructed to 154 feet and 6-5/8 inch steel casing installed to 154 feet. The static water level at the time of construction was $\pm$70 feet.

Well number 1 was constructed by Staco Well Services Inc. in April and May, 1989. Well number 1 included an 18-inch diameter bore to a depth of 32 feet and a $\pm$12-inch diameter bore to a total depth of 217 feet. 12-inch diameter casing was installed to 177 feet and a 10-inch diameter liner was installed to 177 feet. A screen was installed from 177 feet to 217 feet. A&H Pump Service completed a test pumping on April 29, 1989. Generally, A&H Pump recorded a draw down of 70 feet after 42 hours of pumping at a rate of 250 gpm. Pump test results for well number 1 are enclosed. The static water level at the start of the test was 72 feet 9 inches.

Wells 1 and 2 were equipped with air lines and I completed water level measurements during my site inspection. Well number 1 was not running, but had been operated for approximately 12 hours, the night before. A static water level of 100 feet was measured on a direct reading gage, after pumping air into the air tube. Well number 2 had been off for approximately 30 days, but would have been influenced by well number 1 due to the close proximity. A static water level of 90 feet was measured using the same procedure. There was no air tube in well number 3.

G:\1000\1036\101\Cad\Water\W1036101_F4_XSecAA 09:53 08/10/2006 SS



NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Cross-Section A-A'

SVWD - Water Supply Development
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
M.Perle	S.Schenck	August 2006	1036-101	4

Oregon Water Resources Department

State of Oregon
Water Resources Department
725 Summer Street NE, Suite A, Salem, OR. 97301-1271
Phone: 503-986-0900
http://www.wrd.state.or.us

FAX TRANSMITTAL

To: Mathias Perle - Newton Consultants **Fax Number:** 541-504-9961

Date: 10/17/2006 **Pages:** 2, **including cover sheet**

From: Kelly Starnes **Phone:** 503-986-0886

Comments:

10/13/2006 acknowledgment letter for T-10240

DIRECTOR'S OFFICE
- Water Resources Commission
- Legislation and Rules
- Public Information

FIELD SERVICES
- Regional Liaisons
- Transfers
- Hydrographics

NORTHWEST REGION
- District 16 Watermaster

ADMINISTRATIVE SERVICES
- Fiscal / Accounting
- Human Resources / Personnel
- Water Development Loan Fund
- Support Services

Fax: 503-986-0903 or 503-986-0904

TECHNICAL SERVICES
- Dam Safety
- Enforcement
- Ground Water
- Information Services
- GIS/Mapping
- Water Use Reporting

Fax: 503-986-0902

WATER RIGHTS
- Water Rights Information
- Adjudications
- Hydroelectric
- Certificates / Final Proofs
- Hearings / Contested Cases

Fax: 503-986-0901

Oregon
Theodore R. Kulongoski, Governor

Water Resources Department
North Mall Office Building
725 Summer Street NE, Suite A
Salem, OR 97301-1266
503-986-0900
FAX 503-986-0904

October 13, 2006

SALMON VALLEY WATER CO.
PO BOX 205
WELCHES OR 97067

Reference: Permit Amendment Transfer 10240

On September 18, 2006 we received your request for permit amendment additional point of appropriation for use of water from A WELL, tributary to SALMON RIVER. The application was accompanied by $350. Our receipt 84156 is enclosed.

By copy of this letter, we are asking the Watermaster for his report regarding the potential for injury to existing water rights which may be caused by the change.

Except as provided under ORS 540.510(3) for municipalities, you may not use water in the new place of use, or from the new point of appropriation, until 60 days after we received your notice (application) and the permit amendment has been approved.

We will notify you if additional information or corrections to the application or map are required.

If you have any questions, please call the Transfer Section, (503)986-0900.

cc: Watermaster **#20**
David Newton, CWRE
Groundwater
Ed Hopper
Daniel & Melinda Minch
Robert & Margaret Thurman
Clackamas County, Administration

enclosure

PUBLIC NOTICED ON 10/17/2006

County:	CLACKAMAS
Transfer:	10240
Water Right:	PERMIT G 11534
Priority Date:	02/21/1992
Name:	SALMON VALLEY WATER CO
Address:	PO BOX 205; WELCHES OR 97067
Change:	APOA
Source:	WELL
Authorized APOA:	T3S R7E 4
Proposed APOA:	T3S R7E 5

Kelly Starnes

From: Mathias Perle [mperle@newtonconsultants.com]
Sent: Tuesday, October 17, 2006 2:24 PM
To: patrick.k.starnes@wrd.state.or.us
Subject: FW: Permit Amendment Transfer 10240

-->

Dear Kelly,

This request concerns Permit Amendment Transfer 10240 requesting to amend permit G-11534 by adding points of appropriation. Per our phone conversation earlier today (October 17, 2006), we would like to formerly request that Daniel & Melinda Minch and Robert & Margaret Thurman be removed from the application as being receiving land owners as stated in Section 7 of Permit Amendment Transfer 10240. We would like to keep the alternate well locations on the application map however. These well locations will only be considered if the original well placement is not successful.

Please let us know if any further documentation is necessary.

Sincerely,

Mathias Perle

****

Mathias Perle

Hydrologic / Engineering Technician

Newton Consultants, Inc.

541-504-9960 Ext. 233

Fax: 541-504-9961

mperle@newtonconsultants.com

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900
www.wrd.state.or.us

Application for Water Right
Transfer

Please type or print legibly in dark ink. If your application is incomplete or inaccurate, we will return it to you. If any requested information does not apply to your application, insert "n/a". Please read and refer to the instructions when completing your application. A summary of review criteria and procedures that are generally applicable to these applications is available at www.wrd.state.or.us/publication/reports/index.shtml.

APPLICATION FOR:

Please check one

- ☐ Water Right Transfer
  - ☐ Historic Change in POD
  - ☐ To Instream Use
  - ☐ Other Transfer
- ☐ Temporary Transfer (number of years ____)
- ☑ Permit Amendment
- ☐ Drought Transfer
- ☐ Point of Diversion Change Due to Government Action

1. APPLICANT INFORMATION

Name: Salmon Valley Water Company - Michael Bowman
(First / Last)

Address: PO Box 205

Welches (City) | Oregon (State) | 97067 (Zip)

Phone: _____ (Home) 503-622-4083 (Work) _____ (Other)

*Fax: _____ *E-Mail address: bowman.michael@verizon.net

**Optional information*

2. AGENT INFORMATION

(The agent listed is authorized to represent the applicant in all matters relating to this transfer application)

Name: David J. (First) Newton (Last)

Address: 521 SW 6th Street, Suite 100

Redmond (City) | Oregon (State) | 97756 (Zip)

Phone: _____ (Home) 541-504-9960 (Work) _____ (Other)

*Fax: 541-504-9961 *E-Mail address: dnewton@newtonconsultants.com

**Optional information*

T 10240

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WATER RESOURCES DEPT FSD
SALEM, OREGON

3. TYPE OF CHANGE PROPOSED

Please check all that apply

Point of Diversion or Appropriation	Place of Use	Character of Use (n/a for Permit Amendments)
☐ Change (The old point of diversion or appropriation will **not** be used for the portion of the water right affected by the transfer.) ☑ Additional (Both the old and new points of diversion or appropriation will be used for the portion of the water right affected by the transfer.) ☐ Historic Point of Diversion (Unauthorized point of diversion used for more than 10 years.) ☐ Surface Water to Ground Water (A new point of appropriation will be used **instead of** the old point of diversion and not as an additional point of appropriation.)	☐ All, or a portion, of the right will be exercised at a different location than currently authorized. (Use of water at the current location will be discontinued.) ☐ Exchange (Water from another source will be used in exchange for supplying an equal amount of replacement water to that source.)	Proposed new use: ☐ Irrigation ☐ Municipal ☐ Quasi-municipal ☐ Commercial ☐ Industrial ☐ Instream (complete **Supplemental Form B**) ☐ Domestic (indicate number of households) _____ ☐ Other _____ ☐ Substitution (A supplemental ground water right will be substituted for a primary surface water right.)

Reason for changes: Well yield limitations restrict actual peak pumping rate to 0.29 cfs (130 gpm). New points of appropriation are proposed in order to more fully develop Permit G-11534

Describe the ***current*** water delivery system. Include information on the pumps, canals, pipelines and sprinklers used to divert, convey and apply the water at the authorized place of use.

The description must be sufficient to demonstrate that the full quantity of water to be transferred can be conveyed from the authorized source and applied at the authorized location and that the applicant is ready, willing, and able to exercise the right. (Not applicable to applications for Permit Amendments.)

N/A

System capacity: 0.29 cubic feet per second (cfs)

*Attach one or more **Evidence of Use Affidavits** (Supplemental Form A) demonstrating that each of the right(s) involved in the transfer have been exercised in the last five years or that a presumption of forfeiture for non-use could be rebutted. (Not applicable to applications for Permit Amendments.)*

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SALEM OREGON

T 10240

4. CURRENT WATER RIGHT INFORMATION

A separate page providing the information in this section must be completed for ***each*** *certificate, permit, decree, or other right involved in the proposed transfer.*

Water Right Subject to Transfer (check and complete **one** of the following):

☐	Certificated Right	Certificate Number	Permit Number or Decree Name
☐	Adjudicated, Un-certificated Right	Name of Decree	Page Number
☐	Permit for which Proof has been Approved	Permit Number	Date Claim of Beneficial Use Submitted
☐	Transferred Right for which Proof has been Filed	Previous Transfer Number	Date Claim of Beneficial Use Submitted
☑	Permit for which an Amendment is Requested	G-11534 Permit Number	10/01/2030 Completion Date of Permit

Name on Permit, Certificate, or Decree: Salmon Valley Water Company

County: Clackamas Authorized Use(s): Quasi-Municipal

Are there multiple **Priority Dates** identified on the water right? ☐ Yes ☑ No

*If "**Yes**", any information provided on **Page 4 must** identify which priority date is associated with each of the proposed points of diversion/appropriation and places of use. In addition, list those priority dates:* _____

Source(s) of Water Listed on Right: Ground Water

Tributary to: Salmon River Basin

Are there other **Sources** listed on the water right? ☐ Yes ☑ No

*If "**Yes**", any information provided on **Page 4 must** identify which source is associated with each of the proposed points of diversion/appropriation and proposed places of use. In addition, list those other sources:* _____

Are there **Other Water Rights** or permits associated with this land? ☑ Yes ☐ No

*If "**Yes**", what are the Permit or Certificate Numbers?* G-11335, G-11422, G13176, G-15209, 61982

Pursuant to ORS 540.510, any right that is supplemental to a primary right proposed for transfer must be included in the transfer or be cancelled.

Remarks: Certificate 61982 is for both irrigation and domestic use. Other listed permits are for Quasi-Municipal use.

T 10240

Certificate Number or other identifying number from ***Page 3***: G-11534

*A separate page providing the following information must be completed for **each** certificate, permit, decree, or other right involved in the proposed transfer.*

Is the entire water right identified on ***Page 3*** affected by this transfer? ☐ Yes ☑ No

*If "**Yes**", the remainder of **this page** need **not** be completed.*
*If "**No**", the following information **must be provided** only for those points of diversion/appropriation and places of use that are **involved in the transfer**.*

Government lot and donation land claim numbers must be included in the tables below only if the information is reflected on the existing water right.

Location of Existing Authorized Point(s) of Diversion or Appropriation to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
3	S	7	E	W.M.	4	SW NW		2205 feet South & 295 feet East from NW Corner, Section 4

Location of Existing Authorized Place of Use to be Changed:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					No	Change In	Place of	Use

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SALEM OREGON

T 10240

5. PROPOSED CHANGES TO THE WATER RIGHT

A separate page providing the information in this section must be completed for ***each*** *certificate, permit, decree, or other right involved in the proposed transfer.*

Certificate Number or other identifying number from ***Section 4***: G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Survey Coordinates (coordinates from a recognized survey corner)
								See Attached Form

Attach additional copies as necessary to describe locations of other proposed points of diversion or appropriation. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Location of Proposed Place of Use:

Township		Range		Mer	Sec	¼ ¼ Section	Gov't Lot or DLC	Acres (if applicable)
					SEE	ATTACHED	FORM	

Attach additional copies as necessary to describe locations of other proposed places of use. Clearly mark each of the additional copies with the appropriate Certificate Number or other identifying number. Not applicable to applications for transfers to instream water rights.

Remarks: _____

_____

_____

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WATER RESOURCES DEPT
SALEM, OREGON

T 10240

5. PROPOSED CHANGES TO THE WATER RIGHT

Certificate Number or other identifying number : G-11534

Location of Proposed Point(s) of Diversion or Point(s) of Appropriation:

Township		Range		Mer	Section	Qtr160	Qtr40	Gov't Lot or DLC	Survey Coordinates
3	S	7	E	W.M.	5	NW	NE		1270 ft south and 1554 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	NW	NE		210 ft south and 2360 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		2046 ft south and 1260 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		2580 ft south and 845 feet west from NE corner, Section 5
3	S	7	E	W.M.	5	SE	NE		1822 ft south and 60 feet west from NE corner, Section 5

Note: proposed POA No. 2 (see map) is existing Resort at Mountain well No. 3. Data on the well is attached

Location of Proposed Place of Use:

Township		Range		Mer	Section	1/4 1/4 Section		Gov't Lot or DLC
2	S	7	E	W.M.	32	NE	SW	
2	S	7	E	W.M.	32	NW	SE	
2	S	7	E	W.M.	32	SW	SE	
2	S	7	E	W.M.	32	SE	SE	
2	S	7	E	W.M.	33	SW	SW	
2	S	7	E	W.M.	33	SE	SW	
2	S	7	E	W.M.	33	SW	SE	
3	S	7	E	W.M.	4	NE	NE	
3	S	7	E	W.M.	4	NW	NE	
3	S	7	E	W.M.	4	SW	NE	
3	S	7	E	W.M.	4	SE	NE	
3	S	7	E	W.M.	4	NE	NW	
3	S	7	E	W.M.	4	NW	NW	
3	S	7	E	W.M.	4	SW	NW	
3	S	7	E	W.M.	4	SE	NW	
3	S	7	E	W.M.	4	NE	SW	
3	S	7	E	W.M.	4	NW	SW	
3	S	7	E	W.M.	4	SW	SW	
3	S	7	E	W.M.	4	SE	SW	
3	S	7	E	W.M.	4	NW	SE	
3	S	7	E	W.M.	5	NE	NE	
3	S	7	E	W.M.	5	NW	NE	
3	S	7	E	W.M.	5	SW	NE	
3	S	7	E	W.M.	5	SE	NE	
3	S	7	E	W.M.	5	NE	SE	
3	S	7	E	W.M.	5	NW	SE	
3	S	7	E	W.M.	5	SW	SE	
3	S	7	E	W.M.	5	SE	SE	
3	S	7	E	W.M.	9	NE	NW	
3	S	7	E	W.M.	9	NW	NW	

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6. AFFECTED DISTRICTS AND LOCAL GOVERNMENTS

Are any of the water rights proposed for transfer located within or served by an irrigation or other water district? ☑ Yes ☐ No

Will any of the water rights be located within or served by an irrigation or other water district after the proposed transfer? ☑ Yes ☐ No

Is water for any of the rights supplied under a water service agreement or other contract for stored water with a Federal agency? ☐ Yes ☑ No

*If "**Yes**", for any of the above, list the name and mailing address of the district and/or agency:*

Salmon Valley Water Company
PO Box 205
Welches, Oregon 97067

List the name and mailing address of all affected local governments (e.g., county, city, municipal corporation, and tribal governments within whose jurisdiction the rights are located).

Clackamas County-Administration; 2051 Kaen Road; Oregon City, OR 97045

7. LAND OWNERSHIP

Does the applicant own the lands **FROM** which the right is being transferred? ☐ Yes ☐ No
*If "**No**", provide the following information. For Temporary Transfers, also include a notarized statement granting consent to the transfer from each of the landowners:*

Names of Current Landowner(s): N/A (Permit amendment. Not a Transfer)
First Last

Address: _____

City State Zip

Does the applicant own the lands **TO** which the right is being transferred? ☐ Yes ☑ No
*If "**No**", provide the following information:*

Names of Receiving Landowner(s): SEE ATTACHED FORM
First Last

Address: _____

City State Zip

Check one of the following:

☐ The receiving landowner will be responsible for completion of the proposed changes after the final order is issued. All notices and correspondence should be sent to this landowner.

☑ The applicant will remain responsible for completion of changes. Notices and correspondence should continue to be sent to the applicant and applicant's agent.

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7. LAND OWNERSHIP

Does the applicant own the lands TO which the right is being transferred? NO
If "NO" provide the following information:

Names of receiving Landowner(s):

Ed Hopper
68010 East Fairway Avenue
Welches, OR 97067

Daniel G. Minch and Melinda K. Minch
25325 E Welches Road
Welches, OR 97067

Daniel G. Minch and Melinda K. Minch
P.O. Box 265
Rhododendron, OR 97049

Robert W. Thurman and Margaret A. Thurman
P.O. Box 65
Welches, OR 97067

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8. ATTACHMENTS

Check each of the following attachments included with this application. The application will be returned if all required attachments are not included.

Form A – Evidence of Use Affidavits

☐ At least one Evidence of Use Affidavit documenting that the right has been used during the last five years or that the right is not subject to forfeiture under ORS 540.610 is attached. The affidavit provided must be the original, not a copy.

Form B – Instream Water Right Transfer

☐ Required for instream transfers only.

Map

☐ Permanent Water Right Transfer
The map must be prepared by a Certified Water Right Examiner and meet the requirements of OAR 690-380-3100 unless a waiver has been granted. The map provided must be the original, not a copy.

☑ Permit Amendment, Temporary Transfer, or Other Application
A map meeting the requirements of OAR 690-380-3100 must be included but need not be prepared by a Certified Water Right Examiner.

Evidence of Lien Holder Notification

☐ Copies of the written notification of the proposed transfer provided by the applicant to each lien holder, unless the water right has been quit claimed.

Recorded Deed

☐ Required for temporary transfers only.

Land Use Information Form:

☐ Enclosed

☐ Not Required if all of the following are met:
1. In EFU zone or irrigation district,
2. Change in place of use only,
3. No structural changes needed, including diversion works, delivery facilities, other structures, and
4. Irrigation only.

Water Well Reports/Well Logs:

☑ The application is for a change in point of appropriation or change from surface water to ground water and copies of all water well reports are attached.

☑ Water well reports are not available and a description of construction details including well depth, static water level, and information necessary to establish the ground water body developed or proposed to be developed is attached.

☐ The application is for a surface water transfer and water well reports are not required.

Fees:

☑ Amount enclosed: $ 350.00
See the Department's Fee Schedule at www.wrd.state.or.us or call (503) 986-0900.

9. SIGNATURES

I (we) understand that prior to approval of a permanent transfer and after issuance of a draft preliminary determination by the Department, I (we) must submit:

(1) A report on ownership and lien information prepared by a title company within the last three months if required under OAR 690-380-3000(13), and

(2) If I (we) are not the landowners, proof that the landowner or entity to which the water right has been quitclaimed consents to the transfer or that ownership information is not required.

I (we) affirm that the information contained in this application is true and accurate.

applicant signature	name (print)	date
	Michael Bowman	9/15/06

Before submitting your application, be sure you have:

- Answered each question completely.
- Included the required attachments.
- Provided original signatures for all named deed holders or other parties with an interest in the right.
- Included a check payable to the Oregon Water Resources Department for the appropriate amount.

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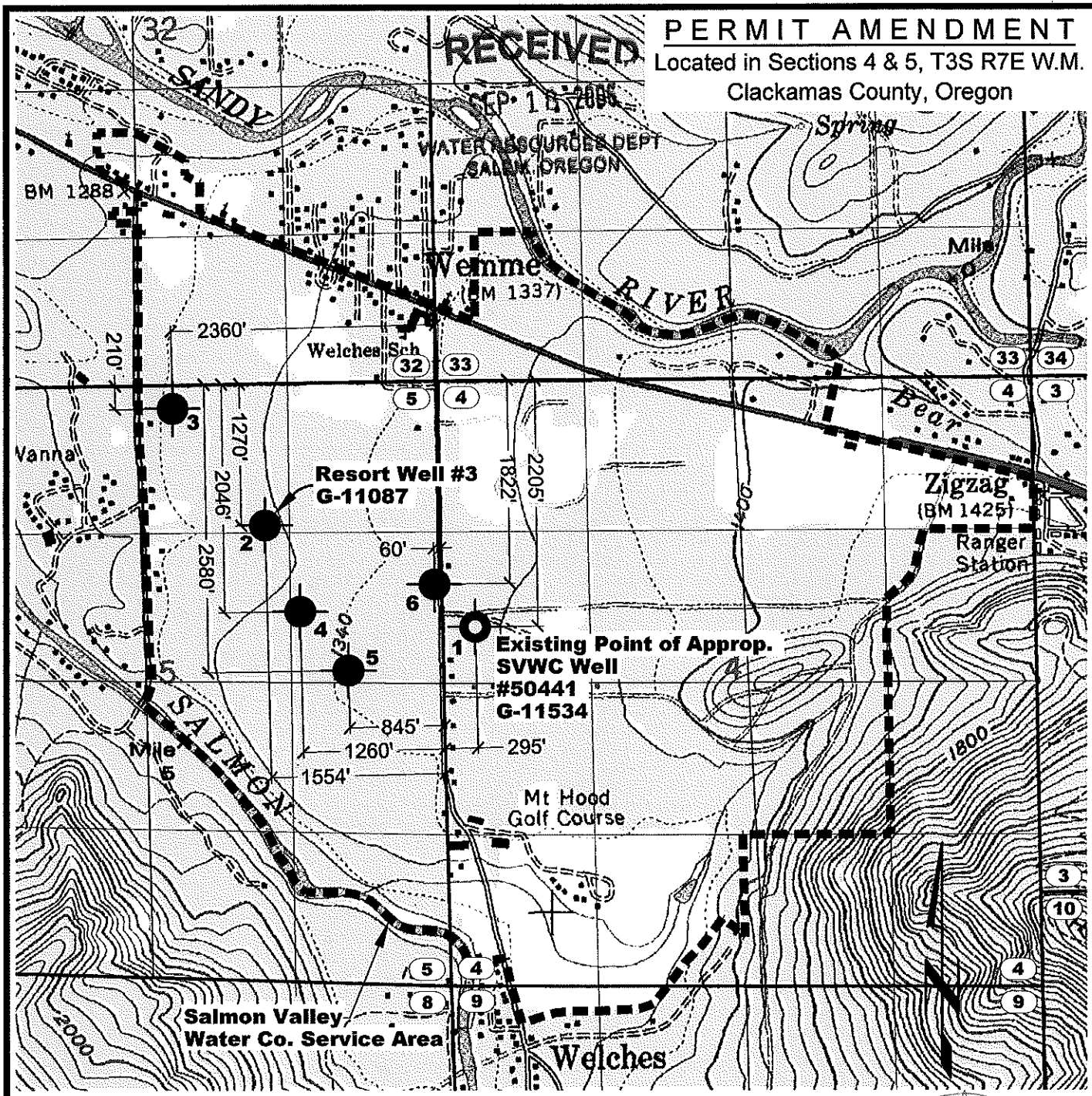
PERMIT AMENDMENT

Located in Sections 4 & 5, T3S R7E W.M.
Clackamas County, Oregon



NOTES

1. This map was prepared for the purpose of identifying the location of water rights only and is not intended to provide legal dimensions or locations of property ownership lines.

LEGEND

1 — Existing Point of Appropriation.

2-6 — Additional Proposed Point of Appropriation.

Point of Appropriation Coordinates are Referenced to NE Corner of Section 5.

Certified Water Rights Examiner
419 WRE
DAVID J. NEWTON
JAN. 16, 1996
STATE OF OREGON

0' 1320' 2640'

SCALE: 1" = 1320'

NEWTON CONSULTANTS INC.
Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Permit Amendment Map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
D.Newton	S.Schenck	Sept 2006	1036-101	1

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STATE OF OREGON

COUNTY OF CLACKAMAS

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

SALMON VALLEY WATER COMPANY
P.O. BOX 205 503-622-4083
WELCHES, OREGON 97067

to use the waters of ONE WELL in the SALMON RIVER BASIN for QUASI-MUNICIPAL USE.

This permit is issued approving Application G-12785. The date of priority is FEBRUARY 21, 1992. The use is limited to not more than 1.0 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the well.

The wells are located as follows:

SW 1/4 NW 1/4, SECTION 4, T 3 S, R 7 E, W.M.; 2205 FEET SOUTH AND 295 FEET EAST FROM NW CORNER, SECTION 4.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the proposed place of use under this permit is as follows:

SE 1/4
SECTION 32
NW 1/4 SW 1/4
S 1/2 SW 1/4
SW 1/4 SE 1/4
SECTION 33
TOWNSHIP 2 SOUTH, RANGE 7 EAST, W.M.

N 1/2
SW 1/4
NW 1/4 SE 1/4
SECTION 4
E 1/2
SECTION 5
N 1/2 NW 1/4
SECTION 9
TOWNSHIP 3 SOUTH, RANGE 7 EAST, W.M.

(1) Use of water from the well, as allowed herein, shall be regulated if the well displays:

(a) An average water level decline of three or more feet per year for five consecutive years; or

(b) A total water level decline of fifteen or more feet; or

(c) A hydraulic interference decline of fifteen or more feet in any neighboring well providing water for senior exempt uses or wells covered by prior rights.

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(2) The permittee/appropriator shall install a meter or other measuring device suitable to the Director, and shall keep a complete record of water uses.

(3) The permittee/appropriator shall be responsible for complying with each of the following requirements for measuring water levels in the well.

(a) Use of water from a new well shall not begin until the initial water level in the well has been measured. A measurement of initial water level shall be made at the time a pump is installed, but before pumping begins.

(b) In addition to the measurement required in subsection (a) of this section, a water level measurement shall be made each year at the time of spring high water during the period March 15 through April 15.

(c) All water level measurements shall be made by a qualified individual. Qualified individuals include certified water rights examiners, licensed water well drillers, registered geologists, registered professional engineers, registered land surveyors, or the permittee/appropriator.

(d) Any qualified individual measuring a well shall use standard methods of procedure and equipment designed for the purpose of well measurement. The equipment used shall be well suited to the conditions of construction at the well. A list of standard methods of procedure and suitable equipment shall be available from the Department.

(e) The permittee/appropriator shall submit a record of the measurement to the Department on a form available from the Department. The record of measurement shall be received not later than 30 days from the date of measurement.

(4) The Department shall determine when any of the declines cited in section (1) are evidenced by the well measurement required in section (3).

Within one year from the date the Water Resources Commission adopts rules describing the schedules, standards and procedures for water conservation management plans by water suppliers, Salmon Valley Water Company shall submit a plan which is consistent with said rules.

Within one year of permit issuance, the Salmon Valley Water Company shall prepare a plan/timetable for the Water Resources Commission which shall indicate the steps which Salmon Valley Water Company intends to pursue to obtain a long-term water supply.

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Actual construction work shall begin on or before August 17, 1993, and shall be completed on or before October 1, 1995. Complete application of the water shall be made on or before October 1, 1996.

BC ext. 10-1-97

T 10240

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for beneficial use of water without waste. The water user is advised that new regulations may require use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Issued this date, AUGUST 17, 1992.

/s/ MARTHA O. PAGEL

Water Resources Department
Martha O. Pagel
Director

"B" Ext to: 10-1-2030

"C" Ext to: 10-1-2030

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CLAC
50441

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

(START CARD) # 80419

(1) OWNER: Well Number 344
Name Salmon Valley Water
Address P.O. Box 205
City Welches State OR. Zip 97067

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 100 ft.
Explosives used [ ] Yes [X] No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	22	bentonite	0	22	50
8	22	100				

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[ ] Other
Backfill placed from ____ ft. to ____ ft. Material ____
Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8	+2	100	¼	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Final location of shoe(s) 100 under

(7) PERFORATIONS/SCREENS:
[X] Perforations Method air
[ ] Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
75	80	¼/1	80	8		[X]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
300		100	1 hr.

Temperature of water 54 Depth Artesian Flow Found ____
Was a water analysis done? [ ] Yes By whom ____
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other ____
Depth of strata: ____

(9) LOCATION OF WELL by legal description:
County Clack. Latitude ____ Longitude ____
Township 3 N or S Range 7 E or W. WM.
Section 14 SW 1/4 NW 1/4
Tax Lot 4300 Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 150 yards off Welch Rd. on Routedge Rd.

(10) STATIC WATER LEVEL:
19 ft. below land surface. Date 4/1/96
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 50

From	To	Estimated Flow Rate	SWL
50	80	300	19

(12) WELL LOG:
Ground Elevation ____

Material	From	To	SWL
gravel/boulders clay	0	30	
sand/gravel gray	30	50	
gravel/bolders gray	50	80	19
clay/gravel gray	80	90	
sand/gravel gray	90	100	

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Date started 3/26/96 Completed 4/1/96

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number 1622
Signed ____ Date 4/2/96

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 663
Signed ____ Date 4/2/96

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

1 .0240

III. SOURCE:

The source, under permit G-11087, includes three groundwater wells located within golf course fairways. Three additional wells, located on the easterly 18-hole golf course, also provide irrigation water and serve other uses. The easterly 18-hole golf course, and the westerly 9-hole golf course, are inter-tied with 2-inch PVC main line piping under Welches Road. This inter-tie improves the efficiency of the underground irrigation system and dramatically improves the reliability of the entire irrigation system. Typically this inter-tie would only be utilized in an emergency, such as failure of a project pump.

The easterly 18-hole golf course is irrigated under permit G-11283 and certificate numbers 61983 and 7895.

Permit G-11087, includes irrigation and recreation as the only uses. It appears appropriate therefore to establish the acres of irrigated turf on the west 9-hole golf course, and the acres of surface water ponds and apply the specified maximum duty of 1/80 cfs per acre. It is also necessary to determine the total maximum pumping rate from the three wells on the west 9-hole golf course, and complete a comparison of the actual beneficial use of the water to the original permit stipulations. The capacity of the irrigation booster pump, drawing water from the storage ponds must equal or exceed the well pump capacity. The final water right certificate will be restricted to 1) the actual quantity of water beneficially utilized in conformance with the permit, or 2) the total quantity of water allowed under the original permit, whichever is less.

IV. DIVERSION POINTS:

As noted, three groundwater wells are included under permit G-11087. Well number 3 was constructed to a total depth of 138 feet below the ground surface. 6-5/8-inch diameter casing was installed to 128 feet. At the time of well construction the static water level was measured at ±70 feet.

Well number 2 was constructed to 154 feet and 6-5/8 inch steel casing installed to 154 feet. The static water level at the time of construction was ±70 feet.

Well number 1 was constructed by Staco Well Services Inc. in April and May, 1989. Well number 1 included an 18-inch diameter bore to a depth of 32 feet and a ±12-inch diameter bore to a total depth of 217 feet. 12-inch diameter casing was installed to 177 feet and a 10-inch diameter liner was installed to 177 feet. A screen was installed from 177 feet to 217 feet. A&H Pump Service completed a test pumping on April 29, 1989. Generally, A&H Pump recorded a draw down of 70 feet after 42 hours of pumping at a rate of 250 gpm. Pump test results for well number 1 are enclosed. The static water level at the start of the test was 72 feet 9 inches.

Wells 1 and 2 were equipped with air lines and I completed water level measurements during my site inspection. Well number 1 was not running, but had been operated for approximately 12 hours, the night before. A static water level of 100 feet was measured on a direct reading gage, after pumping air into the air tube. Well number 2 had been off for approximately 30 days, but would have been influenced by well number 1 due to the close proximity. A static water level of 90 feet was measured using the same procedure. There was no air tube in well number 3.

We know from prior hydrogeologic work that water levels in wells are subject to seasonal fluctuations. The following table provides available water level measurements with dates.

WELL IDENTIFICATION	STATIC WATER LEVEL		PUMPING WATER LEVEL	
Well Number 1	4-29-89 4-15-93	72.75 Feet 72.60 Feet	4-29-89	142.10 Feet
Well Number 2	4-29-89	70.00 Feet		
Well Number 3	-------	----------	-------	----------

Because all wells utilize submersible pumps, I did not attempt to obtain probe measurements. Probe measurement is typically not possible in a well with a submersible pump, due to probe entanglements in the conductor and column.

V. PUMPS AND MOTORS:

Three horsepower submersible pumps are utilized in wells 2 and 3. In each case, a galvanized steel column has been installed to the ground surface.

A 20 horsepower submersible pump is utilized in well number 1. The top of the pump is 164 feet below the top of the well casing. A 4-inch galvanized steel column has been installed to the ground surface. The pump was designed to deliver 250 gallons per minute at 240 feet of head.

The design discharge rate for well number 1 is 250 gpm into the irrigation system. The design discharge rate for wells number 2 and 3 is 50 gpm each, at open discharge to the storage lake. In both cases, I calculated the static lift and column friction losses, to estimate total dynamic head conditions. I then estimated the discharge capacity from well number 1 at 380 gpm and wells number 2 and number 3 at 85 gpm. These numbers do <u>not</u> compare closely with the design discharge rates, but demonstrate adequate capacity to pump the authorized diversion rate.

It is important to note that all wells were constructed in an alluvial aquifer, that is subject to seasonal recharge. The static water level is expected to fluctuate with the season of the year, with this period of the year being the expected lowest water level. As the water level declines, due to expected seasonal fluctuations, the well pump discharge rate will diminish. The final proof survey however, should be based upon the highest pumping water level, observed during development of the supply wells. In this case however, the authorized diversion rate is restricted by acres irrigated and not well pump capacity.

As noted, wells 1 and 2 discharge directly to the storage pond on fairway number five, located in the NW1/4 NE1/4 and the SW1/4 NE1/4 of Section 5. Well 3 discharges into the pond on fairway number seven, located in the SW1/4 NE1/4 of Section 5. Excess water from the fairway seven pond runs through a surface ditch to the fairway number five pond. A centrifugal pump on the lower fairway number five pond pumps into the irrigation main line system. The centrifugal repump station must have a capacity equal to or greater than the final proof diversion rate to assure water can be beneficially utilized.

The centrifugal pump is a single 60 horsepower Gould Century pump and motor. The pump name plate had been removed and The Resort at the Mountain personnel had no record of pump model numbers or characteristic curves. Utilizing standard horsepower/discharge formulas, I calculated a capacity of 880 gpm, which exceeds the water right diversion rate, as expected. Calculations are attached. Typically, water from wells is stored during the day and then pumped from storage ponds at night, at a higher rate, to prevent irrigation impacts on golf play.

VI. PIPE:

Construction record drawings for The Resort at the Mountain golf course irrigation system are not readily available. Golf course maintenance personnel however indicated 2-inch to 6-inch diameter main line pipe has been installed down all fairways. I have estimated approximately 18,000 lineal feet of main line has been installed on the golf course for irrigation.

VII. USES:

As noted, uses observed during my site inspection include irrigation and recreation. The extent of these uses were determined from high quality aerial photography.

During my site inspection I walked each golf course fairway with Mr. Edwin Hopper and golf course personnel. I marked the limits of irrigation, on the aerial map, throughout the project. Typically, the limits of irrigation were determined by the edge of maintained turf. The maintained turf typically transitioned into native brush and vegetation. The brush line was typically accepted as the limits of beneficial use. In some cases, permanent set irrigation sprinklers did not reach to the limits of the maintained turf. Mr. Tony Lasher however, demonstrated irrigation of those areas with hoses and sprinklers, attached to the irrigation system at quick couplers.

Similarly, I compared surface water ponds in the field to the aerial photography and found the aerial photography to be very accurate. The total acreage for surface water ponds was then digitized from the aerial maps.

The following table documents the results of area calculations for both the irrigation and recreation uses on the Fox Glove golf course. All use is within Sections 4 and 5, Township 3 South, Range 7 East, Willamette Meridian.

W&H PACIFIC
Creative Solutions . . . Superior Service
155 N.E. Revere
Bend, Oregon 97701
(503) 388-4255
Fax (503) 388-4229
• Planning
• Engineering
• Surveying
• Landscape Architecture
• Environmental Services

EDWIN A. HOPPER
THE RESORT AT THE MOUNTAIN
FOX GLOVE GOLF COURSE
FINAL PROOF SURVEY - PERMIT G-11087
WELL AND BOOSTER PUMP DIVERSION RATE CALCULATIONS

① WELL NUMBER ONE - 20 HP SUBMERSIBLE

DESIGN FLOW RATE: 250 gpm at 240 Ft TDH
PUMP SET CONDITIONS:
164 LINEAL FEET (LF) 4" GALVANIZED STEEL PIPE
PUMPING WATER LEVEL: ±142 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 225 GPM)

VERTICAL LIFT:	142 Ft
H_f 164 LF 4" G.S. PIPE:	7.7 Ft
H_f 67 LF 4" PVC PIPE:	3.1 Ft
MISC. MINOR LOSSES:	3.0 Ft
ESTIMATED TDH:	156 Ft

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33{,}000)(H_p)(E_p)}{W\ h} = \frac{(33{,}000)(20)(.75)}{(8.34)(156)} = 380 \text{ gpm}$$

CONCLUSION: PUMP CLEARLY HAS CAPACITY TO MEET THE SPECIFIED DIVERSION RATE. THROTTLING OF THE PUMP WILL BE REQUIRED TO RESTRICT THE PUMPING RATE TO THE AUTHORIZED DIVERSION RATE.

② WELLS NUMBER TWO AND THREE: - 3 HP SUBMERSIBLE

DESIGN FLOW RATE: 50 GPM AT 120 FT TDH
PUMP SET: 110 TO 120 FT 2 INCH GALVANIZED STEEL COLUMN
PUMPING WATER LEVEL: ± 100 FT
FRICTION LOSS AND TDH CALCULATION: (ASSUME 50 GPM)

VERTICAL LIFT:	100 FT
H_f 120 LF 3" G.S. PIPE:	1.5
H_f 100 LF 3" PVC PIPE:	1.2
MISC LOSSES:	2.0
ESTIMATED TDH:	105 FT

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(2) WELLS NUMBER TWO AND THREE - CONTINUED

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{(33,000)(H_p)(E_p)}{W \quad h} = \frac{(33.000)(3)(.75)}{(8.34)(105)} = 8.5 \text{ gpm}$$

CONCLUSION: EACH WELL PUMP SHOULD BE CAPABLE OF PROVIDING 50 TO 80 gpm.

(3) LAKE BOOSTER PUMP - 60 HP CENTRIFICAL PUMP

FRICTION LOSS AND TDH CALCULATION

SUCTION LIFT: 1.5 Ft
DISCHARGE PRESSURE: 80PSI = 185 Ft
MISC LOSSES: ± 2.0 Ft
ESTIMATED TDH: 189 Ft

CALCULATE FLOW RATE FOR NOTED HEAD CONDITIONS:

$$Q = \frac{33.000 \; Hp \; EP}{W \quad h} = \frac{(33.000)(60)(.70)}{(8.34)(189)} = 880 \text{ gpm}$$

CONCLUSION: THE CENTRIFICAL PUMP HAS ADEQUATE CAPACITY TO RE-PUMP THE AUTHORIZED DIVERSION. THE CENTRIFICAL PUMP WOULD NORMALLY OPERATE AT NIGHT ONLY, BY DRAWING STORED WATER FROM PONDS.

T 10240

Project: THE RESORT AT THE MTN. PERMIT G-11087 Date: 9-27-93 Sheet No. 2 of 2
Prepared by: TAW Checked by: Job No: 345-02-01

NEWTON CONSULTANTS INC.

September 14, 2006
Project No. 1036-101

Ms. Sarah Henderson
Oregon Water Resources Department
725 Summer Street, NE, Suite A
Salem, OR 97301-1271

PERMIT AMENDMENT APPLICATION
PERMIT NO. G-11534
SALMON VALLEY WATER COMPANY, WELCHES, OREGON

Dear Sarah:

The Salmon Valley Water Company (the SVWC) supplies water to several hundred water users within its service area in the Welches, Oregon area. The SVWC has several ground water permits; however, well yield limitations prevent full appropriation authorized by the permits. Therefore, the SVWC plans to add additional points of appropriation to its Permit No. G-11534 to more fully appropriate water authorized by this permit. This plan is necessary for the SVWC to keep pace with increasing demand due to growth in its service area.

A practical and relatively expeditious solution for adding points of appropriation and increasing capacity is being developed collaboratively between the SVWC and RRR Golf, Inc (RRR). This arrangement would allow SVWC use of the RRR well No. 3 associated with RRR water right permit G-11087 and a new well proposed by RRR.

Addition of the proposed points of appropriation requires an amendment to Permit No. G-11534. In this regard, the following materials are enclosed:

1. Application for Water Right Transfer.
2. Check in the amount of $350 for the application fee.
3. Hydrogeologic report ("*Hydrogeologic Feasibility of Adding Additional Wells As Points of Appropriation*") dated August 25, 2006, by Newton Consultants, Inc. demonstrating that proposed appropriation points will withdraw water from the same source aquifer supplying the authorized point of appropriation.
4. "*Hydrogeological Report, Water Rights Appropriation Application, Rippling River Resort, OWRD File No. G11920*" dated July 12, 1990, by David J. Newton Associates, Inc., with MODFLOW stream depletion analysis for one well, West Golf Course.
5. "*Hydrogeological Report, Water Rights Appropriation Application, The Resort at the Mountain, ,OWRD File G11924*" dated May 3, 1991, by David J. Newton

T 10240

Associates, Inc. with MODFLOW stream depletion analysis for two wells, East Golf Course.

6. Well information for RRR well No. 3 from "*Groundwater Appropriation Claim of Beneficial Use and Site Report Under Permit No. G-11087*" dated September 27, 1993.

The reports of items 3, 4, 5 and 6 are enclosed to support findings that proposed points of appropriation will withdraw water from the same source aquifer supplying the authorized point of appropriation and to show stream depletion potential for proposed points of appropriation based on previous MODFLOW analysis of 3 wells. The report of item 4 is for a well within approximately 700 feet of Resort Well No. 3, proposed for an additional point of appropriation to SVWC Permit G-11534.

These reports indicate that adding the proposed points of appropriation to an existing permit are not likely to result in stream depletion beyond amounts that might occur under authorized appropriations.

A pre-application meeting was held with Ms. Lisa Jaramillo, Donn Miller and Kelly Starnes on August 28, 2006.

Please contact me if you have any questions at (541) 504-9960 extension 211, or by e-mail at dnewton@newtonconsultants.com.

Sincerely,

David J. Newton, P.E., C.W.R.E., C.E.G.
Principal

Enclosures

cc: Michael Bowman
Ed Hopper

T 10240

NEWTON CONSULTANTS INC.

August 25, 2006
Project No. 1036-101

Mr. Mike Bowman, President
Salmon Valley Water Company
P.O. Box 205
Welches, OR 97067

WATER SUPPLY DEVELOPMENT
HYDROGEOLOGIC FEASIBILITY OF ADDING ADDITIONAL WELLS AS POINTS OF APPROPRIATION; PERMIT G-11534

Dear Mr. Bowman:

This document presents the results of a preliminary review of geologic and hydrogeologic data in the area of the Salmon Valley Water Company (SVWC) Well No. 50441, Well No. 3 owned by RRR Golf, Inc. (RRR) and the site of a new well proposed by RRR, near Welches, Oregon. The location of the review area and wells is shown on Figure 1. The purpose of the review was to investigate the possibility that the SVWC Well No. 50441, RRR Well No. 3 and proposed RRR well withdraw water from a source aquifer system common to all three wells. If this possibility exists, it could then be possible to add the RRR wells as additional points of appropriation under a SVWC ground water permit. This, in turn, provides a timely method to help the SVWC maintain pace with water needs of new development within its service area.

The SVWC currently holds five ground water permits for quasi-municipal use. Ground water permits presently held by the SVWC are summarized below.

PERMIT NO.	MAX RATE (CFS)	USE	PRIORITY DATE
G-11335	0.37	Quasi-Municipal	06/03/1991
G-11422	0.50	Quasi-Municipal	10/03/1991
G-11534	1.0	Quasi-Municipal	02/21/1992
G-13176	0.501	Quasi-Municipal	03/13/1996
G-15209	0.334	Quasi-Municipal	03/27/2001
TOTAL	**2.705**		

Ground water is used to supply needs of the SVWC's present customer base, consisting of approximately 800 service connections in the Welches area. The quasi-municipal permits authorize a total maximum combined appropriation rate of 2.705 cubic feet per second (cfs). However, yield limitations and iron, in some cases, restrict the actual total peak pumping rate to about 0.8 cfs (360 gpm), substantially less than the authorized maximum rate. The SVWC customer base is growing rapidly and additional capacity is needed soon to maintain pace with water demand for new development in the SVWC service area.

52nd SW 6th Street, Suite 100 ■ Redmond, Oregon 97756 ■ 541 504-9960 ■ fax 541 504-9961 ■ www.newtonconsultants.com

A practical and relatively expeditious solution for additional capacity is being developed collaboratively between the SVWC and RRR. This arrangement would allow SVWC use of the RRR Well No. 3 associated with RRR water right permit G-11087 and a new well proposed by RRR to keep pace with new demand. This arrangement would require amendment of a SVWC permit, or permits, to include RRR well No. 3 and the new proposed well as additional points of appropriation. Evaluation of opportunities for this arrangement indicates that the SVWC permit G-11534 is a more practical choice. Permit G-11534 authorizes a maximum appropriation of 1 cfs (449 gallons per minute) for quasi-municipal use from Well No. 50411 located at:

> SW ¼ NW ¼, Section 4, T 3S, R 7 E, W.M.' 2205 feet south and 295 feet east from NW corner, Section 4.

The approximate location of Well No. 50441, other SVWC wells and RRR wells are shown on Figure 2. The maximum achievable pumping rate from well No. 50441 is approximately 130 gpm. The proposed amendment to SVWC permit G-11534 adding additional points of appropriation will allow SVWC to more fully develop its maximum permit rate of 449 gpm and respond to increasing demand in a time and cost-effective manner. A regulatory provision for such permit amendments is that the involved wells withdraw water from the same source aquifer system as those existing wells approved under the permit.

The purpose of this review was to determine if hydraulic continuity exists between SVWC Well No. 50441 associated with ground water permit G-11534, RRR well No. 3 associated with RRR ground water permit G-11087 and the new well proposed by RRR (Figure 2). A key objective for the proposed new well is that it is completed in the same source aquifer system as SVWC Well No. 50441 and RRR Well No. 3.

Results from our study indicate that RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from the same source alluvial aquifer system. Evaluation of well log data also shows the proposed new well at the location shown on Figure 2 will also withdraw water from the same source alluvial aquifer system. The aquifer is an alluvial system between the Salmon and Sandy Rivers. The ground water flow diagram on Figure 2 illustrates the approximate ground water elevations.

The location of the proposed well shown in Figure 2, if completed in the same source aquifer system as RRR well No. 3 would also draw from the same source aquifer system as SVWC well No. 50441.

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METHODS

A previous Kleinfelder report completed in September, 2005, in connection with well exploration was reviewed to avoid duplication of services. Well logs for RRR wells, SVWC wells and wells within a half mile of RRR well No. 3 and proposed new well were obtained from the Oregon Water Resources Department (OWRD). These logs were used to gather information on geology, water levels and yields in area wells.

Available Oregon Water Resources Department (OWRD) well log data and piezometric information from a previous Newton investigation and ModFlow model analysis of stream depletion potential by wells for RRR in 1989 were used to develop a generalized ground water elevation diagram as shown on Figure 2. The diagram reflects the differences in ground water elevations as one moves down the valley.

Well log data was also used to generate two cross sections. Cross section A-A' runs longitudinal down the valley and passes through SVWC and RRR wells. Cross section B-B' runs laterally across the valley and passes through the proposed new well location. Well locations and both cross section locations are shown on Figure 3.

FINDINGS

Geologic information gathered from driller's logs indicated that the valley floor is underlain with an alluvial aquifer system comprised of stream deposits and glacial till in mixed beds of sands, gravels, boulders and clays to depths of approximately 200-230 ft below the surface. Geologic cross sections A-A' and B-B' are shown in Figures 4 and 5. This alluvium is underlain by volcanic mudflows, lavas, tuffs, volcanic breccias, cobbly conglomerates and occasional non-carbonized woody materials generally believed to be part of the Sardine Formation.

Cross section A-A' (Figure 4) shows that the majority of the wells in the valley are completed in the alluvial deposits consisting of inter-bedded layers of sand, gravel, clay and conglomerates. Clay and ash lenses which act as local confining layers and partial boundaries to groundwater flow are considered semi-continuous longitudinally down the valley. One such clay lens appears to run semi-continuously through locations of all RRR wells No. 1, 2 and 3 and SVWC well No. 50441. This clay lens which is approximately 10-20 feet thick ranges in depths from 100-120 feet below the surface to 60-80 feet below the surface.

Cross section B-B' (Figure 5) shows very similar deposits as those shown in cross section A-A' (Figure 4). A lateral clay lens appears to lay in a partially continuous manner across the valley, varying in thickness from approximately 10-30 feet. The assumption is made that the clay lens is continuous between Welches Road and Highway 26 (Figure 4). However, no driller's logs were available for wells completed deeper than 50 feet below the surface between Welches Road and Highway 26.

Depth to first water and static water levels were recorded by well constructors. These water levels were also plotted on cross section A-A' and B-B' (Figure 4 and 5). In some cases first water is found deeper than static water level. This disparity in water levels suggests a certain

amount of confinement in the alluvial system. In other cases only static water levels are recorded. A few wells have also shown static water levels to be lower than first water levels. This could be explained by the presence of localized shallow perched water tables.

When looking at cross section A-A', it is apparent that static water levels in the RRR wells No. 1 through No. 3 are lower than those found in the SVWC well No. 50441. This can be explained by the fact that the overall ground water elevation between these wells changes depending on location within the alluvial valley. This is illustrated on the ground water elevation diagram of Figure 2. Ground water elevations are highest in the center of the valley between the Sandy and Salmon Rivers and lower in the proximity of the rivers near the outside edges of the valley. The ground water elevation contours on the diagram illustrate ground water flow in the downstream direction, along the longitudinal centerline of the valley and toward each river flanking the valley. The ground water elevation difference between SVWC well No. 50441 and the RRR wells No. 1 through 3 is approximately 50'. When these ground water elevations are plotted on a vertical 2 dimensional surface as they are plotted in Figure 4, it could appear as if the water table is not continuous. However Figure 2 shows that static water levels of wells along cross section A-A' will vary depending on where they intersect the cross section and where they are located laterally across the valley.

Review of geologic and hydrogeologic information indicates that the aquifer in the valley surrounding the RRR site is an alluvial aquifer system, unconfined, to partially-confined, with laterally discontinuous lenses of clay, tuffacaceous or ash materials. One such lens appears to underlay RRR wells No. 1 through 3 and SVWC well No. 50441. Driller's logs for RRR well No. 1 and SVWC well No. 50441 also indicate that the wells are all completed below this clay lens. We have also noted that the highest pumping rates (100-300 gallons per minute) are recorded on driller's logs for wells completed below this clay layer. Despite the partially-confined nature of the aquifer system in the valley and the presence of potential localized perched ground water tables, ground water elevations recorded by driller's logs do indicate a relatively continuous gradient in water levels with general direction of flow toward either the Sandy or Salmon Rivers (Figure 2).

CONCLUSIONS

Based on the information provided above, RRR well No. 3 and SVWC well No. 50441 are hydrologically connected and draw from a common source aquifer system that is partially-confined by a layer of clay or tuffaceous material that could be continuous between the wells. The location of the proposed well shown on Figure 3, if completed to similar depths and similar geologic materials as RRR well No. 3 would draw from the same source aquifer system as both RRR well No. 3 and SVWC well No. 50441.

T 10240

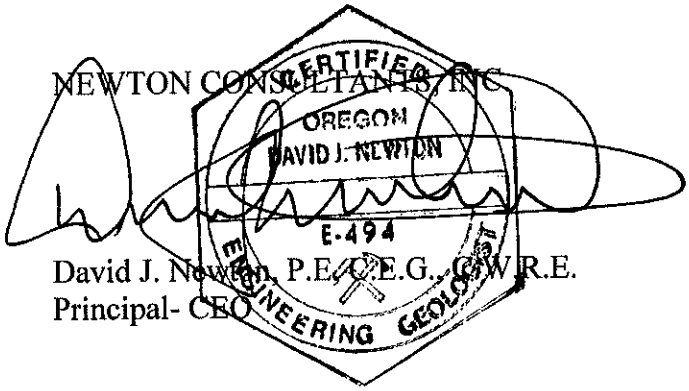
We appreciate the opportunity to be of service to Salmon Valley Water Company. Please call me if you have any questions concerning this report.

Sincerely,

NEWTON CONSULTANTS, INC.

Mathias Perle
Hydrologic / Engineering Technician

NEWTON CONSULTANTS, INC.



David J. Newton, P.E./C.E.G., C.W.R.E.
Principal- CEO

Cc: Ed Hopper, RRR Golf, Inc.

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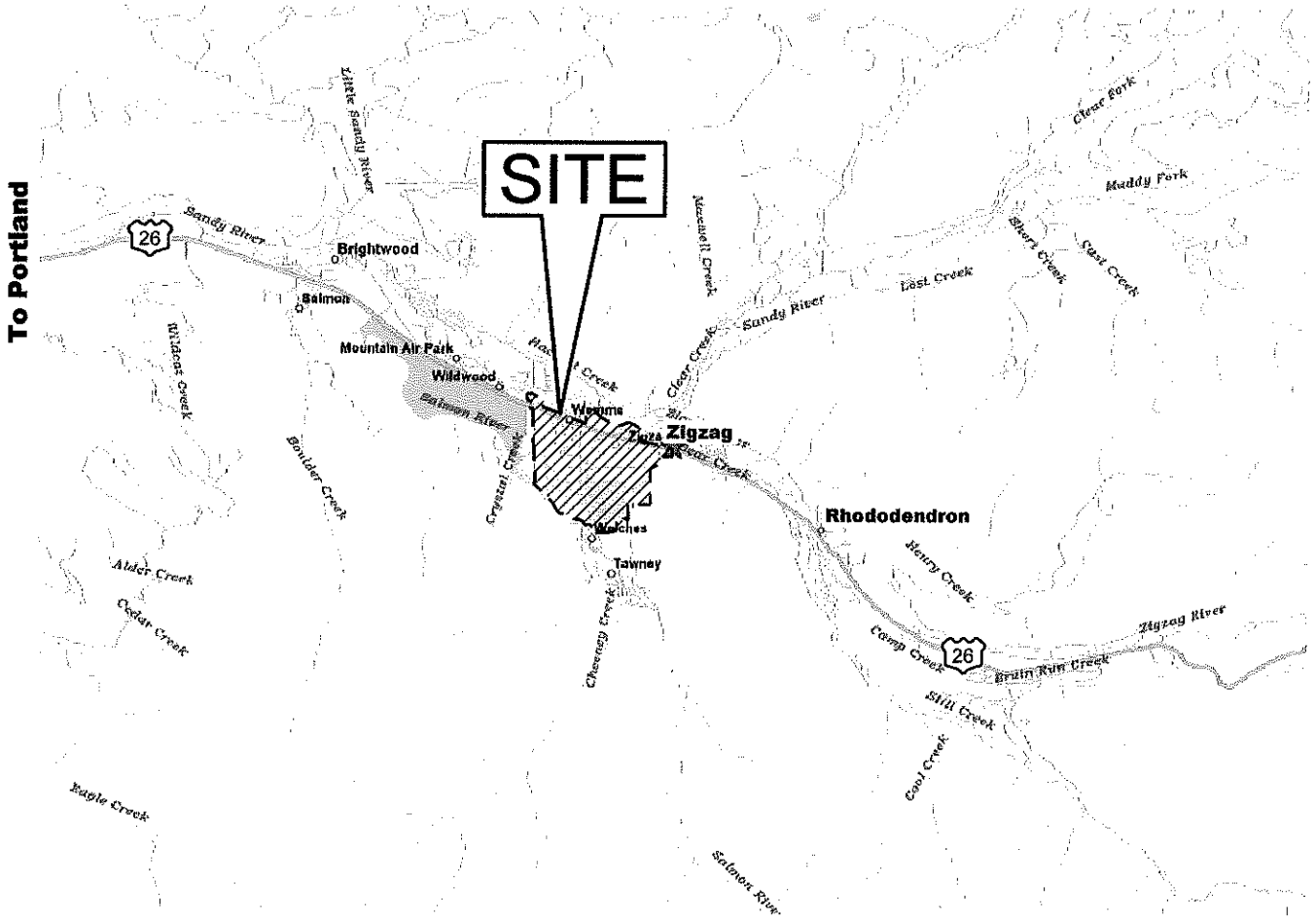

0' 2 Mile 4 Mile

SCALE: 1" = 2 Miles

Base Map:
Map Quest Street Atlas USA

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Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

Vicinity map
Salmon Valley Water Company - Permit G-11534
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
M.Perle	S.Schenck	Sept 2006	1036-101	1

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TRANSFER CHECK OFF LIST

TRANSFER FILE # 10240
DATE RECEIVED 9-18-06
DATE MONEY SLIPPED 9-18-06
DATE RECEIPTED 9-18-06
VALID WATER RIGHT? X Yes ____ No
TEMP ALT AC ____ **IRR DIST** ____ **PERM AMEND** X **DIV 15** ____
TEMP Div 15 ____ **ISWR** ____

LETTER FROM ATTORNEY ____ YES **(PUT INFO ON FRONT COVER)** X NO

FOLDER FILLED OUT* yes

ENTERED IN DB yes

CONTENTS MARKED yes
COLOR CODED X Yes
4 COPIES MADE & STAMPED yes

CERTIFICATE MARKED no
CERTIFICATE COPIED no
PULL APPLICATIONS yes
APP FOLDER MARKED yes
FINAL PROOF MAP COPIED no
PERMIT MARKED yes
PERMIT COPIED yes
PERMIT MAP COPIED no
DECREE MARKED /
DECREE COPIED /
ADJUDICATION MAP COPIED /

ENTRIES CHECKED ____ CHECKED BY ____ INIT FOLDER ____
PUBLIC NOTICE DATE 10-17-06 (PREPARED & COPIED) yes
LETTER SENT yes Irrigation District yes (copy of app & map)
COPY TO WM yes
BLUE FORM TO WM yes Orange Perm Amend/Yellow Temp/Grn Dist/Lav Alt Acr/pink his
COPY TO GW yes POA, APOA, or [SW TO GW ONLY(as POD)]
BLUE FORM TO GW yes Orange Perm Amend/Yellow Temp/Grn Dist/Lav Alt Acr/pink his
COPY TO CWRE yes
LETTER TO ODFW no ALL Surface water POU/USE (POD and APOD FISH SCREENS)
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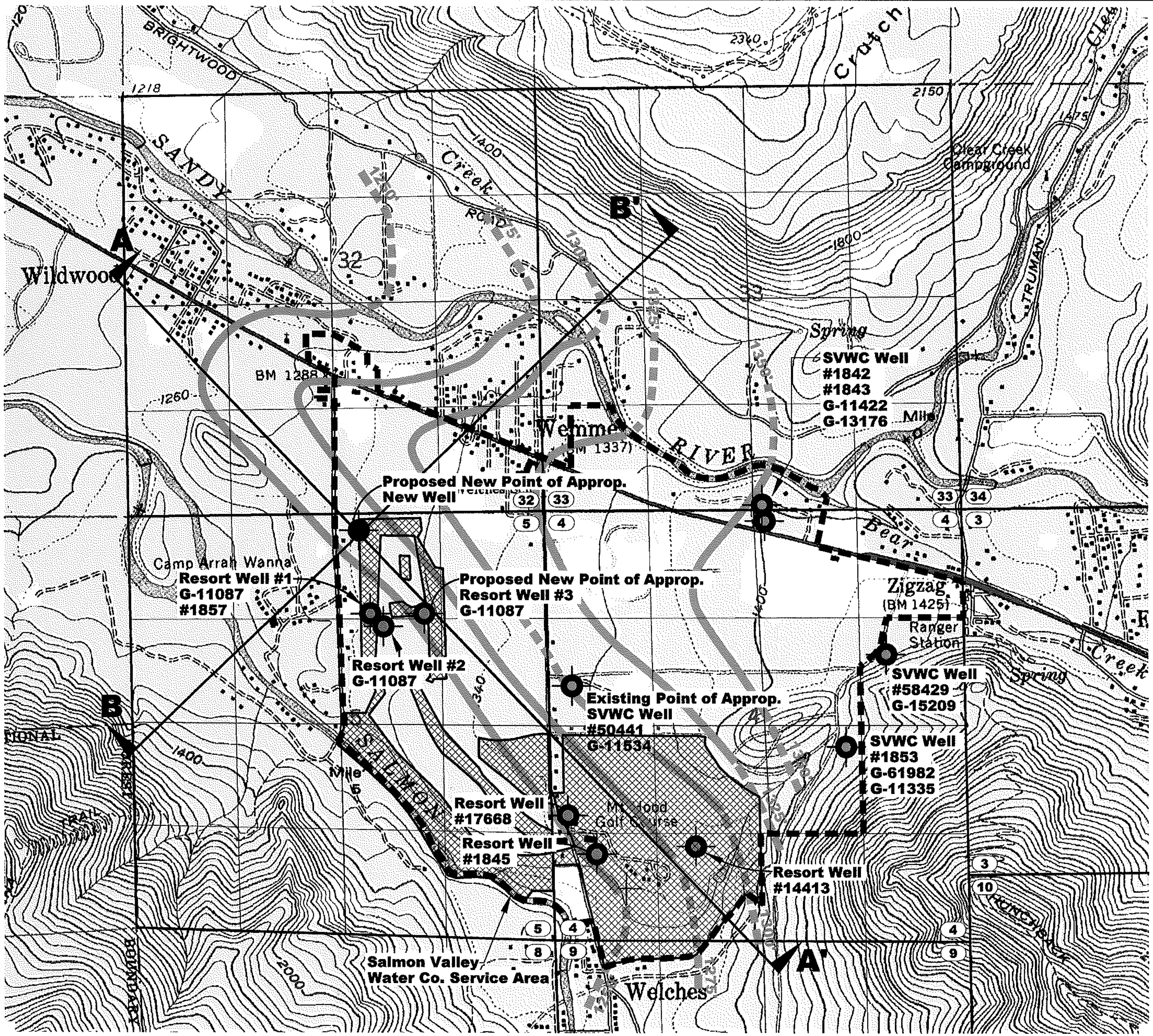

LEGEND

Approximate Location of Well

- Resort Well
- Salmon Well Water Co. (SVWC)
- RRR Golf Course Boundary
- Site Boundary
- 1350 Groundwater Elevation

0' 1,320' 2,640'

SCALE: 1" = 1,320'

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Groundwater Elevation Map

SWWD - Water Supply Development
Clackamas County, Oregon

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Earth, Water and Rock Specialists
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DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
M.Perle	S.Schenck	August 2006	1036-101	2

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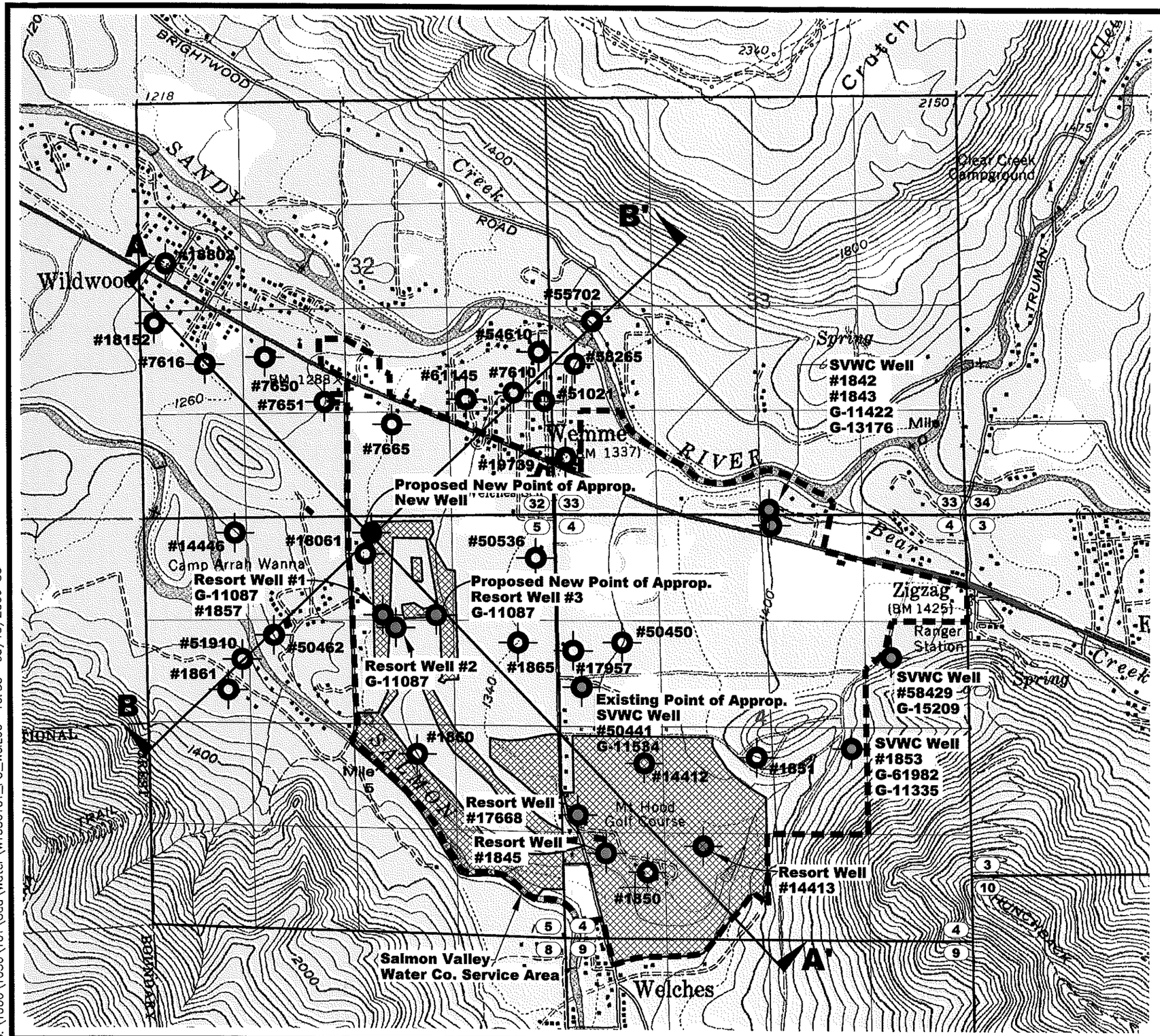

0' 1,320' 2,640'

SCALE: 1" = 1,320'

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Existing Wells & Cross-Section Locations

SVWD - Water Supply Development
Clackamas County, Oregon

FIGURE 3

PROJECT NO. 1036-101

DATE: August 2006

DESIGNED BY: M.Perle

DRAWN BY: S.Schenck

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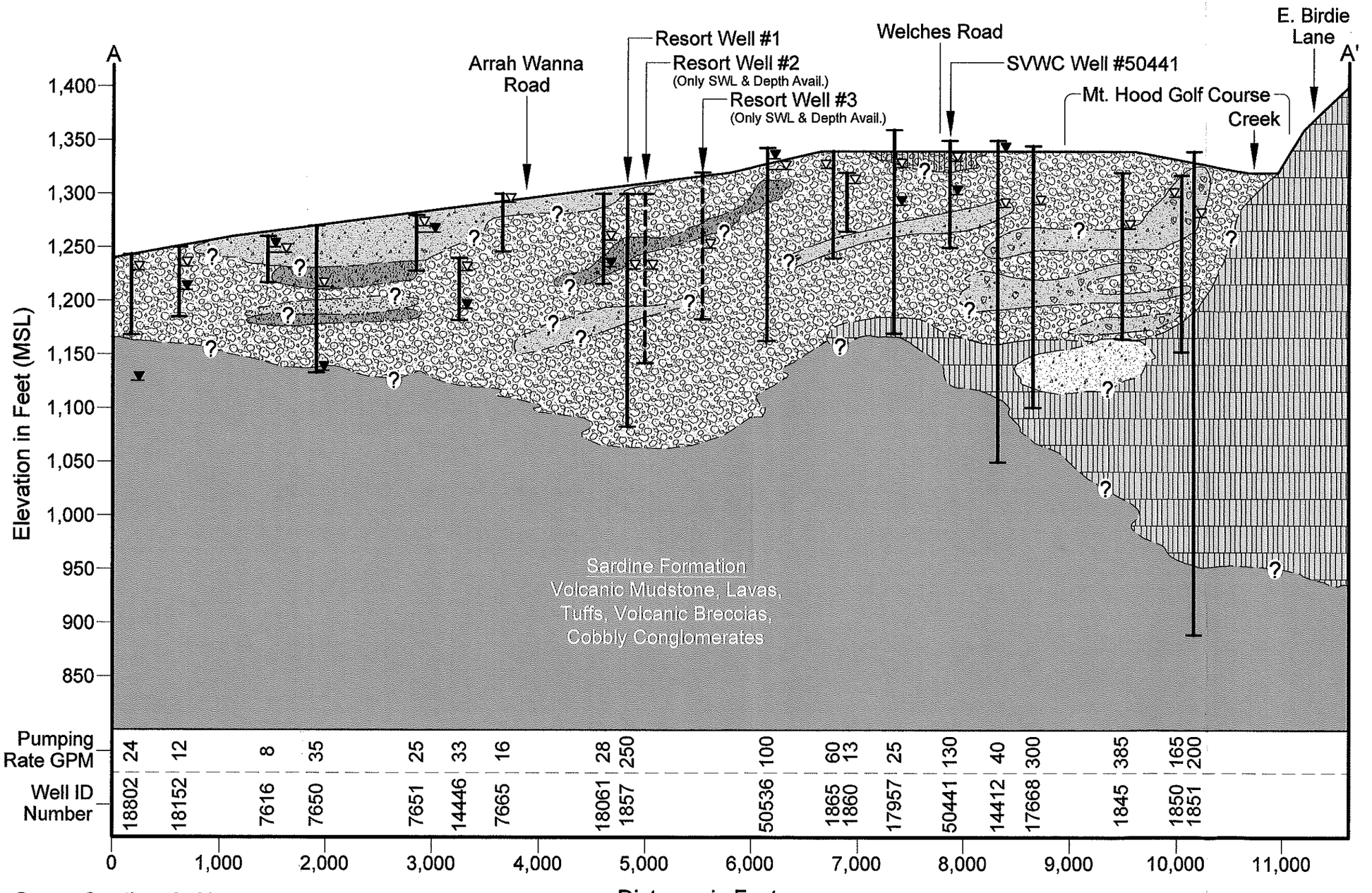

Cross-Section A-A'

Legend

- Static Water Elevation Level
- First Water Elevation Level

VERTICAL SCALE: 1"=100'
HORIZONTAL SCALE: 1"=1,000'

Explanation

- Clay with Sand & Gravel
- Conglomerate & Sand
- Clay & Sand
- Clay with Sand & Silt
- Sand with Gravel
- Sand with Gravel & Boulders
- Gray Volcanic Rock

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Cross-Section A-A'
SVWD - Water Supply Development
Clackamas County, Oregon

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Ph: 541 504-9960 Fax: 541 504-9961

DESIGNED BY: M.Perle	DRAWN BY: S.Schenck	DATE: August 2006	PROJECT NO. 1036-101	FIGURE 4

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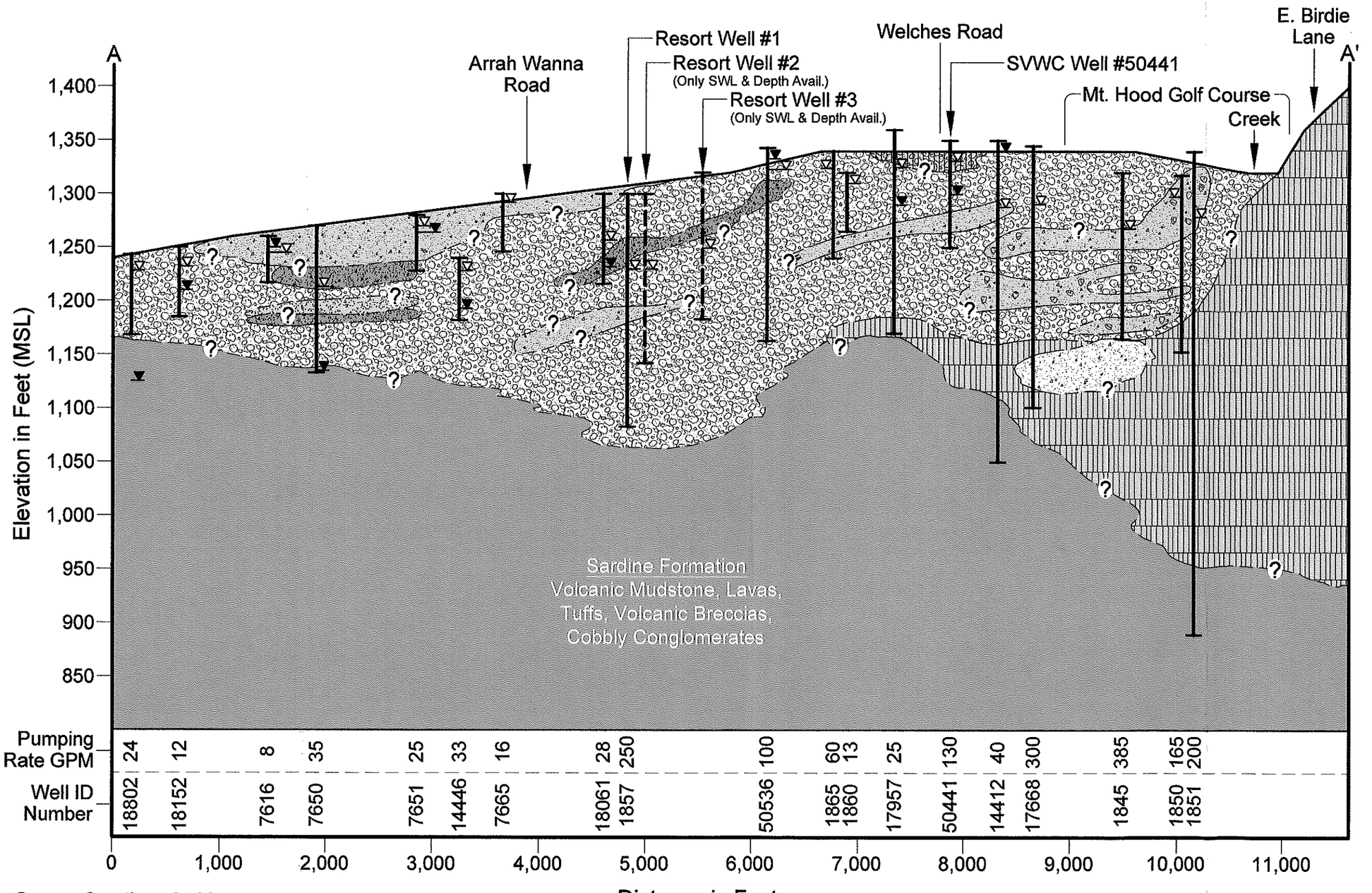

Cross-Section A-A'

Legend

- Static Water Elevation Level
- First Water Elevation Level

VERTICAL SCALE: 1"=100'
HORIZONTAL SCALE: 1"=1,000'

Explanation

- Clay with Sand & Gravel
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- Clay & Sand
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- Sand with Gravel
- Sand with Gravel & Boulders
- Gray Volcanic Rock

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SALEM, OREGON

Cross-Section A-A'
SVWD - Water Supply Development
Clackamas County, Oregon

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Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

DESIGNED BY: M.Perle	DRAWN BY: S.Schenck	DATE: August 2006	PROJECT NO. 1036-101	FIGURE 4

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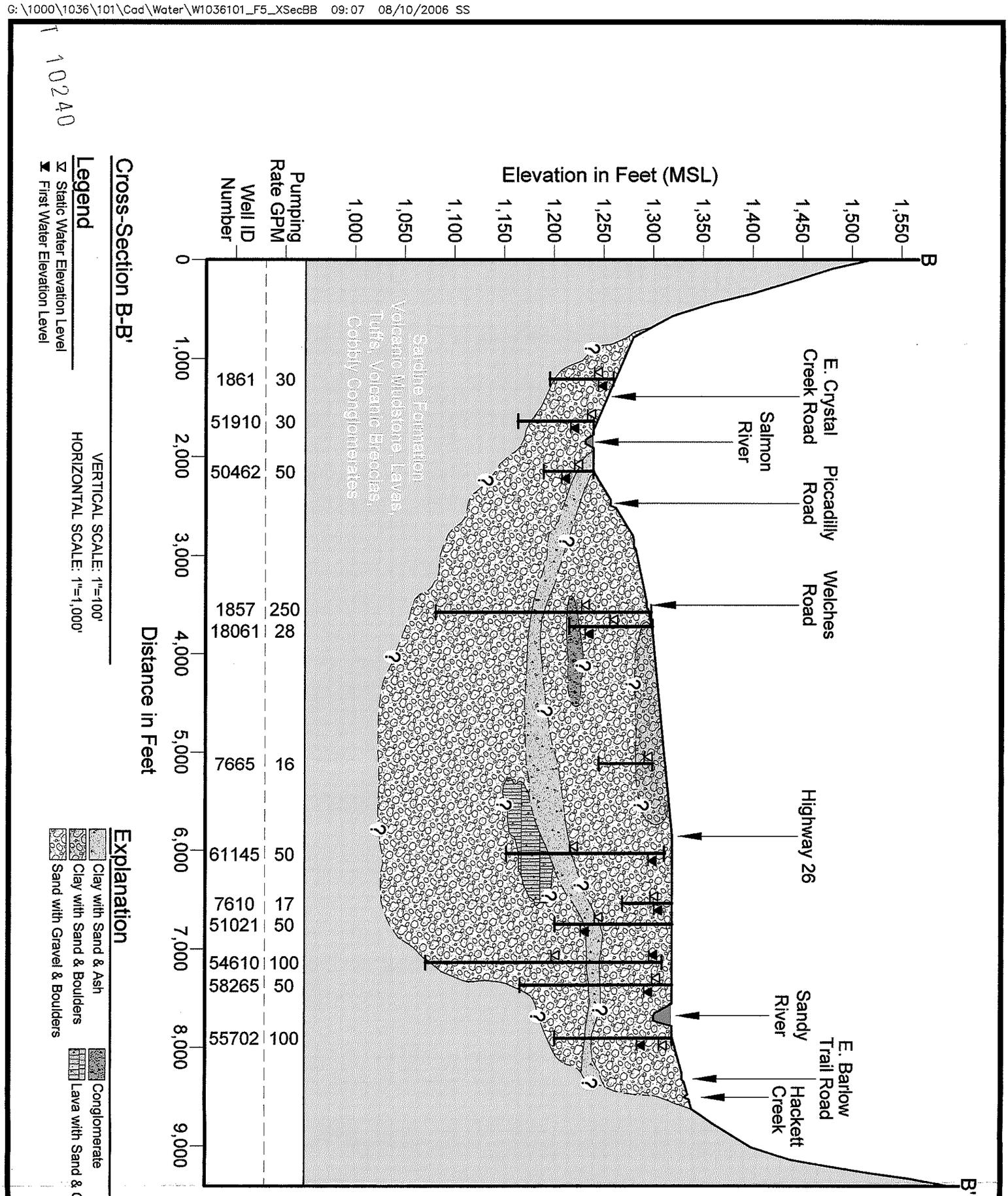

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Earth, Water and Rock Specialists
Ph: 541 504-9960 Fax: 541 504-9961

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SALEM, OREGON

Cross-Section B-B'
SVWD - Water Supply Development
Clackamas County, Oregon

DESIGNED BY:	DRAWN BY:	DATE:	PROJECT NO.	FIGURE
M.Perle	S.Schenck	August 2006	1036-101	5

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CONSULTANTS INC.
Earth, Water and Rock Specialists

HYDROGEOLOGICAL REPORT
Water Rights Appropriation Application
Analysis of Stream Depletion Potential
Rippling River Resort
OWRD File No. G-11920

Prepared for:

Rippling River Resort
68010 East Fairway Avenue
Welches, OR 97067

July 12, 1990
Project No.: 215 CD 91 DN

T 10240

DAVID J. NEWTON ASSOCIATES
INCORPORATED
Civil and Geological Engineering Services

July 13, 1990

Mr. Steve Applegate
Water Rights Division
OREGON WATER RESOURCES DEPARTMENT
3850 Portland Road N.E.
Salem, Oregon 97310

SUBJECT: File G11920; Hydrogeological Report and Analysis of Stream Depletion Potential.

Dear Mr. Applegate:

Transmitted herewith is our report on hydrogeology and analysis of stream depletion potential for Well No. 1 on the West Golf Course at Rippling River Resort (The Resort at the Mountain). Investigations and analysis that provide the basis for the report were performed to determine the potential for stream depletion according to OWRD criteria for streams subject to Diack provisions. The report consists of two bound volumes. The findings and conclusions of the investigations are presented in the first, while the second (Appendix D) contains raw computer data outputs from groundwater modeling.

Geology and aquifer conditions for the site were investigated and characterized by observations during construction of Well No. 1 by DNA geologists. Additional work included reviews of well logs, outcrop observations, and reviews of geological and ground water reports for the site area. Exhaustive computer analyses were performed to evaluate ground water flow responses to the proposed pumping rate of 280 gpm for Well No. 1, and to determine the potential for stream depletion on the Salmon River, 1,400 feet from the well.

The results of the investigations and analyses indicate that flows in the Salmon River will not be affected by pumping at the proposed rate after the 30 day period of the OWRD stream depletion criteria.

This report provides justification for approval of Permit Application G11920. On this basis, it is respectfully requested that approval of the permit is granted.

If you have any questions regarding this report, please do not hesitate to give me a call at 228-7718.

Very truly yours,

DAVID J. NEWTON ASSOCIATES, INC.

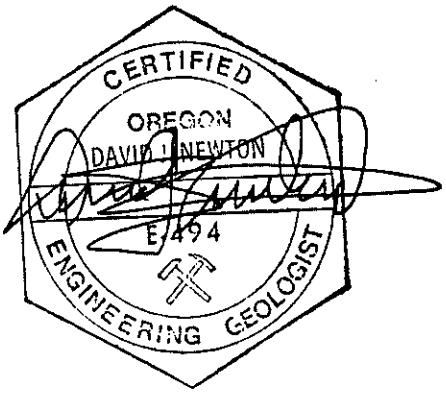
David J. Newton, P.E., C.E.G.
President

HYDROGEOLOGICAL REPORT

WATER RIGHTS APPROPRIATION APPLICATION

RIPPLING RIVER RESORT

OWRD FILE NO. G11920



Prepared for:

Rippling River Resort
68010 East Fairway Avenue
Welches, Oregon 97067

Prepared by:

David J. Newton Associates, Inc.
1201 SW 12th Avenue, Suite 620
Portland, Oregon 97205

July 12, 1990

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APPENDIX C - WELL LOGS

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Small Lens Model
Extended Lens Model
Overbank Deposit Model
Small Lens-River Confined Model

HYDROGEOLOGICAL REPORT

WATER RIGHTS APPROPRIATION APPLICATION

RIPPLING RIVER RESORT

OWRD FILE NO. G11920

1.0 INTRODUCTION

A ground water appropriation permit application was submitted to the Oregon Water Resources Department (OWRD) on May 3, 1989 to obtain additional golf course irrigation water for the existing West Golf Course at Rippling River Resort. This report presents the results of hydrogeological investigations requested by OWRD that conclusively justifies the approval of the permit application. The report is based upon work sessions with the OWRD, evaluations of well logs in the site area, evaluation of the log prepared for Well No. 1 (drilled on the West Golf Course in April, 1989), test pumping of Well No. 1, analyses of ground water flow with computer modeling techniques, and proof of the validity of the computer models by comparison with field measurements taken during the drilling and testing of Well No. 1.

Rippling River Resort is located in the valley of the Salmon and Sandy Rivers on the west slope of Mt. Hood. The resort has served recreational customers for over 100 years and demand has increased substantially over the past few years. Improvement of recreational facilities, particularly the golf course, is considered critical to the continued success of the project. The pending OWRD water right appropriation application will provide the means to improve the existing golf course and provide the high quality recreational use demanded in Oregon.

Augmentation of the existing irrigation water supply is subject to the doctrine of prior appropriation and associated water rights provisions administered by the OWRD. In addition, the application must meet the approval conditions associated with ground water sources in a wild and scenic river basin. Both the Sandy and Salmon River reaches near the site have been designated as wild and scenic. This report demonstrates that the requested ground water appropriation for Rippling River Resort will have an insignificant impact on the Sandy and Salmon Rivers, and easily meets the various approval conditions of the OWRD.

The procedures utilized in this evaluation included state-of-the-art computer modeling of the ground water systems based upon the documented and observed hydrogeologic conditions in the river basin. Computer models were calibrated and confirmed using the results of actual test pumping and analyses of well logs. In the modeling, hydraulic parameters for the aquifers were varied over a wide range of values in order to further

confirm the conclusions. In addition, evaluation criteria and modeling procedures were reviewed with staff hydrogeologists of OWRD and with Mr. W. C. Walton, a leading expert in hydrogeological modeling and author of several books and various computer models including those that investigate stream depletion.

Significant findings and the conclusions resulting from this investigation are summarized in Section 2 below. Detailed descriptions of the project, research procedures, pertinent well logs, computer model runs, and hydrogeological calculations are included in Section 3 through 9 and the appendices A through D.

2.0 SUMMARY OF FINDINGS

2.1. The West Golf Course Well No. 1 has an insignificant impact on the Salmon River based upon a pumping rate of 280 gpm after a 30 day period.

Ground water supply for the new irrigation well (Well No. 1) on the West Golf Course at Rippling River Resort is provided by glaciofluvial aquifers consisting primarily of permeable sands, gravels, cobbles, and boulders. Numerical flow analyses based on pump testing of the well and review of well logs for the site area demonstrate that ground water storage and yield of the aquifers are adequate to satisfy the continuous 280 gpm pumping rate for the West Golf Course Well No. 1, with insignificant impact on the Salmon River. The Salmon River is separated from the well by a distance of 1,400 feet horizontally. A vertical distance of 142 feet exists between the well bottom and the river bed.

Geologic and groundwater models of the site area were developed for four cases that represent the range of conditions that are most applicable to the site. The basis for the models are observations by DNA geologists of formational materials penetrated as Well No. 1 was drilled, logs of other wells in the area, and similarities between DNA observations and published geologic models for alluvial - glaciofluvial basins (McGowen and Groat, 1971).

Computer analyses of the four models resulted in insignificant depletion rates of 14, 18, 20, and 21 percent of the pumping rate along the reach of the Salmon River that flows through the modeled area (about 3.25 miles). Significant depletion is defined by OWRD as more than 25 percent of the pumping rate.

2.2 **The ground water system in the valley fill deposits at the site is composed of a regional, partially confined aquifer, and a locally perched aquifer.**

The valley fill aquifers in the site area consist of partially confined and perched ground water systems. Ground water confinement results from stratification of beds of silt-to-clay sized material with sands, gravels, cobbles, and boulders. The silt and clay rich strata are relatively low-permeability materials that separate water bearing zones and impede vertical ground water flow between the separated water bearing zones. Ground water is locally perched in an unconfined state on top of low-permeability layers. Ground water is also locally confined beneath low-permeability layers.

2.3 **Depletion potential is accentuated by assumptions that were applied to the computer analyses.**

Computed depletion values include no allowance for groundwater recharge from the bedrock that encloses the alluvial fill in the site area, recharge from summer precipitation, or recharge from golf course irrigation. Allowance for recharge will decrease the computed depletion values to a lower level of insignificance.

2.4 **Well No. 1 withdraws ground water from a regional aquifer that is locally confined near the well. An upper perched aquifer is separated from the regional aquifer by a low-permeability stratum.**

Well No. 1 penetrates two aquifers that are separated by a relatively low-permeability strata in the depth interval of approximately 110 to 120 feet below the ground surface. The upper aquifer is sealed from the well intake section by unperforated casing. Groundwater is drawn only from the lower regional aquifer through a screened intake section extending from 177 to 217 feet deep. The bottom of the well is 217 feet deep. Separation of the two aquifers is demonstrated in two ways. The water levels in nearby shallow wells in the upper, perched aquifer, differ from the water level of Well No. 1, and there was no impact on shallow wells during pump testing of Well No. 1.

2.5 **Low-permeability strata in the glaciofluvial deposits are discontinuous, resulting in local confinement of ground water over limited areas beneath the valley floor.**

The silt-to-clay strata that separate water bearing zones are laterally discontinuous, forming lenses. As a result of the lenticular stratification of the deposits, ground water confinement beneath low-permeability layers is localized and of limited lateral extent beneath the valley floor.

2.6 **The probable source of recharge noted early in the pump test of Well No. 1 signifies the point in which drawdown exceeded the lateral limits of the confining strata.**

Time verses drawdown curves for the pump test on Well No. 1 reflect a recharge condition after approximately 10 hours of pumping. The radius of the cone of depression at this time into the test was calculated at about 1300 feet. The point(s) of recharge could be located any where along a 1300 foot perimeter from the well. Downward movement from the saturated zone above the confining stratum tapped by the well, is the probable recharge source. This form of recharge is recognized in published literature for lenticular formations in which only the lower part of the formation is screened for water intake into a well (Driscoll, 1989). These conditions apply to Well No.1 and the site. Vertical movement would occur after the cone of depression has expanded to the end of the low-permeability lens, allowing downward flow from upper saturated zones through a breach in the low-permeability stratum.

It is apparent that ground water recharge to the rivers is probable on a year-round basis from shallow ground water systems based on water table elevations relative to the rivers and recharge processes at the head of the valley. River recharge to the ground water system is probable in the headwater areas where the rivers depart from bedrock bottom conditions and enter the areas of alluvial deposition. This recharge mechanism is consistent with previous reports that describe runoff percolation into the ground where runoff from steep terrain encounters the less steep topography of the valley fill deposits. This water infiltration raises the "water table at the head of the valley, causing a down-valley gradient on the water table which induces a ground water flow in a west-northwesterly direction" (Lissner, 1975). This flow direction is consistent with the direction identified during review of well logs and by model predictions. This recharge replenishes the alluvial aquifers and occurs primarily during the period of heavy precipitation (October through March) and heavy stream flow (extending into late Spring).

2.7 **Separation of an aquifer from a river by a low-permeability confining layer will reduce stream depletion in response to pumping.**

In order for stream depletion to occur by pumping from a confined aquifer, the aquifer must be in hydraulic communication with the river such that flow in response to pumping can effectively occur between the riverbed and the aquifer. Separation of the aquifer from the river by a low-permeability confining layer will prevent stream depletion in response to pumping. Three of the computer models presented in this report had no confinement under the river. In one model the

confining layer was extended beneath the river. By extending the localized confining layer beneath the river, in one model, depletion was reduced by 4%.

2.8 **The "MODFLOW" computer program is well suited for evaluation of stream depletion potential at the site. The numerical analysis process accounts for the ground water conditions that apply to the project site.**

Computer analyses were made to simulate aquifer response and determine stream depletion potential. The computer program "MODFLOW", written by Michael G. McDonald and Arlen W. Harbough of the U. S. Geological Survey, has sufficient flexibility to simulate the relatively complex aquifer conditions at the well site. The program is applicable for the case where the stream and the well do not fully penetrate the aquifer. The program is well suited for modeling the site conditions in which the well partially penetrates the aquifer, the stream does not penetrate the aquifer, and a significant ground water flow gradient exists.

The model is also well suited for testing the sensitivity of the groundwater system in question. By changing different parameters during different computer runs, the modeler can determine the magnitude of the effects each parameter has on the system. Sensitivity analysis has convinced DNA geologists that the data and conclusions presented herein will not vary appreciably due to parameters which are not known with certainty.

2.9 **The MODFLOW simulation of ground water flow at the site reflects actual field conditions and is valid for the project.**

The MODFLOW computer model was calibrated for field conditions determined by pump testing Well No. 1 and review of well logs and other published geological data that represent the alluvial basin associated with the site. Drawdown prediction by the model for Well No. 1 is within 5 feet of the actual measured drawdown during the pump test. The model will accurately reproduce the potentiometric surface for the aquifers that was developed on the basis of Well No. 1 observations and review of other well logs for shallow and deep wells.

3.0 PROJECT DESCRIPTION AND WATER NEED

Rippling River Resort is located south of Wemme, 1 mile south of Highway 26. The West Golf Course and location of Well No. 1 are located in Section 5, Township 3 South, Range 7 East as shown on Figure 1.

The West Golf Course is a 9-hole facility that occupies 48.7 acres. Irrigation is currently provided by 2 wells equipped with pumps that will each deliver approximately 60 to 70 gpm to a storage pond on fairway No. 5. Sprinkler irrigation is accomplished with a centrifugal pump that withdraws water from the storage pond and distributes it over the golf course through an underground pipeline and sprinkler system.

The capacity of the existing two wells is inadequate during the peak dry season to meet the water demand for the entire golf course. Therefore, only the greens and tees can be irrigated. The fairways are not irrigated during this period and become relatively hard and brown, thus diminishing the quality of the course at the peak of the summer recreation season.

Since surface water sources for the additional water are not available or feasible, it is necessary to consider a ground water source. A substantial ground water resource is available in the alluvial sediments that fill the Sandy and Salmon River valley to depths of 200 to 300 feet. On this basis, it is proposed to augment the water supply with the recently constructed West Golf Course Well No. 1. This well will be the primary water supply for golf course irrigation.

The primary water need to be supplied by Well No. 1 is 280 gpm. This pumping rate is based on a flow rate of 1 cubic foot per second (cfs) per 80 acres of land under irrigation allowed by the Water Resources Department.

4.0 PHYSIOGRAPHIC ASPECTS OF THE PROJECT AREA

Rippling River Resort and golf courses are located on the floor of the Sandy and Salmon River valley at elevations in the range of 1300 to 1360 feet above sea level (USGS, Rhododendron Quadrangle). The valley floor in the project area is 1-1/4 to 1- 1/2 miles wide and slopes toward the northwest, in the direction of river flow, at about 100 feet per mile (2 percent). The broad valley floor is flanked by steep ridges that rise to elevations greater than 3000 feet. The length of the broad valley is abruptly terminated by steep ridges approximately 1 mile southeast of the West Golf Course. The Sandy, Salmon and Zigzag Rivers enter the valley at this point through separate, relatively narrow canyons.

The Sandy and Zigzag Rivers join at their entry point into the broad valley floor. The Sandy River continues through the valley in a channel area located near the northeast edge of the valley floor. The Salmon River enters the broad valley at a separate point south of the confluence between the Sandy and Zigzag Rivers, and continues through the

valley in a channel area located near the southwest edge of the valley floor. Topographic relief between the river channel areas and the elevated central area of the valley floor ranges from 20 to 80 feet. The elevation of the Salmon River is approximately 40 to 60 feet below the elevation of the Sandy River at a point north of the Well No. 1. The rivers are separated by an approximate distance of 1 mile at the West Golf Course area. Figure 1 reflects the physiographic nature of the project area. Development in the project area consists primarily of single-family residential and recreational housing. Undeveloped areas support underbrush and timber. Water supply for domestic use is provided by private wells on individual properties, or by the Salmon River Water District. We understand that the golf courses on the Rippling River Resort are the only significant irrigation projects in the area that depend on ground water.

5.0 CLIMATE ASPECTS OF THE PROJECT AREA

Average annual precipitation is mostly rain and amounts to approximately 80 inches based on the weather station records for Brightwood, located about 3 miles northwest of the project. Based on regional estimations (Ground Water Report No. 29, State of Oregon, Water Resources Department, 1983), approximately 70 percent of the precipitation falls during October through March. Approximately 3 percent of the precipitation falls during July and August.

The project area is subject to drying conditions during the period from June through September. Average daily precipitation values for this period reflected by Ground Water Report No. 29 vary from about 0.10 inches per day in June and September, to about 0.05 inches per day in July, the hottest month of the year. Irrigation is necessary during this period to offset the deficiency in water for the golf course fairways, greens and tees.

6.0 GEOLOGICAL ASPECTS OF THE PROJECT AREA

Geological aspects of the project area have direct influence on the availability of ground water in sufficient quantities for irrigation use. Ground water occurs in the project area in consolidated and unconsolidated materials. Consolidated materials are generally characterized by rock and ground water storage in the void space of fracture systems, contacts between different rock types, or other structural zones. The matrix of consolidated materials is often relatively impermeable and ground water yield to wells is primarily through more permeable structures within the rock that are intersected by

wells. Unconsolidated materials are generally excavatable sediments that can include a very porous and permeable matrix that will yield significant quantities of ground water to wells throughout the well penetration depth.

6.1 Consolidated Materials

The oldest rocks exposed in the project area are consolidated materials (i.e., bedrock) that form the valley walls and extend beneath the alluvial fill deposits that form the valley floor. In the vicinity of the project, the older rocks mapped on the valley walls consist of volcanic mudflows, lava and tuff identified as Pliocene Age Sardine Formation as depicted on the attached geologic map (figure 2). Specific components of the formation include tufaceous volcanic breccia with blocks of lava. In localized areas, cobble conglomerates, tufaceous siltstones and claystones are reported as formation components (Leonard, 1983). The Sardine Formation materials are deeply weathered. Weathering products include laterite and saprolite soil materials that extend to depths on the order of 50 feet.

Domestic and public water supply wells reportedly extend into the Sardine Formation materials in the general area of the project. Water yields for these wells are reported to be adequate for household use with yields ranging from "a few to more than 50 gallons per minute" (Ground Water Report No. 29). Review of well logs for the area indicates examples of wells that were drilled into rock beneath alluvial materials and abandoned due to lack of water. It appears that generally low to moderate yield rates apply to the consolidated rock materials in the project area. Several springs have also been reported which discharge from the Sardine Formation on the flanks of the basin in the area of Wemme, Oregon.

6.2 Unconsolidated Materials

The alluvial fill deposits on the valley floor are generally unconsolidated and are estimated to reach a maximum thickness in excess of 250 feet. The deposits consist primarily of sands, gravels, cobbles and boulders carried to the depositional areas by the Sandy, Zigzag, and Salmon River systems. The sediments have been described as glaciofluvial deposits including "a wide variety of stratified materials ranging from silts and fine sands to ice-rafted boulders the size of small busses. These deposits are relatively unconsolidated with the exception of occasional, discontinuous layers or lenses of iron cemented and/or compacted materials. In addition to the layering or stratification there is evidence of the horizontal variation, or channeling that would be expected in this type of deposit" (Mathiot, 1978).

A glaciofluvial depositional environment is subject to widely fluctuating discharges typical of meltwater streams, which result in considerable variation in sediment discharge and

particle size distribution in the sediments. The braided rivers within this environment, in particular the Salmon and Sandy Rivers, are laterally unstable because the floodplain banks are thinner, less cohesive, and more erodible. These rivers have high discharge peaks in areas of steeper slopes and narrow canyon confinement which would increase their eroding power and subsequently dissect any laterally extensive strata previously deposited. Both sandy and gravelly braided river systems migrate laterally, leaving sheet-like or wedge-shaped deposits preserving only minor amounts of the fine-grained floodplain material (Cant, 1982). Lateral migration coupled with aggradation leads to laterally extensive sands and gravels with thin, discontinuous, fine-grained (silt and clay) deposits enclosed within the coarser sediments.

An alluvial/glaciofluvial model (figure 3), similar to the depositional environment of the Rippling River area, adapted from McGowen and Groat (1971) displays riverflow conditions during deposition within the alluvial basin. The predominant occurrence of the fine grained materials have been superimposed on the figure in areas of relatively low intensity fluvial processes. This model provides the basis for various site depositional models evaluated by computer modeling for this report.

Sediment accumulations could also result from mudflow or lahar events associated with volcanism and glacial activity. Although the material is generally unconsolidated and granular, local aggregation with silt and clay is reported. Mudflow deposits are reported to exist in the granular fill deposits. Relatively fine-grained material that may also represent a mudflow (or lahar) deposit was observed during the drilling of Well No. 1 and is exposed in several places including a vertical wall of the creek on the west side of the Tartans Inn at the Rippling River Resort. The relatively stiff or hard nature of the material in the exposure reflects cementation or the presence of cohesive materials that would reduce the permeability of the matrix. This exposure, in addition to observations of materials penetrated by the Well No. 1, indicates that low-permeability layers exist in the otherwise granular, and relatively permeable alluvial fill deposits that underlay the valley floor.

Reviews of descriptions for the alluvial fill deposits in the literature (Ground Water Report No. 29) were supplemented by reviews of logs for water wells that were constructed in the project area. The logs reflect generally consistent granular materials including sands, gravels, cobbles, and boulders. The logs also reflect the presence of "clay" strata within the granular materials. These strata are probably similar to the type of material exposed in the creek wall near the Tartans Inn.

A vertical profile of the glaciofluvial sediments was identified by DNA geologists during the construction of Well No. 1. Samples obtained at 5 foot depth intervals during the drilling work reflected a dominance of sand and gravel materials. Close inspection by geologists of the gravel-size materials indicated rounded surfaces on portions of the

fragments that were otherwise angular due to fracturing and crushing during the drilling process. The prevailing size of the fragments with remnant rounded surfaces suggest that the profile at the well site consists primarily of cobble to sand materials. The composition of the cuttings is primarily basalt. A finer-grained, yellow-brown material was encountered in the 110 to 120 foot depth interval. The presence of the material was marked by a color change in the discharge water from the well along with a more turbid condition in the fluid. Granular material in the sand to cobble size range persisted below this strata to the bottom of the well at the 217 foot depth.

Distribution of geologic formations relative to the site are illustrated in figure 2. Figures 4 and 5 represent subsurface features according to well logs and observations of well construction. Well logs used for figures 4 and 5 are presented in Appendix C.

7.0 GROUND WATER ASPECTS OF THE PROJECT AREA

Ground water aspects of the project area were investigated by review of existing available publications, review of well logs, and by observations and pump testing during construction of Well No.1. In general, ground water in the area occurs in both the bedrock materials beneath the valley fill, and in the glaciofluvial deposits which cover bedrock. Previous well construction experience in the area indicates that the wells in the bedrock materials are generally characterized by low yield potential. The higher yield wells are generally installed in the valley fill deposits. The thick sections of sediments associated with the valley fill deposits are reported as the best aquifer in the area of coverage by Ground Water Report No. 29. Well yields for wells in glaciofluvial sediments are reported in the range of 10 to 400 gpm.

7.1 Valley Fill Ground Water Systems

Existing data and drilling observations by DNA geologists during construction of Well No. 1 indicate that ground water occurs in a regional, partly confined aquifer with dry season water levels between 20 and 70 feet below ground surface. This regional aquifer is intersected by a low permeability layer of questionable lateral extent, which perches water at depths between 10 and 30 feet below ground surface during the dry season. A shallow perched aquifer condition must exist around the location of Water Well No. 1, with the regional aquifer locally confined as indicated by potentiometric head from well logs and observations during construction of Well No. 1. Confinement is by the low-permeability strata that separates zones of saturation in the glaciofluvial sediments.

It should be noted that the perched and regional water tables are indistinguishable toward the eastern edge of the study area. The regional water table mirrors the ground surface, while the perched water table is controlled by the extent of the confining layer beyond its intersection with the regional water table (figure 6). Confinement of the regional aquifer probably occurs only locally, as well logs indicate the absence of any laterally extensive fine-grained deposits and an abundance of discontinuous lenticular strata.

7.1.1 Perched Aquifer System

The perched system was investigated by review of well logs and observations of shallow wells near the location of Well No. 1. Consideration was given to the year and season of well construction when reviewing water levels reported on well logs. This was done as an effort to account for potential variations in water level reporting that could result from year to year and seasonal changes in ground water levels. Other reports indicate water level fluctuations between wet and dry periods as well as possible perched conditions (Lissner and Frederick, 1975; Mathiot, 1978; and Sweet and Lissner). Based on this approach, the contour map of the upper perched system presented in Figure 7 was generated. This map reflects a general gradient of about 100 feet per mile in the direction of river flow through the valley. The elevation of the water table reflected by the mapping is approximately 50 feet above the river elevation in the central portion of the valley floor, which reflects anticipated summer and fall water levels. The water table contours indicate ground water from this system discharges to the river along the southern side and into the regional aquifer along other boundaries. Based on the water table elevation relative to the rivers and year-round service capability of the wells, ground water discharge to the rivers is probable on a year-round basis.

7.1.2 Locally Confined System

Construction of Well No. 1 and subsequent pump testing indicate confined ground water conditions exist in the alluvial sediments near the well. The well was drilled to a depth of 217 feet below the ground surface and cased with steel casing to the 177 foot depth. Observation of samples obtained from 5 foot depth intervals indicated that sand and gravel materials dominate the subsurface profile at the well site. However, a yellow-brown, relatively fine-grained material was encountered in the depth range of 110 to 120 feet as shown in Figure 8, representing the log of Well No. 1. Although ground water depths were measured in the 20 to 30 foot range during the initial drilling operations, the static water level after completion of the well was measured at a 70 foot depth, approximately 30 feet above the fine-grained layer. Since unperforated casing penetrates the fine-grained layer and extends to the 177 foot depth, it is apparent that the static water level reflects hydraulic head conditions for a deeper saturated zone that is separated from the shallow zone evidenced during the early stages of drilling.

The water level in the existing irrigation well located approximately 150 feet south of the Well No. 1 was also measured at 70 feet. Review of the well log indicates the well was drilled to a depth of 165 feet and cased to approximately 160 feet, extending below the depth of the fine-grained layer evidenced in the Well No. 1.

Measurement of the water level in two shallow domestic wells located approximately 150 feet southwest of the Well No. 1 indicated a static water level of 9 feet in both wells. The well depths are 20 and 40 feet. The water level differences between the deeper irrigation wells and the shallow domestic well reflect separate ground water systems at the site of Well No. 1. Figure 7 reflects the shape of the piezometric surface for the confined system tapped by Well No. 1 based on the data from construction of the well and review of logs for other deep wells in the site area. The gradient represented for this aquifer is about 70 feet per mile.

7.2 Pump Test of Well No. 1

Well No. 1 is located 1,400 feet from the Salmon River, the nearest river, as shown on Figure 1. This location was consciously selected to provide a separation distance from the Salmon River that is greater than one quarter mile. This distance is referenced in OWRD publications as a criteria for assessing the potential for pumping impacts on surface water sources.

Well No. 1 withdraws water from glaciofluvial sands, gravels and cobbles beneath a confining layer that was observed by DNA geologists in the 110 to 120 foot depth interval during construction of the well. The well is 217 feet deep and is cased with unperforated steel casing to a depth of 177 feet below the ground surface. The bottom of the casing is approximately 70 feet below the confining zone. The well is equipped with a 40 foot long screen extending from the 177 foot depth to the bottom of the well.

Pump testing was performed on Well No. 1 in order to confirm the capacity to meet the necessary pumping rate for irrigation, and to determine actual hydraulic properties of the aquifer from which the well withdraws water. The test was performed at a constant pumping rate of 250 gallons per minute (gpm) for a continuous 42 hour period. Drawdown was monitored during the test by periodic water level measurements in the pumping well and in one of the existing irrigation wells located approximately 150 feet south of Well No. 1. The static water level in Well No. 1 and the irrigation well (observation well) prior to the test was 70 feet below the ground surface (elevation 1230). Drawdown was measured at 70 feet below static water level in Well No. 1 (elevation 1160), and 60 feet below static water level (elevation 1170) in the irrigation well (observation well).

Pump testing of Well No. 1 confirmed the presence of separate ground water systems and withdrawal of water by Well No. 1 from a deep confined aquifer. Measurements of 2 shallow domestic wells located approximately 120 feet southwest of Well No. 1 indicated no response to the pump test. The water levels in the shallow wells remained at approximately 9 feet below the ground surface. The shallow wells were constructed to depths of about 20 and 40 feet. The lack of response in the shallow wells to the pump test indicates that the shallow ground water system is separated from the deeper system from which Well No. 1 withdraws water. The static water level depth of 70 feet in Well No. 1 is about 30 feet above the approximately 10 feet thick stratum of relatively fine-grained,compact material observed during well construction that appears to be the confining layer. Since the casing extends 60 feet below this layer, the water supplying the well is from a confined ground water system.

Time verses drawdown data for the pump test based on measurements of the observation well and pumped well are presented in Figure 9 and 10, respectively. Transmissivity of the aquifer materials was estimated to be 2300 gallons per day per foot of aquifer from the straight-line slope portion of the time-drawdown plot. Review of the time-drawdown plot indicates a flattening of the curve beginning after about 10 hours of pumping. The curve flattening indicates that the 250 gpm pumping rate can be sustained without further drawdown, reflecting a recharge condition. Computations based on transmissivity and time of pumping at the recharge point, indicate that the radius of influence for the cone of depression at 10 hours is about 1300 feet from the well. Vertical flow around the edges of the confining layer would account for this condition. This distance probably represents the lateral extent of the confining layer at a radius of 1300 feet in any direction from Well No. 1.

Downward movement from the saturated zone above the confining stratum tapped by the well, is the probable recharge source. This form of recharge is recognized in published literature for lenticular formations in which only the lower part of the formation is screened for water intake into a well (Driscoll, 1989). These conditions apply to Well No.1 and the site. Vertical movement would occur after the cone of depression has expanded to the end of the low-permeability lens, allowing downward flow from upper saturated zones through a breach in the low-permeability stratum.

Concerns were raised addressing the possibility of a "significant" amount or recharge originating from the nearby Salmon River, however, modeling in succeeding chapters shows an insignificant amount of recharge originates from the river.

8.0 RELATIONSHIPS BETWEEN GEOLOGY, GROUND WATER AND SURFACE WATER

The relationships between geology, ground water and surface water are important considerations for evaluating the potential impact of well pumping on streams. Since the glaciofluvial deposits are the source of the ground water for the Well No. 1, the geological relationships discussed herein are confined to the alluvium.

Based on the ground water conditions reflected by well logs and observed at the well site, saturated zones in the alluvial deposits beneath the valley floor are in communication with the Sandy and Salmon Rivers. It is apparent that ground water recharge to the rivers is probable on a year-round basis from shallow ground water systems based on water table elevations relative to the rivers and recharge processes at the head of the valley.

River recharge to the ground water system is probable in the headwater areas where the rivers depart from bedrock bottom conditions and enter the areas of alluvial deposition. This recharge mechanism is consistent with previous reports that describe runoff percolation into the ground where runoff from steep terrain encounters the less steep topography of the valley fill deposits. This water infiltration raises the "water table at the head of the valley, causing a down-valley gradient on the water table which induces a ground water flow in a west-northwesterly direction" (Lissner, 1975). This flow direction is consistent with the direction identified during review of well logs and by model predictions. This recharge replenishes the alluvial aquifers and occurs primarily during the period of heavy precipitation (October through March) and heavy stream flow (extending into late Spring).

The general consistency between coarser materials reported on well logs and locations of the wells near the areas where the Sandy, Zigzag and Salmon Rivers enter the broad valley floor supports the geological inference that coarser materials would comprise the alluvium at these locations. For this condition, the upper end of the broad valley would be a primary recharge area for the ground water systems in the alluvium.

Although the alluvial deposits consist primarily of granular materials (sands, gravels, cobbles, boulders), the stratigraphy of the deposits is complicated by interbedded fine-grained materials associated with flood-related overbank deposits and possibly mudflow or lahar deposits. In addition to stratification according to variable grain size accumulations of the granular materials, layered sequences of fine-grained material and cemented sediments provide significant contrast in vertical permeability of the alluvial deposits. These stratigraphic contrasts result in localized separation of water bearing zones and confinement of ground water systems in the project area.

As discussed previously, environments characterized by stream deposition are extremely variable over geologic time according to wide extremes in energy level. Heavy flows transport larger sized materials and result in coarser material deposits. Low, quiet flows carry smaller particles and result in deposits of finer materials. Cyclic periods of heavy and low flow result in erosion and redeposition. The result is a highly variable stratification from coarse to fine material in the vertical and horizontal directions in alluvial deposits. However, due to the relatively steep river gradient and close proximity to the sediment source, the coarse materials will predominate in the alluvial deposits. In addition, mudflow events are generally characteristic of volcanic areas such as Mount Hood. Mudflow debris migration from higher elevations would focus in the drainage systems. Therefore, it is likely that mudflow deposits in the alluvium beneath the project area consist of material that moved into the broad valley from the Sandy, Zigzag and Salmon River canyons. In this case, it is reasonable to expect wider lateral distribution of the mudflow deposits in the lower end of the broad valley, and perhaps more confinement to stream channels in the upper reaches of the valley. Stream erosion and downcutting before or after possible mudflow events would reduce the lateral extent of the mudflow layers to local areas, allowing hydraulic connection of ground water systems.

In summary, the conditions for the alluvium reflected by review of well logs and the observations during construction of Well No. 1 indicate that the glaciofluvial sediments beneath the valley floor are characterized by lenticular stratification. Permeability contrasts between various strata result in localized ground water confinement conditions. Since lenticular, discontinuous stratification is probable considering the results of well log reviews, well construction on the project, and the depositional processes for glaciofluvial deposits, the ground water beneath the valley floor is found in both unconfined and locally confined systems. Evaluation of stream depletion potential in response to well pumping must be considered according to these ground water conditions.

9.0 RELATIONSHIPS BETWEEN GROUND WATER PUMPING OF WELL NO. 1 AND SALMON RIVER

9.1 Criteria for Significant Stream Depletion

The OWRD criteria for identifying impacts on stream flows includes the following:

1. "If the well is less than 1/4 mile from a stream, the department will presume that significant surface water interference will occur unless the Ground Water Section states that the proposed use will be from a confined

aquifer. As such, responses from Ground Water signify that there is no significant surface water interference on a "by exception" basis".

2. "If the well is greater than 1/4 mile from a stream, the department will presume that no interference exists, unless the Ground Water Section can clearly state that significant surface water interference will occur at the nearest point on the stream".

"Significant surface water interference " exists if the impact of pumping at the proposed rate would likely reduce the surface stream flows by 25 percent of the proposed pumping rate within 30 days at the nearest point on the stream. Subsequent communication between OWRD and DNA indicate that calculations of stream depletion should be made to include the nearest affected reach of the stream.

9.2 Numerical Computer Model (MODFLOW) for Depletion Analysis

Several programs using numerical methods for analyzing groundwater flow are available. Many of these programs model only two dimensional flow in a single aquifer. In order to predict the degree of stream depletion for the conditions depicted by the idealized cross-sections on Figures 5 and 11, a model must be able to determine the vertical flow due to varying degrees of confinement as well as the two dimensional horizontal flow in each aquifer. The three dimensional finite difference groundwater modelling program MODFLOW, published by the United States Geological Survey, is well suited to modelling the groundwater system described in Sections 6, 7, and 8 of this report.

9.2.1 Computer Models

Three dimensional modelling with MODFLOW is accomplished by defining distinct layers, each having unique characteristics and boundary conditions. Two layers were defined for the Rippling River models. Layer 1 represents the perched aquifer. Layer 2 represents the aquifer from which the irrigation well is extracting water (regional aquifer). The Rippling River models assume isotropic, homogenous conditions exist in each aquifer.

The two dimensional model areas are defined in terms of a variable size grid. Using a variable grid allows for greater resolution in areas of interest while maintaining manageable limits to the model input and computer run time required. Rows and columns intersecting the region near Well No. 1 were assigned a dimension of 125 feet in order to enable calibration of the final drawdown observed during the pump test in both the pumping and observation well. The observation well used in the test is located 145 feet south of the pumping well. Cell dimensions of 125 feet adequately approximate the true location. In the immediate vicinity of the river reach most affected by pumping,

cells 500 feet wide were used. Cells 1000 feet wide were used near the edge of the modeled area, where resolution was found to be less critical.

MODFLOW computes the head and resulting net flow in each "cell" defined by row, column and layer number subject to the defined boundaries, aquifer parameters, and external discharge or recharge to the system. For the Rippling River stream depletion models, bedrock creates "no-flow" boundaries to the north, south and east. Flow into the system is regulated by "constant head" boundaries in the upper reaches of the Salmon River near Welches and the recharge area near the confluence of the Sandy River and the Zigzag River. Constant head boundaries were compared for 30 days of no pumping, and 30 days of pumping for each of the four models. The heads in nearby variable head cells remained unchanged, which validates constant head assumptions at these points. Discharge from the system is through Well No. 1 and the constant head cells representing the Salmon and Sandy rivers. Discharge in the well was taken to be 250 gpm for calibration purposes and 280 gpm for determination of final depletions. Figure 12, "Model Grid and Boundary Conditions" shows the grid and boundaries used in the Rippling River stream depletion models.

As discussed in previous chapters, the exact location and extent of the confining layer cannot be fully determined using available information. However, this information can be used to limit the number of possible configurations of the confining layer. In order to evaluate the affect of pumping on the nearby Salmon River for a range of geologic conditions, four depositional models were analyzed: Small Lens (fig. 13), Extended Lens (fig. 14), Overbank Deposit (fig. 15), and Small Lens-River Confined (fig. 16). These models represent either discontinuous, lenticular, fine-grained materials deposited within a glaciofluvial environment, or deposits of dissected, once laterally extensive mudflow or ash fall deposits.

The depositional models selected represent a comprehensive range of reasonable confining layer configurations based on information obtained from existing well logs, a pump test, and published information on glaciofluvial environments. The minimum lateral extent of the confining layer was taken to be 1300 feet as obtained from the pump test of Well No. 1. All models, therefore, reflect this minimum condition. The maximum lateral extent of the confining layer is not known. There are no laterally extensive, fine-grained layers indicated on drillers well logs for the area. Drillers logs however, are not detailed enough to rule out the possibility of an extensive fine-grained layer. Therefore, a glaciofluvial depositional model was used to reconstruct possible geometries of fine-grained layers (fig. 3). The four models presented represent the full range of possible fine-grained geometries.

Calibration for models where the confining layers did not intersect bedrock along one of their sides could not be obtained when tilting the confining layer to the west. Tilting the

confining layer did not support a difference in heads between the upper and lower saturated zones in models in which the confining layer did not intersect bedrock. The result was an essentially unconfined condition demonstrating 0% depletion along the nearest reach of the Salmon River. Since pump tests and well data indicate two separate aquifers in the vicinity of the well, using a tilted layer is not valid for the confining layer geometries of the Small Lens and Extended Lens .

The top of the confining layer was held at a constant elevation for all models. This established a norm between models so that comparisons could be made. It is important to note, however, that tilting of the confining layer was done in the two models with confining layers that intersected bedrock (Small Lens-River Confined and Overbank Deposit) in order to make sure that tilting would not effect depletions. It was found that tilting caused depletion values to increase by only 1%, indicating the use of flat layers for all models was a valid approximation of a condition which could not be determined using existing field information. In glaciofluvial environments flat contacts are possible. Localized ponding or damming meltwater, for instance, can produce fine-grained strata with flat upper contacts.

9.2.2 Calibration of Models for Observed Conditions of Well No. 1 and the Site

The remaining input parameters required by MODFLOW were varied over a wide range in order to account for the range of cases that likely apply to the site area. These parameters are: initial aquifer head, horizontal conductivity in each aquifer, vertical conductance in unconfined regions, vertical conductance through the confining layer, storativity for confined conditions, and specific yield for unconfined conditions. Initial values of the aquifer parameters were estimated using data from available well logs, the time-drawdown data collected during the pump test and published values. These parameters were varied one at a time based on ranges of published values that apply to a sand/gravel system with fine-grained lenses. After initial calibration of the system, hydraulic parameters were held constant in each subsequent model.

The final values for the above aquifer parameters were determined using three calibration criteria:

1) Under static conditions (no pumping) the initial head should not change over time. The model was set up such that no pumping occurred. In this case, recharge and discharge from the system are controlled only by the constant head boundaries and constant head river cells. Variations in head after 30 days with no pumping averaging greater than +/- 10 feet were assumed to indicate a poor calibration and invalid parameters.

2) The drawdown predicted by the model after 30 days of pumping should be within 10 feet of the maximum drawdown observed during the pump test.

3) The model should reflect realistic hydrogeologic conditions that fit the alluvial basin, based on the environment of deposition, well logs, and pump test results.

9.2.3 Aquifer Parameters for Computer Analysis

Following is a discussion of the impact of varying each aquifer parameter. The results of model runs for several combinations of aquifer parameters are summarized in Table I and Table II. Table I summarizes model runs based on initial estimates of the aquifer parameters. To simplify calibration, the model runs presented in Table I were based on the Extended Lens Model. Table II summarizes model runs using adjusted parameters that best fit conditions observed during well construction and determined by review of well log information. The 'Calibration Drawdown' referred to in the tables is the change in head predicted by the model after 30 days with no pumping and no recharge to the system.

A. INITIAL HEAD:

The initial head in each aquifer was determined using USGS topographic maps and static water levels reported in area well logs. It was assumed that the static water levels reported under a confining layer of limited extent must correlate to the water table determined from regional wells. The static water level above the confining layer reflects a perched condition and reflects mounding above the flat confining bed (fig. 6). Figure 7 shows the initial head applying to the regional aquifer (layer 2) and the perched aquifer (layer 1).

Several variations in both the perched and regional surfaces were considered. The perched surface initially used in calibration runs was ten feet higher in the Small Lens and Extended Lens Models than shown in the figure 7. As shown in the summary tables, regardless of variations in the other parameters, the higher water table forced unreasonable negative drawdowns (rising water table) in the lower aquifer under static conditions. Variations as to the time of year the water levels in the well logs were recorded and the accuracy of the USGS contours at 2000'=1" justify a 10 foot decrease in the upper water table. This decrease puts the water table in a depth range that is consistent with summer and fall water levels (20 to 30 feet below ground surface) reported for various shallow wells near the site (Lissner, 1975). This water table condition corresponds to relatively dry irrigation season conditions.

In the Overbank Deposit and Small Lens-River Confined Models, initial heads had to be adjusted for the unique conditions of having the confining layer intersect bedrock on one

of its sides. Calibration could not be achieved when using the same initial heads as were used in the other two models. The first two days of static conditions, as determined by computer runs, changed heads beyond the calibration criteria. Reassessment of the initial heads, with expected hydrologic gradients, showed that initial heads would indeed be expected to be different than the other models. Input for the Overbank Deposit and Small Lens-River Confined Models, for the pumped case, was then changed to include what was predicted by the computer models under static conditions. Changing the initial heads in these two models improved calibration but had little effect on depletion.

Both higher and lower initial heads in the regional water table were considered. Variations had little effect on depletion and while raising the portion of the regional water table under the perched layer improved calibration, this level was left as originally observed to better represent the initial conditions observed in the pump test.

B. REGIONAL AQUIFER TRANSMISSIVITY: 400 sq. ft./day
PERCHED AQUIFER HYDRAULIC CONDUCTIVITY: 3.0 ft./day

Range of Values Examined, T:	300 - 4,000 sq. ft./day
Range of Values Examined, K:	2 - 32 ft./day

In each model, it was assumed that the regional layer, layer 2, is fully saturated throughout the modelling period. This allows a constant transmissivity to be used. In the upper, fully unconfined layer 1, transmissivity varies with head and hydraulic conductivity must be specified. Initial values for hydraulic conductivity in the perched aquifer and the transmissivity in the regional aquifer were based on the transmissivity determined from the pumping test (316 $ft.^2$/DAY) and an estimated aquifer thickness of 150 feet. The aquifer thickness was taken as slightly greater than the length of well penetrating the regional aquifer. Well logs support the assumption that conductivities in the perched aquifer are similar to those of the regional aquifer.

Increases in the transmissivity of the regional aquifer resulted in increased depletion and decreased drawdown. Order of magnitude increases resulted in no drawdown at all. Small increases were necessary to match the calculated drawdown to the observed drawdown. A final transmissivity of 400 sq. ft./day resulted in the required drawdown in the pumping well. Variations in the perched layer conductivity had little impact on depletion and drawdown. A value for hydraulic conductivity of 3.0 ft/day, based on the adjusted lower aquifer transmissivity and an aquifer thickness of 150 ft., was used in each model.

C. VERTICAL CONDUCTANCE

MODFLOW calculates the flow between layers based on the difference in head and a representative vertical conductance term. The vertical conductance term VCONT varies throughout the model area and accounts for the vertical conductivity and thickness of the surficial aquifer, the vertical conductivity and thickness of the confined aquifer and the vertical conductivity and thickness of the confining layer. For a model with two aquifers separated by a confining layer, VCONT is calculated according to the following equation:

$$VCONT = \frac{1}{DZ1/K1v + DZ2/K2v + Tcfn/KCFNv}$$

DZ1, DZ2 = *1/2 the aquifer thickness for layers 1,2*
Tcfn = *Thickness of confining layer*
K1v, K2v = *Vertical Hydraulic Conductivity in layers 1,2*
KCFNv = *Vertical Hydraulic Conductivity in the confining layer*

The Rippling River model requires only two values of VCONT. The value of VCONT used for the unconfined region of the lower aquifer directly underneath the river represents only the thickness and vertical conductance of the two aquifers. The value of VCONT used throughout the rest of the model area reflects the effect of the confining layer.

VCONT was calculated assuming that the confining layer is 10 feet thick, the combined travel distance through the upper and lower aquifers is 125 feet, and the vertical conductivities in the upper and lower aquifers are equal. These assumptions allow the vertical conductance to be evaluated by varying only the vertical conductivity in the unconfined and confined regions.

D. VERTICAL CONDUCTIVITY, UNCONFINED REGION: .30 ft/day

Range of Values Examined: .02 - .32 ft/day

The initial vertical conductivity used was determined using a ratio to horizontal conductivity for medium stratification as reported by Walton (1989). The summary tables show that order of magnitude variations in the unconfined vertical conductivity did not cause any unreasonable results. Medium stratification was assumed for the final model in order to account for some difference between vertical and horizontal conductance.

E. VERTICAL CONDUCTIVITY, CONFINED REGION: .00134 ft/day

Range of Values Examined: .000001 - .0134 ft/day

The vertical conductivity used for the confining layer is based on the mid-range of published values for silty clay layers. Using higher vertical conductivities resulted in excessively low drawdowns in the confined layer. Lowering the vertical conductivity had little effect and resulted in higher drawdowns than the observed values.

F. STORATIVITY: .000163

Range of Values Examined: .0000163 - .00163

The storativity is based on time-drawdown data obtained from the pumping test. Order of magnitude changes had little effect on calibration or the rate of stream depletion.

G. SPECIFIC YIELD: .20

Range of Values Examined: .15 - .30

The final specific yield represents an average of the published range. Decreasing the specific yield had little effect. Increasing the specific yield decreased the rate of stream depletion. The final specific yield represents a conservative value.

9.3 Results of MODFLOW Computer Analyses

Figures 13-16 show the piezometric head predicted by MODFLOW, for the regional aquifer after 30 days without pumping for the calibrated model, for each confining layer geometry. These contours are consistent with those based on well log data that are presented on Figure 7, and demonstrate that the parameters and boundary conditions used in the final models are consistent with the well log information. Figures 17-20 show the piezometric head in the perched and regional aquifer after 30 days of pumping as predicted by the final models. These contours demonstrate that the dominating gradient after pumping is in the upstream direction and not in the direction of the river for each model.

Table I and Table II clearly show that regardless of the aquifer parameters used, rates of depletion in excess of 25 percent of the pumping rate will not occur for any geologically reasonable confining layer configuration, and with any reasonable hydrologic parameters. For the models, depletion values were: Small Lens-River Confined 14%; Small Lens, 18%; Extended Lens, 20%; and Overbank Deposit, 21%.

9.4 Conditions Necessary to Induce Significant Stream Depletion By Pumping of Well No. 1

The MODFLOW models were used to analyze stream depletion for wells located closer to the Salmon River than the actual 1,400 foot separation distance that applies to Well No. 1. Significant depletion occurs only at distances of less than 500 feet to the river. These results are shown in Table II. If it is assumed that the aquifer is unconfined, analysis with a model by W. C. Walton as a validation check predicts that significant depletion occurs only at distances less than 300 feet. In confined conditions where the river and well both completely penetrate the confined aquifer, significant depletion is predicted for greater distance from the river. However, in the case of Well No. 1, confinement of the aquifer supplying the well is probable only on a local basis. The well partially penetrates the confined portion of the aquifer, and the river bed is at least 175 feet above the bottom of the aquifer with no penetration. The conditions necessary for significant stream depletion do not apply to Well No. 1.

Reasonable variations of confining layer configurations and hydrogeologic parameters did not, in any case, result in significant stream depletion for the actual separation distance of 1,400 feet between Well No. 1 and the Salmon River. The results of analysis with MODFLOW and Walton models, coupled with knowledge of the geology in the Salmon-Sandy River basin, demonstrate that significant depletion will not occur due to pumping of Well No. 1 at the rate of 280 gpm for the existing separation distance between the well and the Salmon River of 1,400 feet.

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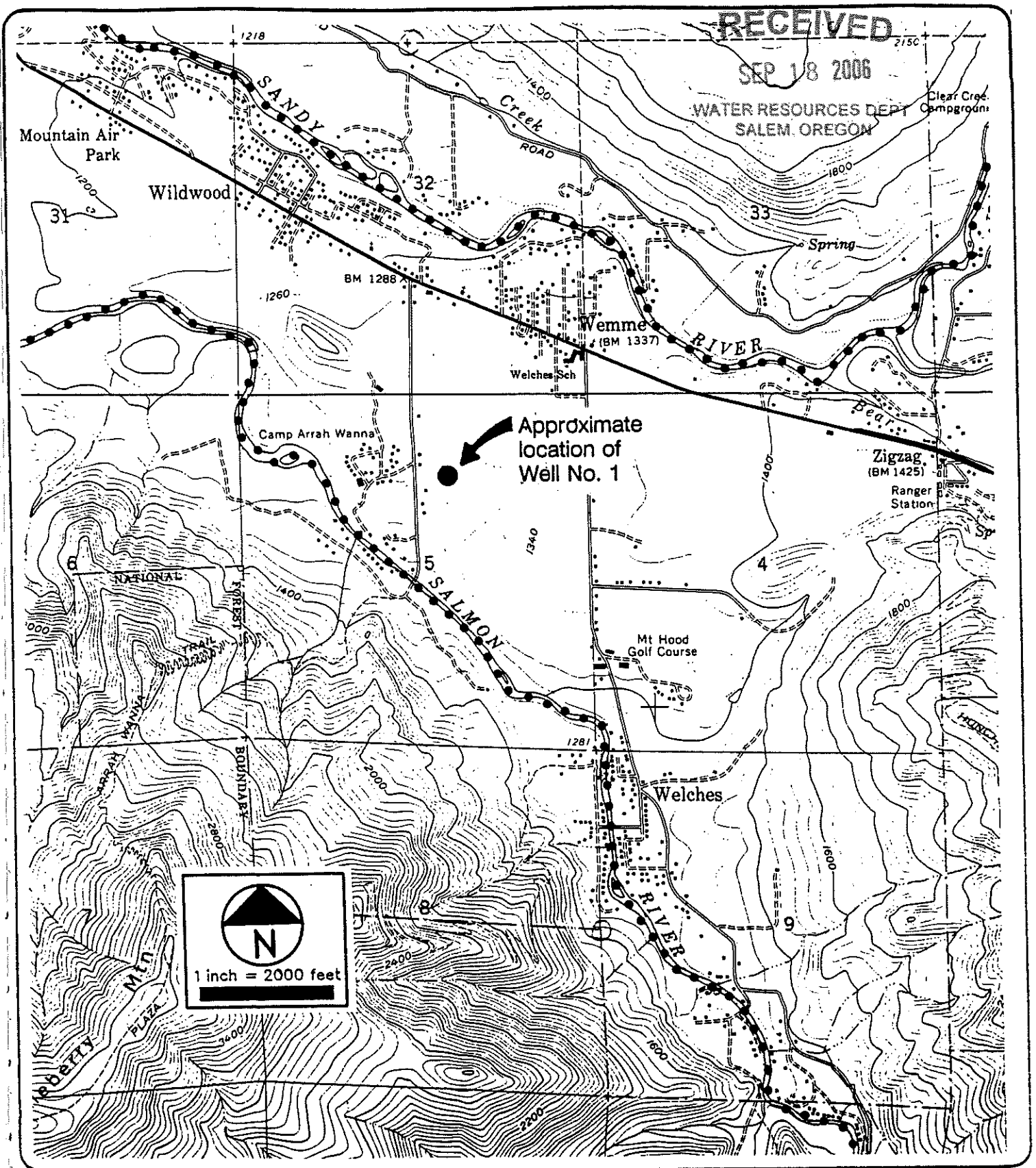
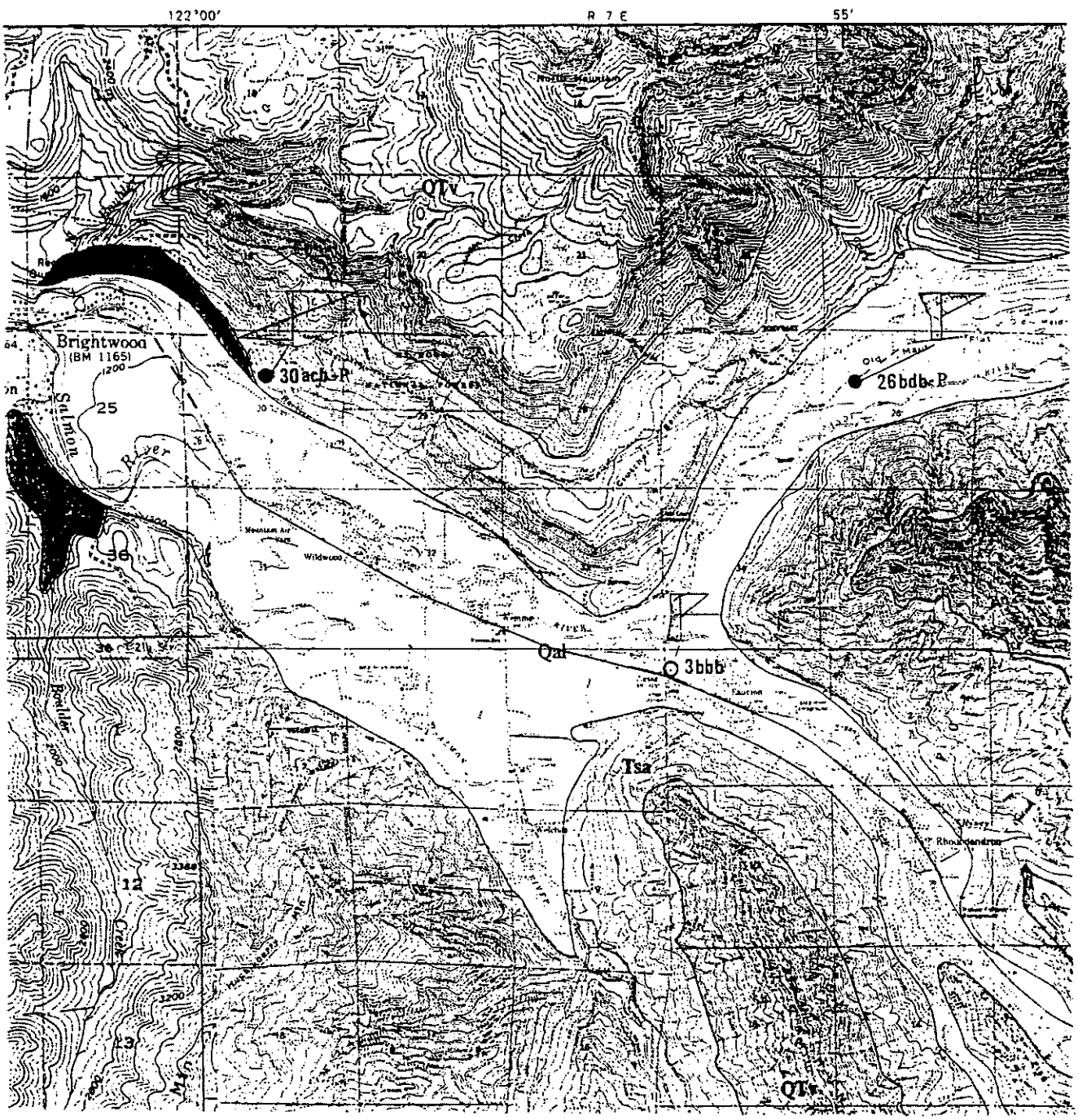
Appendix A - Figures



DESIGNED: MSH DRAWN: MSH CHECKED: DJN PROJECT NO. 215 CD 91	DAVID J. NEWTON ASSOCIATES INCORPORATED CIVIL & GEOLOGICAL ENGINEERING 1201 S.W. 12TH AVE., SUITE 620 PORTLAND, ORE. 97205 • 228-7718	LOCATION MAP AND PHYSIOGRAPHY OF SITE AREA Rippling River Golf Course Ground Water Evaluation	DATE JULY 1990 FIGURE 1

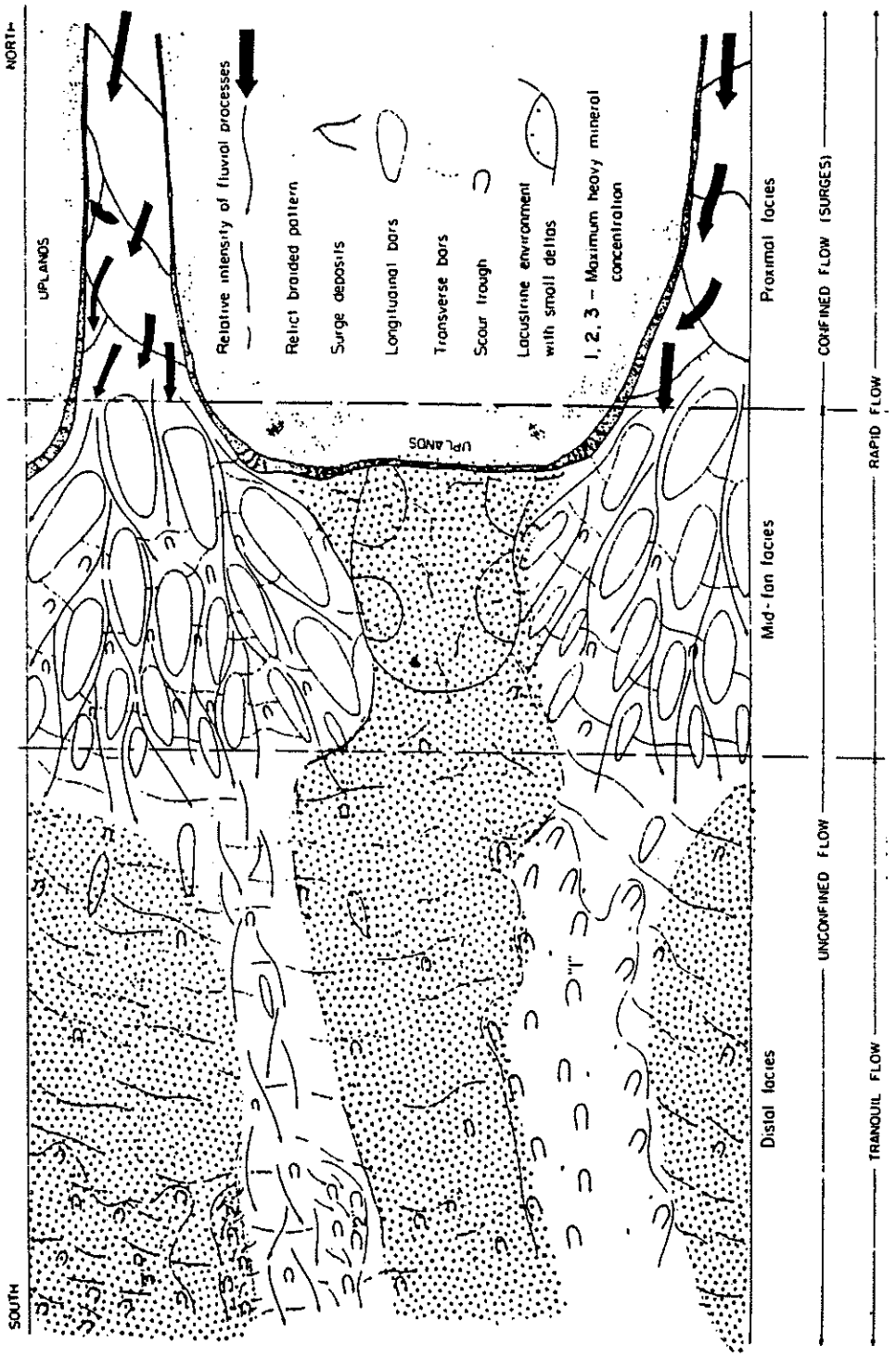


DESCRIPTION OF MAP UNITS

Qal	ALLUVIUM - Silt, sand and gravel, locally cemented with clay; coarsest and most permeable along Sandy and Zigzag Rivers, where it includes glacial outwash gravel. Thickness ranges generally from 15 to 100 feet. Yields ranges from 10 to 400 gpm in individual wells.
QTv	The HIGH CASCADES LAVAS are largely andesitic and occur in the higher mountain areas east of Cherryville. No wells are known to tap these lavas, but they contribute large volumes of water to the base flow of streams and have the potential to yield large quantities to wells.
Tsa	SARDINE FORMATION - Volcanic mudflows, lava, and tuff. Crops out east of Estacada and Sandy but underlies younger rocks several miles farther west, as between Beaver Creek and Estacada. THickness ranges from 600 to few thousand feet in eastern part of area. Yields to wells generally 2 to 50 gpm; a major source of domestic water supplies eastward from Estacada and Sandy.
	COLUMBIA RIVER BASALT GROUP - Flows of fine-grained dark basalt with scoriaceous or brecciated interflow zones. Yields to wells reported to range from 7 to 300 gpm.

(Modified from: *Groundwater Report No. 29*)

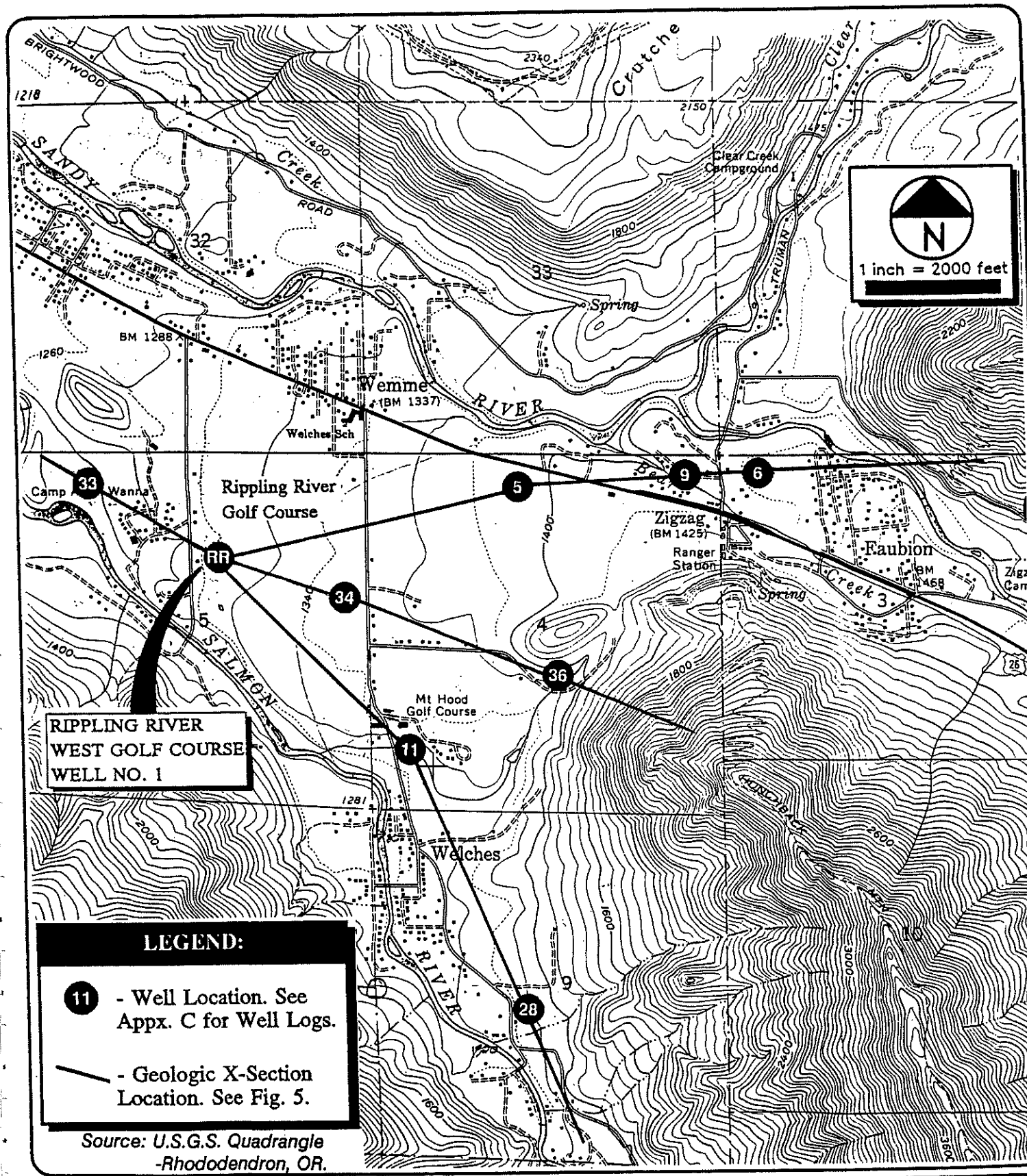
DRAWN: NAE DESIGNED: NAE CHECKED: DJN	DAVID J. NEWTON ASSOCIATES, INC.	GEOLOGIC MAP OF SITE AREA	DATE 7/90 FIGURE 2



Predominance of Fine-Grained Materials

(From McGowen & Groat, 1971)

DESIGNED:	DAVID J. NEWTON ASSOCIATES INCORPORATED CIVIL & GEOLOGICAL ENGINEERING 1201 S.W. 12TH AVE., SUITE 620 PORTLAND, ORE. 97205 • 228-7718	ALLUVIAL/GLACIOFLUVIAL DEPOSITIONAL MODEL	DATE 7/90
DRAWN:			
CHECKED:		Rippling River Golf Course Ground Water Evaluation	FIGURE 3
PROJECT NO.			



Source: U.S.G.S. Quadrangle -Rhododendron, OR.

DESIGNED: MB
DRAWN: RM
CHECKED: TK
PROJECT NO. 215 CD 91 DN

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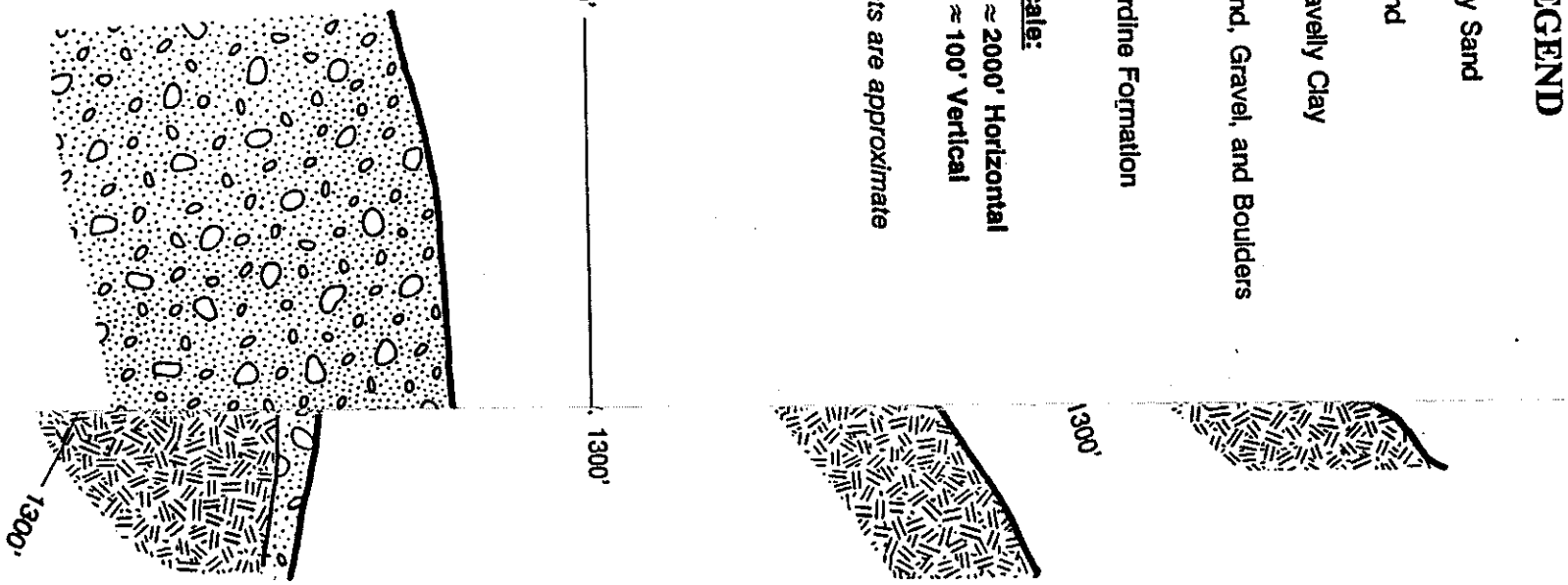
VICINITY MAP

Rippling River Golf Course Ground Water Evaluation

DATE: JULY 1990
FIGURE: 4



LEGEND

- Silty Sand
- Sand
- Gravelly Clay
- Sand, Gravel, and Boulders

GLACIOFLUVIAL SEDIMENTS

- Sardine Formation

Scale:
1" ≈ 2000' Horizontal
1" ≈ 100' Vertical

Note:
Geologic contacts are approximate

DATE JULY, 1990

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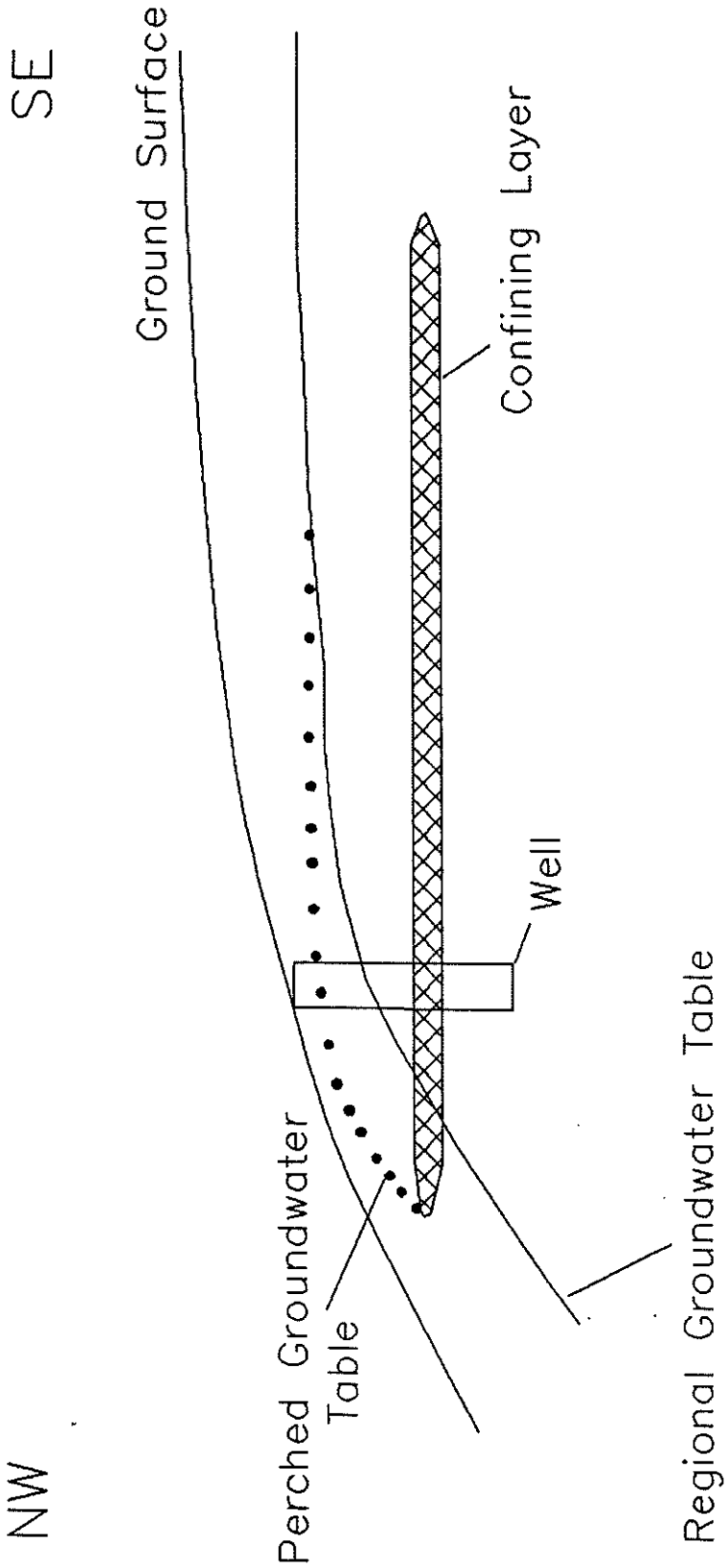
Geologic Cross Section
Interpretive

Rippling River Golf Course
Ground Water Evaluation

FIGURE 5



DATE
JULY
1990

PROJECT NO.
215 CD 91

PROJECT NO. – DWG

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GROUND WATER RELATIONSHIPS

Rippling River Golf Course
Ground Water Evaluation

FIGURE
6

FIGURE 7

PIEZOMETRIC CONTOURS FOR THE PERCHED AND REGIONAL AQUIFERS

RIPPLING RIVER STREAM DEPLETION

OMETRIC SURFACE

present the approximate
ometric surface for the
al aquifer. The contours
the static water levels
shallow wells, deep wells,
during the driest months.
esent heads used as initial
modeling.

GEND

S.G.S. Contours
gional Piezometric Surface
rched Piezometric Surface
ponds to Well Logs in Appendix C

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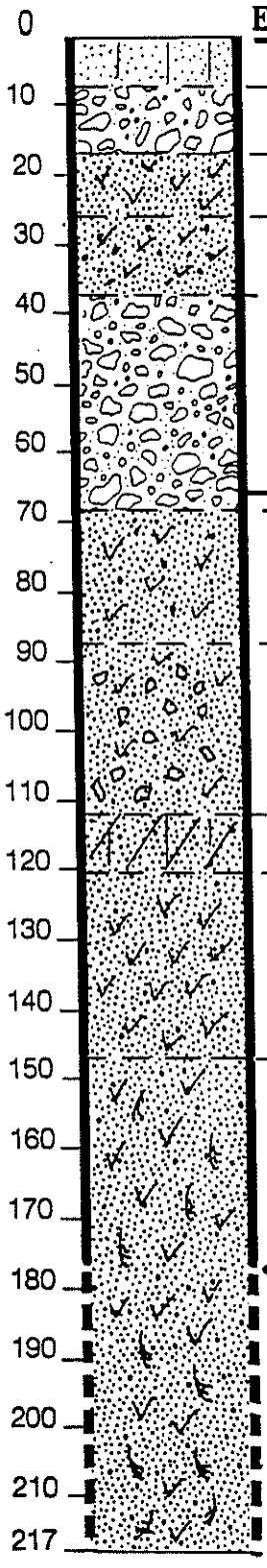
JULY 1990

PROJECT NO.
215 CD 91 DN

215 CD 91 DN - RIP-PIEZ



ELEVATION 1300± FT.

Dark brown silty sand with gravel

Gray, cobbles/boulders/rubble (difficult drilling)

Gray, buff to red orange, rounded to angular basalt gravels and sand with apparent layers of cemented buff sandstone or mudstone

Gray, relatively course basalt sand and gravel, ground water noted (well bore filled in) at approximately 30 ft.

Gray to red orange, cobbles/boulders/ rubble

Static water level after casing & screen installation

Gray, subrounded basalt gravels relatively loose, reported as water bearing by driller

Gray, subrounded basalt cobbles and gravels (coarser than above material)

(Static water level measured after overnight period at 23 feet for well depth of 115 ft.)

Yellow silt to clay with gravels, apparent mudstone or mudflow stratum

Gray, subrounded basalt gravels

Gray, coarse (1 to 1-1/4 inch sizes) basalt gravels with wood fragments and medium to coarse sands

Gravels are subrounded to rounded, and consist of basalt to well bottom at 217 ft.

Bottom of unperforated steel casing, 177 ft.

10" stainless steel screen, No. 30 slot, 177 to 217 ft.

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DRAWN: DJW
CHECKED: DJN
PROJECT NO. 215 CD 91

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WEST GOLF COURSE

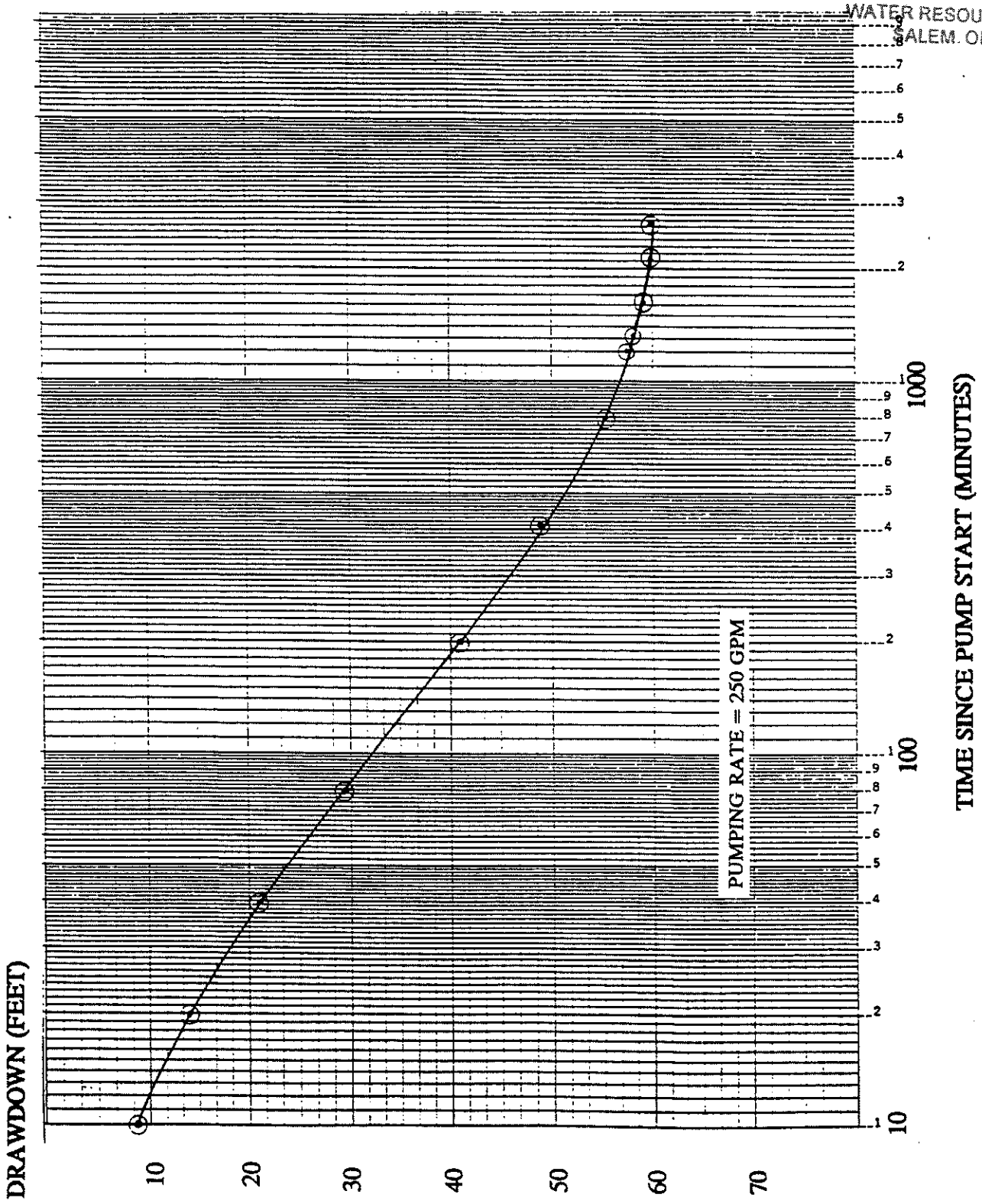
LOG OF WELL NO. 1 AND ILLUSTRATION OF CASING/SCREEN

Drilled April, 1989

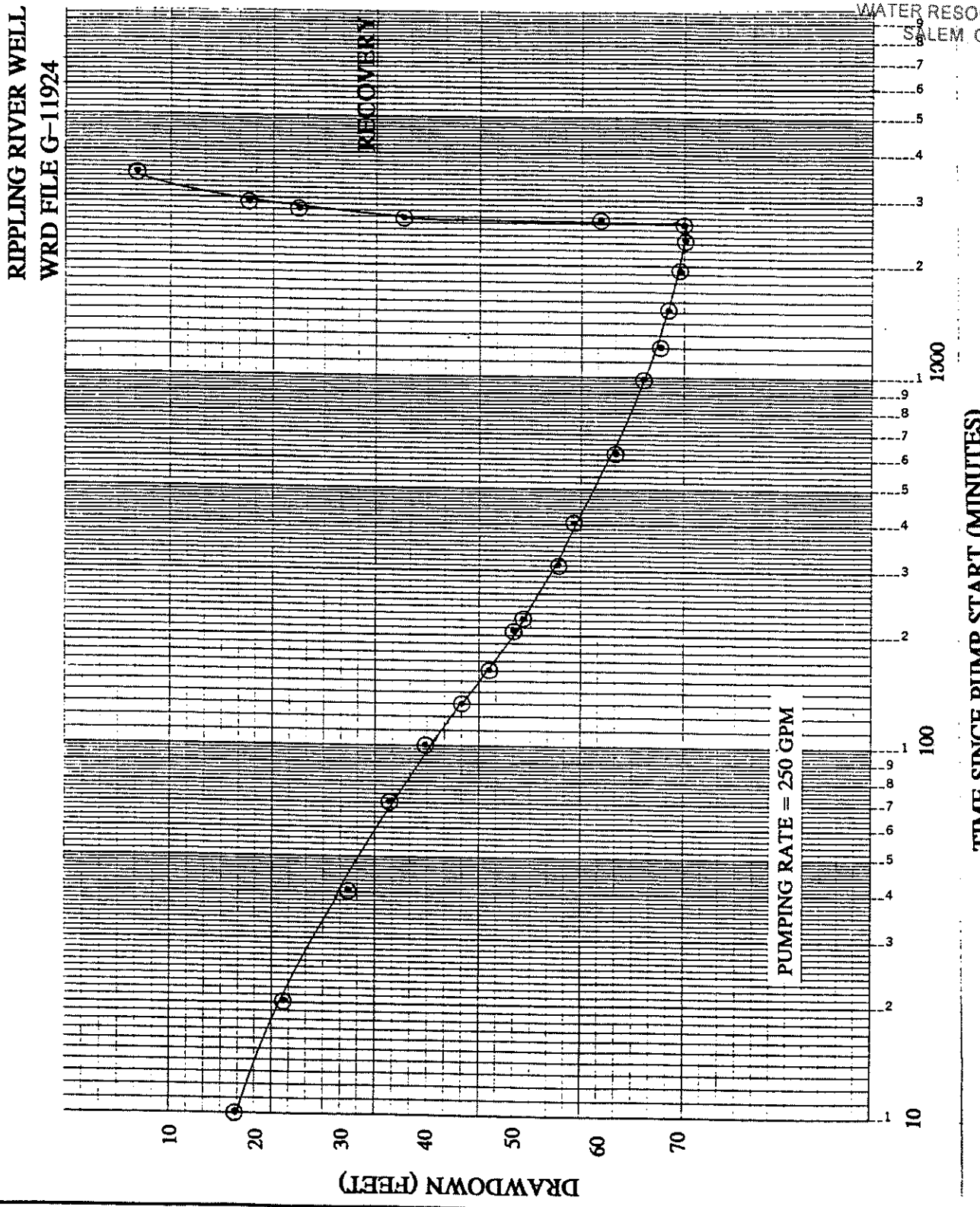
DATE JULY 1990

FIGURE 8

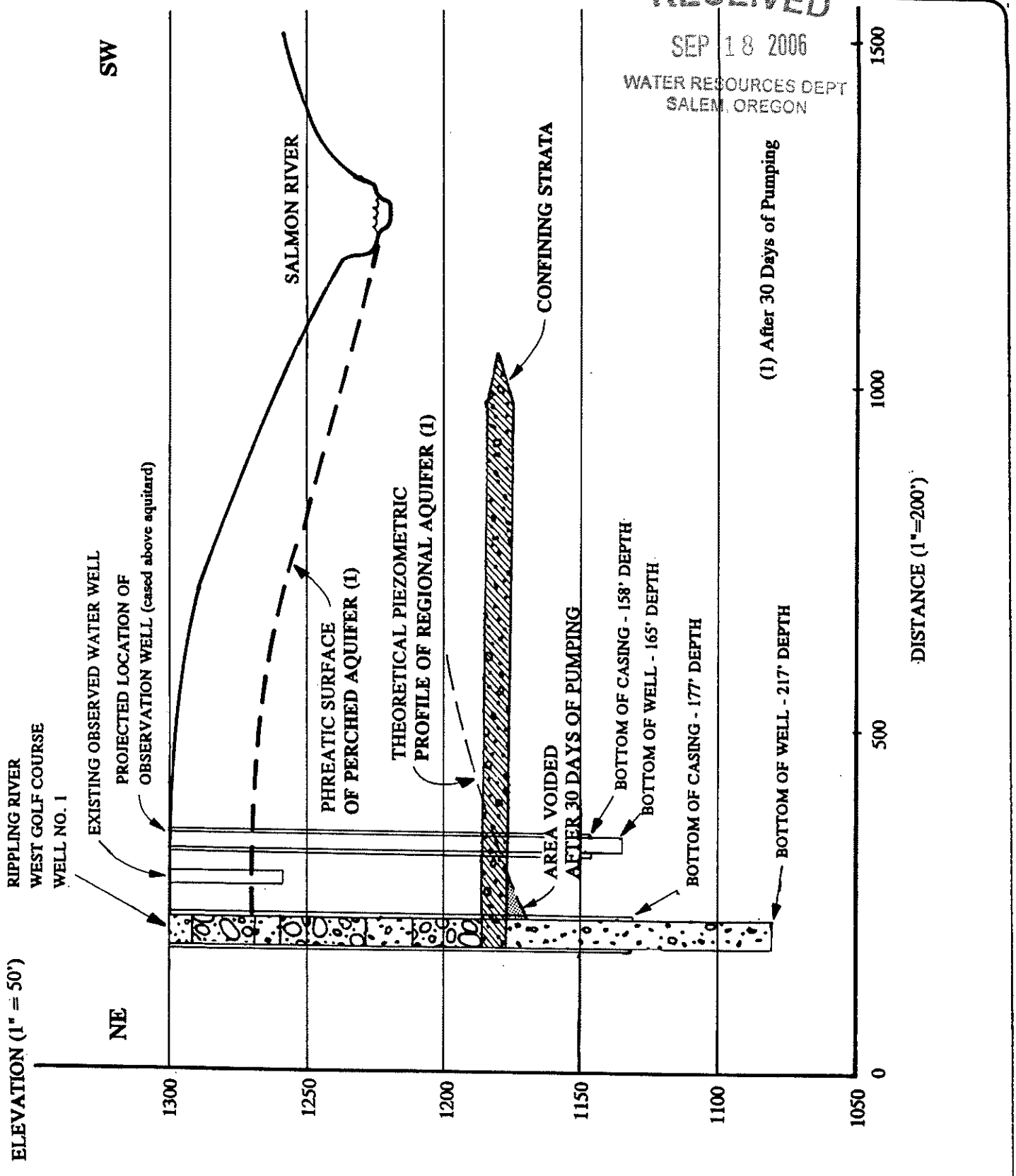
PROJECT NO. - PWG



DESIGNED: DJN DRAWN: MSH CHECKED: DJN PROJECT NO. 215 CD 91	DAVID J. NEWTON ASSOCIATES INCORPORATED CIVIL & GEOLOGICAL ENGINEERING 1201 S.W. 12TH AVE., SUITE 620 PORTLAND, ORE. 97205 • 228-7718	TIME-DRAWDOWN CURVE FOR OBSERVATION WELL Rippling River Golf Course Ground Water Evaluation	DATE JULY 1990 FIGURE 9



DESIGNED: DJN DRAWN: MSH CHECKED: DWO PROJECT NO. 215 CD 91	DAVID J. NEWTON ASSOCIATES INCORPORATED CIVIL & GEOLOGICAL ENGINEERING 1201 S.W. 12TH AVE., SUITE 620 PORTLAND, ORE. 97205 • 228-7718	TIME-DRAWDOWN CURVE FOR PUMPED WELL Rippling River Golf Course Ground Water Evaluation	DATE JULY 1990 FIGURE 10



DESIGNED: DLS DRAWN: MSH CHECKED: DWO PROJECT NO. 215 CD 91	DAVID J. NEWTON ASSOCIATES INCORPORATED CIVIL & GEOLOGICAL ENGINEERING 1201 S.W. 12TH AVE., SUITE 620 PORTLAND, ORE. 97205 • 228-7718	WATER TABLE AND WELL RELATIONSHIPS - INTERPRETIVE Rippling River Golf Course Ground Water Evaluation	DATE JULY 1990 FIGURE 11

Appendix B - Tables

Table I
Summary of Calibration Model Runs

	Input Parameters						Results				
Model Description *	Upper Kh (fpd)	Lower T (sf/day)	Sy (dim)	S (dim)	Confining Kv (fpd)	Aquifer Kv (fpd)	Layer 1 Calibration Drawdown (ft)	Layer 2 Calibration Drawdown (ft)	Drawdown ** Pumping Well (ft)	Drawdown ** Observatoin Well (ft)	% Depletion *** (entire reach)
T estimated from time-drawdown data	3.0	316.0	0.20	0.000163	0.0013	0.3	1.0	-10.0	110.0	80.0	17.0%
Increased Kv in confining layer	3.0	400.0	0.20	0.000163	0.013	0.3	1.0	-7.0	48.0	17.0	0.0%
Decreased Kv in confining layer	2.0	400.0	0.20	0.000163	0.000001	0.3	2.0	-6.0	83.0	53.0	20.0%
St. Heads = 10' higher in perched region	3.0	400.0	0.20	0.000163	0.0013	0.3	3.0	-15.0	73.5	43.3	20.0%
High T	5.0	450.0	0.20	0.000163	0.0013	0.3	1.0	-11.0	50.0	18.0	23.0%
Final Values	3.0	400	0.20	0.000163	0.0013	0.3	0.0	-7	75.0	47.0	20.0%

* All models use Extended Lens configuration

** Pumping Rate for Drawdown Calibration = 250 gpm

*** Pumping Rate for Depletion Calculations = 280 gpm

Table II
Summary of Final Model Runs

Model Description	Input Parameters						Results				
	Upper Kh (fpd)	Lower T (sf/day)	Sy (dim)	S (dim)	Confining Kv (fpd)	Aquifer Kv (fpd)	Layer 1 Calibration Drawdown (ft)	Layer 2 Calibration Drawdown (ft)	Drawdown * Pumping Well (ft)	Drawdown * Observatoin Well (ft)	% Depletion ** (entire reach)
Extended Lens	3.0	400.0	0.20	0.000163	0.0013	0.2	0.0	-7.0	75.0	47.0	20.0%
Small Lens	3.0	400.0	0.20	0.000163	0.0013	0.2	3.0	-10.0	75.0	48.0	19.0%
Overbank	3.0	400.0	0.20	0.000163	0.0013	0.2	1.0	-10.0	76.0	48.0	21.0%
Small Lens- Under River	3.0	400.0	0.20	0.000163	0.0013	0.2	3.0	-10.0	75.0	44.0	14.0%

* Pumping Rate for Drawdown Calibration = 250 gpm

** Pumping Rate for Depletion Calculations = 280 gpm

Appendix C - Well Logs

STACO WELL SERVICES, INC TEL: 503-845-9[illegible] RECEIVED 05/30 16:18 No.017 P.02

SEP 18 2006

WATER RESOURCES DEPT
SALEM OREGON

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(1) OWNER:
Well Number:
Name Rippling River Resort
Address
City Welches State OR Zip 97067

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☒ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☒ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☐ No ☒ Depth of Completed Well 217 ft.
Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
16	0	32	volclay	21	32	14 sacks
			cement	0	21	25 sacks

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E pumped
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12"	+1	177	.250	☒	☐	☒	☐
					☐	☐	☐	☐
	10"	167	177	.250	☒	☐	☒	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type Howard Smith Material Stainless

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
177	217	.30			10" tele	☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.
250	70		48 hrs.

Temperature of water Depth Artesian Flow Found
Was water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Clack. Latitude Longitude
Township 3S N or S, Range 7E E or W, WM.
Section 5 SW ¼ SE ¼
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:
70 ft. below land surface. Date 5-2-89
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL
43	53	10	25
69	87	50	40
147	217	250	70

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
Sandy soil gravels	0	7	
Broken rock cobbles	7	12	
Gravely rubble volcanic	12	21	
Fractured rubble	21	30	
Gravels loose	30	37	
Basaltic rubble large	37	55	25
Gravel grey red	55	69	
Gravel loose grey	69	83	40
Gravels loose	83	87	40
Gravels large	87	113	
Gravel yellow with clay	113	122	
Gravels	122	145	
Gravels with wood	145	147	
Gravels	147	217	70

Date started 4-24-89 Completed 5-2-89

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed [signature] WWC Number 1258
Date 5-8-89

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed [signature] WWC Number 723
Date 5-8-89

WHITE COPIES - WATER RESOURCES DEPARTMENT

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WATER RESOURCES DEPT
SALEM, OREGON

(5)

3s/7E-4ab

STATE OF OREGON

RECEIVED
SEP - 8 1987

WATER WELL REPORT
(as required by ORS 537.765)

Valley Water Dist. Co.

(1) OWNER:
Well Number 04
Name Salmon WATER RESOURCES DEPT Water District Co.
Address Box 205 SALEM, OREGON
City Welches State Oregon Zip 97067

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☒ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☐ No ☒ Depth of Completed Well 121 ft.
Explosives used Yes ☐ No ☒ Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
12	0	20	Gran. Bent.	0	20	17 sacks
6	20	121				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other Granular bentonite placed dry
Backfill placed from ____ ft. to ____ ft. Material ____
Gravel placed from ____ ft. to ____ ft. Size of gravel ____

CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+1½	121	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 121

(7) PERFORATIONS/SCREENS:
☒ Perforations Method Air Rotary
☐ Screens Type ____ Material ____

Perforations From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
104	116	1/8	235			☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
80		100	1 hr.
50		75	½ hr.

Temperature of water 50° Depth Artesian Flow Found ____
Was a water analysis done? ☒ Yes By whom Driller
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other ____

(9) LOCATION OF WELL by legal description:
County Clackamas Latitude ____ Longitude ____
Township 3 South N or S, Range 7 East E or W, WM.
Section 4 N.W. ¼ N.E. ¼
Tax Lot ____ Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 69080 E. Vine Maple Dr. Welches, Oregon 97067

(10) STATIC WATER LEVEL:
50 ft. below land surface. Date 8-28-87
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 66

From	To	Estimated Flow Rate	SWL
66	90	30 gpm	
104	121	90 gpm	50

(12) WELL LOG:
Ground elevation ____

Material	From	To	SWL
Sand, Gravel and Boulders	0	66	
Sand, Gravel and Boulders (water bearing)	66	90	
Sand, Gravel and Boulders	90	104	
Sand, Gravel and Boulders (water bearing)	104	121	50

Date started 8-25-87 Completed 8-28-87

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number ____
Signed ____ Date ____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 553

RECEIVED (6)

RECEIVED APR 15 1966 STATE ENGINEER SALEM, OREGON

RECEIVED SEP 18 2006 WATER RESOURCES DEPT. SALEM, OREGON

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM 10, OREGON within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

State Well No. 3/7-3D

State Permit No.

(1) OWNER:
Name United States Forest Service
Address Department of Agriculture
Zig Zag Ranger Sta., Zigzag, Oregon

(2) LOCATION OF WELL:
County Clackamas Driller's well number 21-66
NW ¼ NW ¼ Section 3 T. 3S R. 7E W.M.
Bearing and distance from section or subdivision corner

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☒ Rgr. Sta.

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒
8" Diam. from plus 1 ft. to 163 ft. Gage 0.277
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS:
Well screen installed ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Well seal—Material used in seal Bentonite & Cement
Depth of seal 21 ft. Was a packer used? No
Diameter of well bore to bottom of seal 12 in.
Were any loose strata cemented off? ☐ Yes ☒ No Depth
Was a drive shoe used? ☒ Yes ☐ No
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? Iron Depth of strata 55' to 72'
Method of sealing strata off Casing

(10) WATER LEVELS:
Static level ft. below land surface Date
Artesian pressure 5 lbs. per square inch Date 3/25/66

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom Steinman Bros.

Yield:	116	gal./min. with	30	ft. drawdown after	2 hrs.
"	75	"	40	"	2 "
"	60	"	19	"	2 "

Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow 40 g.p.m. Date Mar. 25, 1966
Temperature of water 47 Was a chemical analysis made? ☒ Yes ☐ No

(12) WELL LOG:
Diameter of well below casing
Depth drilled 163 ft. Depth of completed well 163 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand, grey, coarse	0	2
Grey sand and boulders, large	2	45
Grey sand and boulders and wood	45	50
Grey sand	50	67
Sand and gravel (water)	67	72
Sand and boulders	72	157
Reddish-brown sand, coarse	157	161
Coarse gravel and sand (Artesian water)	161	163

Work started Feb. 2 1966. Completed March 31 1966
Date well drilling machine moved off of well April 5 1966

(13) PUMP:
Manufacturer's Name
Type: H.P.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Steinman Bros. (Person, firm or corporation) (Type or print)
Address 15112 S.E. McLoughlin, Milwaukie, Ore. 972
Drilling Machine Operator's License No. 67
[Signed] Steinman Bros. (Water Well Contractor)
Contractor's License No. I Date April 12, 1966

The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON

(Please type or print)

(Do not write above this line)

RECEIVED
SEP 18 1980
WATER RESOURCES DEPT
SALEM, OREGON

(9)

State Well No. XXXXX 4E/3S-4Db

State Permit No. .....

(1) OWNER:

Name Wallace Dwight McKenzie

Address Box 293 Welches, Oregon 97067

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:

Threaded ☐ Welded ☒ PVC

6 " Diam. from 0 ft. to 40 ft. Gage CL 160

..... " Diam. from ..... ft. to ..... ft. Gage .....

..... " Diam. from ..... ft. to ..... ft. Gage .....

(6) PERFORATIONS:

Perforated? XXYes ☒XXX

Type of perforator used Skillsaw

Size of perforations 1/8 " in. by 8 in.

20 perforations from 30 ft. to 40 ft.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name .....

Type ..... Model No. .....

Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes XX No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

" " "

" " "

Bailer test 10 gal./min. with 12 ft. drawdown after 1 hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:

Well seal—Material used Portland Cement

Well sealed from land surface to 18 ft.

Diameter of well bore to bottom of seal 10 in.

Diameter of well bore below seal 6 in.

Number of sacks of cement used in well seal 10 sacks

How was cement grout placed? Pressure Grouted

.....

.....

.....

Was drive shoe used? ☐ Yes ☒ No Plugs ..... Size: location ..... ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? depth of strata

Method of sealing strata off

Was well gravel packed? ☒ Yes ☒XXX Size of gravel: 1/4"

Gravel placed from 30 ft. to 40 ft.

(10) LOCATION OF WELL:

County Clackamas Driller's well number 80-11

NW ¼ NW ¼ Section 4 T. 3S R. 7E W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 32 ft.

Static level 18 ft. below land surface. Date 9-15-80

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0

Depth drilled 40 ft. Depth of completed well 39 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Fine sand and silt	0	1	
Coarse sand, gravel, boulders	1	32	
Fine to coarse sand, gravel wb	32	40	18

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OCT 21 1980
WATER RESOURCES DEPT
SALEM, OREGON

Work started 9-12 80 19 Completed 9-16-80 19

Date well drilling machine moved off of well 9-16-80 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] W A Knapp (Drilling Machine Operator) Date 9-16, 19 80

Drilling Machine Operator's License No. 1394

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name W.A. Knapp dba Zig Zag Enterprises (Person, firm or corporation) (Type or print)

Address Box 368, Rhododeneron, Oregon 97049

[Signed] W A Knapp (Water Well Contractor)

Contractor's License No. 762 Date 9-16-80 19

(11)

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SEP 18 2006
WATER RESOURCES DEPT
SALEM, OREGON

File Original and First Copy with the STATE ENGINEER, SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

State Well No. 3/7-4N

State Permit No. G-8857

OWNER:
Name Mt. Hood Golf Club
Address Welches, Oregon

(2) LOCATION OF WELL:
County Clack. Owner's number, if any—
SW ¼ SW ¼ Section 4 T. 3S R. 7E W.M.
Bearing and distance from section or subdivision corner

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒
10" Diam. from 0 110 ft. to 110 ft. Gage Std.
8" Diam. from 0 ft. to 156'-6" ft. Gage Std.
" Diam. from ft. to ft. Gage

(7) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS:
Well screen installed ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Slot size Set from ft. to ft.
Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.
Was a surface seal provided? ☐ Yes ☐ No To what depth? ft.
Material used in seal—
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? Iron Depth of strata To 100 ft.
Method of sealing strata off 10 inch casing.

(10) WATER LEVELS:
Level 52 ft. below land surface Date 3/19/58
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] Eugene Baumen (Owner) Date 7/15/58

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom Farm Tractor Co
Yield: 385 gal./min. with 51 ft. drawdown after 8 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 50 Was a chemical analysis made? ☐ Yes ☒ No

(12) WELL LOG:
Diameter of well 8 inches.
Depth drilled 155 ft. Depth of completed well 155 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Cement gravel and boulders	0	30
Coarse packed sand	30	55
Brown silt	55	62
Glacial sand, gravel and boulders	62	75
Coarse packed sand and broken rock	75	84
Clay and broken rock	84	90
Coarse packed sand & broken rock	90	106
Boulders and cement gravel	106	110
Cemented sand, gravel and broken rk	110	137
Clay and cemented gravel mixed	137	149
Loose gravel and sand (Water)	149	155

Work started Feb. 1958 Completed Mar. 1958

(13) PUMP:
Manufacturer's Name Jacuzzi
Type: Turbine H.P. 15

Well Driller's Statement:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Steinman Bros.
(Person, firm, or corporation) (Type or print)
Address 15112 S. E. McLoughlin, Milwaukie 22, Ore.

Driller's well number 6-58

[Signed] Steinman Bros. by K E McConnell
(Well Driller)

License No. 1 Date May 15, 1958

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

SEP 16 1986

WATER RESOURCES DEPT
SALEM, OREGON

(28) RECEIVED

SEP 18 2006

WATER RESOURCES DEPT
SALEM, OREGON

(1) OWNER:

Owner's Well Number: 1

Dennis Tylka

Address: P.O. BOX 369

City: Welches State: Oregon Zip: 97067

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Other

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 43 ft.

Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
12	0	18	Gr Bent	0	18	12 Sacks
6	18	45				

How was seal placed? Method ☐ A ☐ B ☐ C ☐ D ☐ E

Other Granular Bentonite placed dry

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+1	38	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 38

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
			¼ hr
20		37	1 hr

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Clackamas Latitude ' " Longitude ' "

Township 3 South N or S, Range 7 East E or W, WM.

Section 9 NE ¼ SW ¼

Tax Lot Lot Block Subdivision

Street Address of Well (or nearest address) 68865 Manape
Welches, Oregon 97067

(10) STATIC WATER LEVEL:

22 ft. below land surface. Date 9-2-86

Artesian pressure lb. per square inch. Date

(11) WELL LOG:

Ground elevation

Material	From	To	WB?	SWL
Gravel & Boulders	0	28		
Sand & Gravel medium to large	28	45	X	22

Date started 9-2-86 Completed 9-2-86

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed Date 2 Sept 1986

Contractor's Name SKYLES DRILLING INC Contractor's License No. 4486

RECEIVED SEP 18 2006
WATER RESOURCES DEPT SALEM, OREGON

MAY 15 1970

of this report are to be filed with the STATE ENGINEER, SALEM, OREGON within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print) (Do not write above this line)

State Well No. 3/7-5L

State Permit No.

(1) OWNER:
Name Linden B. Bowman (Arrah Wanna Co.)
Address Wilcox Bldg. 506 S.W. 6th Portland, Oregon 97204

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☒
8" Diam. from 0 ft. to 57 ft. Gage ¼ wall
6" Diam. from 0 ft. to 65 ft. Gage ¼ wall
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☒ Yes ☐ No.
Type of perforator used torch
Size of perforations 1/8 in. by 8 in.
55 perforations from 5 ft. to 65 ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WATER LEVEL: Completed well.
Static level 30 ft. below land surface Date 5-12-70
Artesian pressure lbs. per square inch Date

WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 90 gal./min. with 30 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☒ No

(10) CONSTRUCTION:
Well seal—Material used cement
Depth of seal from 0 to 25 feet ft.
Diameter of well bore to bottom of seal 12 inches.
Were any loose strata cemented off? ☐ Yes ☒ No Depth
Was a drive shoe used? ☐ Yes ☒ No
Any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(11) LOCATION OF WELL:
County Clackamas Driller's well number
¼ N.W. ¼ Section 5 T. 3-S R. 7-E W.M.
Bearing and distance from section or subdivision corner

(12) WELL LOG:
Diameter of well below casing 6 inch
Depth drilled 110 ft. Depth of completed well 110 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Top soil	0	1	
Sandy clay and gravel	1	15	
Brown clay and gravel	15	25	
Brown broken hard rock	25	55	
Brown rock and sand	55	61	
Hard gray rock	61	68	
Broken brown rock and sand	68	85	
Gray rock	85	100	
River gravel and sand	100	110	

Work started 5-4-70 19 Completed 5-12-70 19
Date well drilling machine moved off of well 5-12-70 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] (Drilling Machine Operator) Date 5-13, 1970
Drilling Machine Operator's License No. 566

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
NAME Ralph Turner Drilling Co. (Person, firm or corporation) (Type or print)
Address Rte 1 Box 141 Hillsboro, Oregon 9712
[Signed] (Water Well Contractor)
Contractor's License No. 217

RECEIVED
JUN 16 1971
STATE ENGINEER
SALEM, OREGON

RECEIVED
SEP 18 2006
WATER RESOURCES DEPT
SALEM, OREGON

of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

State Well No. 3/7-4 da
State Permit No.

OWNER:
Name MT HOOD LOOP WATER DIST.
Address P.O. BOX 87, WEMME, ORE. 97067

(2) TYPE OF WORK (check):
New Well [X] Deepening [ ] Reconditioning [ ] Abandon [ ]
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bored [ ]

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [X]
Irrigation [ ] Test Well [ ] Other [ ]

CASING INSTALLED:
Threaded [ ] Welded [X]
12" Diam. from +2 ft. to 38 ft. Gage .330
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? [ ] Yes [X] No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? [ ] Yes [X] No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? [ ] Yes [X] No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
" " "
Bailer test 4 gal./min. with 156 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used CEMENT
Well sealed from land surface to 35 ft.
Diameter of well bore to bottom of seal 16 in.
Diameter of well bore below seal 12 in.
Number of sacks of cement used in well seal 41 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was drive shoe used? [ ] Yes [X] No Plugs Size: location ft.
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? [ ] Yes [X] No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County CLACK. Driller's well number 5774
SE ¼ NE ¼ Section 4 T. 3S R. 7E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found INSUFFICIENT WATER WELL CAPPED ft.
Static level 144 ft. below land surface. Date APR 26 1971
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 12
Depth drilled 400 ft. Depth of completed well 400 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
LIGHT BROWN ROCK	0	54	
MED HARD GREY ROCK	54	237	
MED SOFT BROWN ROCK	237	247	
HARD GREY ROCK	247	261	
GREEN SHALE AND GRAVEL	261	267	
HARD GREY ROCK	267	273	
SOFT GREY ROCK	273	310	
HARD BLACK ROCK (CLAY SEAMS)	310	332	
HARD GREY ROCK	332	387	
BROKEN BLACK BASALT (CLAY SEAMS)	387	398	
HARD GREY ROCK	398	400	

Work started DEC 11 1971 Completed MAY 28 1971
Date well drilling machine moved off of well JUNE 10 1971

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] W.M. Smith (Drilling Machine Operator) Date JUNE 11, 1971
Drilling Machine Operator's License No. 175

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name R.J. STRASSER DRILLING CO (Person, firm or corporation) (Type or print)
Address 8110 SE SUNSET LANE PORTLAND ORE.
[Signed] Robert L. Strasser (Water Well Contractor)
Contractor's License No. 19 Date JUNE 11 1971

HYDROGEOLOGICAL REPORT
Water Rights Appropriation Application
THE RESORT AT THE MOUNTAIN
OWRD File G11924

Prepared For:

The Resort At The Mountain
68010 East Fairway Avenue
Welches, Oregon 97067

Prepared By:

David J. Newton Associates, Inc.
1201 S.W. 12th Avenue, Suite 400
Portland, Oregon 97205

T 10240

Analysis of Stream Depletion Potential

DAVID J. NEWTON ASSOCIATES
INCORPORATED
Civil and Geological Engineering Services

May 3, 1991

Mr. Steve Applegate
Water Rights Division
OREGON WATER RESOURCES DEPARTMENT
3850 Portland Road N.E.
Salem, Oregon 97310

SUBJECT: File G11924; Hydrogeological Report and Analysis of Stream Depletion Potential.

Dear Mr. Applegate:

Transmitted herewith is our report on hydrogeology and analysis of stream depletion potential for the existing Well 1 and proposed Well 2 on the East 18 Golf Course at The Resort At The Mountain (formerly Rippling River Resort). Investigations and analysis that provide the basis for the report were performed to determine the potential for stream depletion according to OWRD criteria for streams subject to Diack provisions. The report consists of two bound volumes. The findings and conclusions of the investigations are presented in the first, while the second (Appendix C) contains raw computer data output from groundwater modeling.

Operators at The Resort At The Mountain would like to express their concern for a timely review of this application. Due to the closeness of the upcoming irrigation season and the work that needs to be done in drilling and constructing a new well, the operators feel that a critical need exists which must be addressed soon. OWRD's cooperation in this matter would be greatly appreciated.

This report will be used as an addendum to the previous report entitled "Hydrogeological Report, Water Rights Appropriation Application, Rippling River Resort, OWRD File No. G11920" and dated July 13, 1990. In the previous report, geology and aquifer conditions for the site were investigated and characterized by observations during construction of Well 1 on the West Golf Course. Groundwater computer models developed for the previous study were modified and used for this report. These models evaluate a range of hydrogeological conditions applicable to the site. Analyses were performed to evaluate groundwater flow responses to the proposed pumping rates of 350 gpm for Well 1, and 355 gpm for proposed Well 2.

The results of investigations and analyses indicate that flows from the Salmon and Sandy rivers will not be "significant" due to pumping at the proposed rate after the 30 day period outlined in the OWRD stream depletion criteria.

This report provides justification for approval of Permit Application G11924. On this basis, it is respectfully requested that approval of the permit is granted.

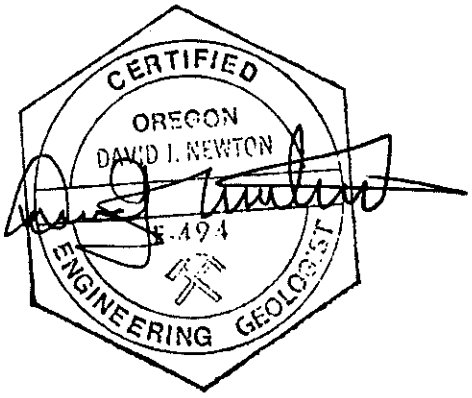
If you have any questions regarding this report, please do not hesitate to give us a call at 228-7718.

Very truly yours,
DAVID J. NEWTON ASSOCIATES, INC.

David J. Newton, P.E., C.E.G.
President

Mike Buren
Project Geologist

HYDROGEOLOGICAL REPORT
Water Rights Appropriation Application
THE RESORT AT THE MOUNTAIN
OWRD File G11924



Prepared For:

The Resort At The Mountain
68010 East Fairway Avenue
Welches, Oregon 97067

Prepared By:

David J. Newton Associates, Inc.
1201 S.W. 12th Avenue, Suite 400
Portland, Oregon 97205

May 3, 1991

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HYDROGEOLOGICAL REPORT

WATER RIGHTS APPROPRIATION APPLICATION

THE RESORT AT THE MOUNTAIN

OWRD FILE G11924

1.0 INTRODUCTION

A groundwater appropriation permit application was submitted to the Oregon Water Resources Department (OWRD file G11924) on May 10, 1989 to obtain additional golf course irrigation water for the existing East 18 Golf Course at The Resort At The Mountain, formerly Rippling River Resort. This report presents the results of hydrogeological investigations requested by Mr. Ed Hopper, owner-operator of The Resort At The Mountain, to aid in the evaluation of the permit application. This report uses a previously developed computer groundwater model. This model was originally developed to assess the depletion potential of West Golf Course Well 1 located on the West Golf Course nearby. Analyses of the West Golf Course Well 1 are contained in the report entitled "Hydrogeological Report, Water Rights Appropriation Application, Rippling River Resort, OWRD File No. G11920", and dated July 12, 1990. In many cases the present report will be treated as an addendum to the previous report, referring the reader to more detailed descriptions of geology, hydrogeology, and modeling descriptions.

The Resort At The Mountain has applied for an additional water right of 655 gpm. 300 gpm to be applied to the existing East 18 Golf Course Well 1 which is permitted for 50 gpm and 355 gpm to be applied to the proposed East 18 Golf Course Well 2. Computer groundwater modeling, using modifications of computer models from the previous report, was done to accommodate the proposed pumping rates for Wells 1 and 2 discussed herein. The procedures utilized in this report included state-of-the-art computer modeling of the groundwater systems based upon geologic possibilities outlined in the previous report.

The Resort At The Mountain is located in the valley of the Salmon and Sandy rivers on the west slope of Mt. Hood. The resort has served recreational customers for over 100 years and demand has increased substantially over the past few years. Improvement of recreational facilities, particularly the golf course, is considered critical to the continued success of the project. The pending OWRD water right appropriation application will provide the means to improve the existing golf course and provide the high quality recreational use demanded in Oregon.

Golf courses are a highly efficient means to utilize land and water resources. 65,000 to 75,000 rounds of golf are played each year at The Resort At The Mountain, reducing the

impacts to other public recreational lands. If these golfers were unleashed on streams, forest trails, and parks, it would further burden these already overburdened areas.

Augmentation of the existing irrigation water supply is subject to the doctrine of prior appropriation and associated water rights provisions administered by the OWRD. In addition, the application must meet the approval conditions associated with groundwater sources in a wild and scenic river basin. Both the Sandy and Salmon river reaches near the site have been designated as wild and scenic. This report demonstrates that the requested groundwater appropriation for The Resort At The Mountain will have a low impact on the Sandy and Salmon rivers.

Significant findings and conclusions resulting from this investigation are summarized in Section 2 below. Detailed descriptions of the project, research procedures, and pertinent computer model runs, are included in Sections 3 through 6 and the appendices A through D.

2.0 SUMMARY OF FINDINGS

2.1 The East 18 Golf Course Well 1 and 2 have an insignificant impact on the Sandy and Salmon rivers based upon a pumping rate of 705 gpm after a 30 day period.

Groundwater supply for Well 1 and proposed Well 2 on the East 18 Golf Course at The Resort At The Mountain is provided by glaciofluvial aquifers consisting primarily of permeable sands, gravels, cobbles, and boulders. Numerical flow analyses based on pump testing of the well and review of well logs for the site area demonstrate that groundwater storage and yield of the aquifers are adequate to satisfy the continuous 705 gpm pumping rate for the East 18 Golf Course wells, with insignificant impact on the Salmon and Sandy rivers. The Salmon River is separated from Well 1 by a distance of 1,050 feet and Well 2 by 1,550 feet horizontally. The Sandy River is separated from Well 1 by a distance of 4,500 feet and Well 2 by 4,600 feet horizontally.

Geologic and groundwater models of the site area were developed for two cases that represent the range of conditions that are most applicable to the site. The basis for the models are observations by DNA geologists of formational materials penetrated as West Golf Course Well 1 was drilled (see previous report "Hydrogeological Report, Water Rights Appropriation Application, Rippling River Resort, OWRD File No. G11920"), logs of other wells in the area, and similarities between DNA observations and published geologic models for alluvial - glaciofluvial basins (McGowen and Groat, 1971).

Computer analyses of the two models resulted in depletion rates between 5% and 20.5% of the total pumping rate of 705 gpm along the reaches of the Salmon and Sandy rivers that flow through the modeled area (35.25 gpm to 144.52 gpm, or .08 cf/s to .32 cf/s). Depletions will actually be less as the models did not account for recharge from bedrock or summer precipitation. Significant depletion is defined by OWRD as more than 25 percent of the pumping rate.

2.2 The groundwater system in the valley fill deposits at the site is composed of a regional, partially confined aquifer, and a locally perched aquifer.

The valley fill aquifers in the site area consist of partially confined and perched groundwater systems. Groundwater confinement results from stratification of beds of silt-to-clay sized material with sands, gravels, cobbles, and boulders. The silt and clay rich strata are relatively low-permeability materials that separate water bearing zones and impede vertical groundwater flow between the separated water bearing zones. Groundwater is locally perched in an unconfined state on top of low-permeability layers. Groundwater is also locally confined beneath low-permeability layers. It is the extent of these low-permeability layers that is the controlling factor on depletion of the rivers. Therefore, the extent of these layers was varied during computer modeling to assess depletion.

2.3 Separation of an aquifer from a river by a low-permeability confining layer will reduce stream depletion in response to pumping.

In order for stream depletion to occur by pumping from a confined aquifer, the aquifer must be in hydraulic communication with the river such that flow in response to pumping can effectively occur between the river bed and the aquifer. Separation of the aquifer from the river by a low-permeability confining layer will prevent stream depletion in response to pumping. The computer models presented in this report had no confinement under the river. In a computer model presented in the previous report, the confining layer was extended beneath the river and depletion wad reduced by 4%.

2.4 Depletion potential is accentuated by assumptions that were applied to the computer analyses.

Computed depletion values include no allowance for groundwater recharge from the bedrock that encloses the alluvial fill in the site area, recharge from summer precipitation, or recharge from golf course irrigation. Also, computed depletion values were obtained under groundwater conditions existing at the end of a 30 day summer drought condition. All of the above conditions make the overall analyses conservative.

2.5 The "MODFLOW" computer program is well suited for evaluation of stream depletion potential at the site. The numerical analysis process accounts for the groundwater conditions that apply to the project site.

Computer analyses were made to simulate aquifer response and determine stream depletion potential. The computer program "MODFLOW", written by Michael G. McDonald and Arlen W. Harbough of the U. S. Geological Survey, has sufficient flexibility to simulate the relatively complex aquifer conditions at the well site. The program is applicable for the case where the stream and the well do not fully penetrate the aquifer. The program is well suited for modeling the site conditions in which the well partially penetrates the aquifer, the stream does not penetrate the aquifer, and a significant groundwater flow gradient exists.

The model is also well suited for testing the sensitivity of the groundwater system in question. By changing different parameters during different computer runs, the modeler can determine the magnitude of the effects each parameter has on the system. Sensitivity analysis has convinced DNA geologists that the data and conclusions presented herein will not vary appreciably due to parameters which are not known with certainty.

2.6 The MODFLOW simulation of groundwater flow at the site reflects actual field conditions and is valid for the project.

The MODFLOW computer model was calibrated for field conditions determined by pump testing West Golf Course Well 1 and review of well logs and other published geological data that represent the alluvial basin associated with the site. Drawdown prediction by the model for West Golf Course Well 1 is within 5 feet of the actual measured drawdown during the pump test. Further calibration was done after making minor modifications to the model grid. Modifications were done to accomodate Well 1 and proposed Well 2 on the East 18 Golf Course. The model will accurately reproduce the potentiometric surface for the aquifers that was developed on the basis of West Golf Course Well 1 observations and review of other well logs for shallow and deep wells.

3.0 PROJECT DESCRIPTION AND WATER NEED

The Resort At The Mountain is located south of Wemme, 1 mile south of Highway 26. The East 18 Golf Course and locations of Well 1 and proposed Well 2 are located in Section 4, Township 3 South, Range 7 East as shown on figure 1.

The East 18 Golf Course is an 18-hole facility that occupies 125 acres. Irrigation is currently accomplished from East 18 Golf Course Well 1 with a certified diversion rate of 50 gpm, and an unnamed stream with a certified diversion rate of 224 gpm. Irrigation is accomplished with a centrifugal pump that withdraws water from a storage pond and distributes it over the golf course through an underground pipeline and sprinkler system.

The supply of water is inadequate during the peak dry season to irrigate the entire golf course. Therefore, only the greens and tees can be irrigated. The fairways are not irrigated during this period and become relatively hard and brown, thus diminishing the quality of the course at the peak of the summer recreation season.

A total of 705 gpm is needed to irrigate during the dry season. Since surface water sources for the additional water are not available or feasible, it is necessary to consider a groundwater source. A substantial groundwater resource is available in the alluvial sediments that fill the Sandy and Salmon river valley to depths of 200 to 300 feet. On this basis, it is proposed to augment the water supply by increasing the water right on the existing Well 1 from 50 gpm to 350 gpm and drilling a new well (Well 2) capable of 355 gpm.

The primary water need to be supplied by Wells 1 and 2 on the East 18 Golf Course is 705 gpm. This pumping rate is based on a flow rate of 1 cubic foot per second (cf/s) per 80 acres of land under irrigation allowed by the Water Resources Department.

4.0 CHARACTERISTICS OF THE PROJECT AREA

For a more detailed discussion of topography, climate, geology, and hydrogeology the reader is referred to the previous report entitled "Hydrogeological Report, Water Rights Appropriation Application, Rippling River Resort, OWRD File No. G11920", dated July 12, 1990.

The Resort At The Mountain and golf courses are located on the floor of the Sandy and Salmon river valley at elevations in the range of 1300 to 1360 feet above sea level (USGS, Rhododendron Quadrangle). The valley floor in the project area is 1-1/4 to 1-1/2 miles wide and slopes toward the northwest, in the direction of river flow, at about 100 feet per mile (2 percent). The broad valley floor is flanked by steep ridges that rise to elevations greater than 3000 feet. The length of the broad valley is abruptly terminated by steep ridges approximately 1 mile southeast of the West Golf Course. The Sandy, Salmon and Zigzag rivers enter the valley at this point through separate, relatively narrow canyons.

The oldest rocks exposed in the project area are consolidated materials (i.e., bedrock) that form the valley walls and extend beneath the alluvial fill deposits that form the valley floor. In the vicinity of the project, the older rocks mapped on the valley walls consist of volcanic mudflows, lava, and tuff identified as Pliocene Age Sardine Formation.

Reviews of descriptions for the alluvial fill deposits in the literature (Groundwater Report No. 29) were supplemented by reviews of logs for water wells that were constructed in the project area. The alluvial fill deposits on the valley floor are generally unconsolidated and are estimated to reach a maximum thickness in excess of 250 feet. The deposits consist primarily of sands, gravels, cobbles and boulders carried to depositional areas by the Sandy, Zigzag, and Salmon river systems. Alluvial fill generally consists of granular materials including sands, gravels, cobbles, and boulders. Logs also reflect the presence of "clay" strata within the granular materials.

The sediments have been described as glaciofluvial deposits including "a wide variety of stratified materials ranging from silts and fine sands to ice-rafted boulders the size of small busses. These deposits are relatively unconsolidated with the exception of occasional, discontinuous layers or lenses of iron cemented and/or compacted materials. In addition to the layering or stratification there is evidence of the horizontal variation, or channeling that would be expected in this type of deposit" (Mathiot, 1978).

5.0 HYDROGEOLOGY OF THE VALLEY FILL GROUNDWATER SYSTEMS

The reader is referred to the previous report for a detailed discussion of the groundwater aspects of the project area. In general, groundwater in the area occurs in both the bedrock material beneath the valley fill, and in the glaciofluvial deposits which cover bedrock. It appears that generally low to moderate yields apply to the consolidated rock materials in the project area. The thick sections of sediments associated with the valley fill deposits are reported as the best aquifer in the area of coverage by Groundwater Report No. 29. Well yields for wells in glaciofluvial sediments are reported in the range of 10 to 400 gpm.

During the drilling and testing of West Golf Course Well 1, a lower, confined regional system was found to be underlain by an upper unconfined perched system. DNA geologists concluded that the smallest dimension of the confining layer separating the two systems was approximately 1300 feet. However, since the existing well logs are geologically vague, it was not known how far to the east the observed confining layer at West Golf Course Well 1 extends. Several alternate extents of confinement were

analyzed for their effects on the nearby rivers when the West Golf Course Well 1 was pumping. This approach was used for the computer analyses discussed in the next section.

According to Lissner (1975) a down-valley gradient exists on the water table which induces groundwater flow in a west-northwesterly direction. This flow direction is consistent with the direction identified during review of well logs and by model predictions.

6.0 RELATIONSHIPS BETWEEN GROUNDWATER PUMPING OF EAST 18 GOLF COURSE WELL 1 AND 2 AND THE SALMON AND SANDY RIVERS

6.1 Criteria for Significant Stream Depletion

The OWRD criteria for identifying impacts on stream flows includes the following:

1. "If the well is less than 1/4 mile from a stream, the department will presume that significant surface water interference will occur unless the Groundwater Section states that the proposed use will be from a confined aquifer. As such, responses from Groundwater signify that there is no significant surface water interference on a "by exception" basis.

2. "If the well is greater than 1/4 mile from a stream, the department will presume that no interference exists, unless the Ground Water Section can clearly state that significant surface water interference will occur at the nearest point on the stream".

"Significant surface water interference " exists if the impact of pumping at the proposed rate would likely reduce the surface stream flows by 25 percent of the proposed pumping rate within 30 days at the nearest point the stream.

At the suggestion of OWRD, DNA calculated stream depletion on a much broader basis, to include the nearest affected reach of nearby streams. Depletion calculations were done along a 3.50 mile stretch of the Salmon River, and a 3.31 mile stretch of the Sandy River.

6.2 Numerical Computer Model (MODFLOW) for Depletion Analysis

In the previous report entitled "Hydrogeological Report, Water Rights Appropriation Application, Rippling River Resort, OWRD File No. G11920" a detailed description of computer modeling is contained. Descriptions of the MODFLOW computer program,

calibration of the model, and aquifer parameters are contained in sections 9.2, 9.2.1, 9.2.2, and 9.2.3 of the previous report.

6.3 Modifications to Computer Model in Previous Report

Minor changes were made to the MODFLOW computer model from the last report in order to accommodate the two wells of interest on the East 18 Golf Course. These modifications were necessary since the new area of interest is located at the head of the alluvial valley, east of the location of the West Golf Course Well 1. Modifications to the previous model grid and boundary conditions are reflected in figure 2 and include the following:

1) The constant head boundary at the edge of the modeling area to the south of the town of Welches was moved south 2700 feet, and appropriate river cells were added in this area. This change was made to remove any possible influences the boundary might have on depletion calculations along the Salmon River.

2) Grid spacing was decreased from 500 to 250 feet in the area of the East 18 Golf Course, and from 1000 to 500 feet in the area around and south of Welches. Reduced spacing was chosen in order to increase the resolution near possible well locations and the Salmon River.

3) The no-flow boundary was modified to accommodate the movement of the constant head boundary, also minor modifications were made to accommodate the increased resolution provided by the reduced grid spacing near the East 18 Golf Course.

6.4 Methods of MODFLOW Computer Analyses

Computer runs were made using two of the depositional models from the previous report. These depositional models include the Small Lens Model and the Overbank Model. Since aquifer parameters are speculative based on pump tests conducted at the West Golf Course Well 1, the total extent of confinement between the upper perched aquifer and the lower regional aquifer is not known. Therefore, these models represent two geologically feasible extremes in the area of confinement and were chosen to provide a range of depletions on the rivers. Figures 3 and 5 show the extent of the confining layer used in each model. Actual river depletions are likely to fall between depletions calculated by each of the models.

Aquifer parameters for the valley fill aquifers and confining layer are assumed to be the same as the area of the West Golf Course Well 1. These values were calibrated for the model at the position of the West Golf Course Well 1 and are not changed in this study.

After grid and boundary conditions were modified for this study, a calibration runs were performed for the Small Lens and Overbank models by pumping from the West Golf Course Well 1. Calibration was done to insure that these changes did not affect the models adversely, and to maintain continuity between models of the previous report and the present study. Results obtained were compared to the previously calibrated models from the last report (for a detailed discussion of calibration methods used in the last report see section 9.2.2 in "Hydrogeological Report, Water Rights Appropriation Application, Rippling River Resort, OWRD File No. G11920"). Results of the calibration runs are discussed below.

As in the previous report, models were run first with no wells pumping under drought conditions (no recharge other than rivers) for a total of 30 days. Models were then run with wells pumping for 30 days under drought conditions and calculations for depletions on the Salmon and Sandy rivers were done by comparing the difference between the no-well drought case and the with-well drought case.

Depletion calculations were performed on all river cells, and constant head cells on the east and southeast boundaries of the modeled area (fig 2). Cells on the west end of the modeled area are to far removed from the wells to be affected by them, in fact when the constant head cells representing the east and southeast boundaries were added into the depletion calculations no increase in depletion was noted. This finding is important in that it shows that these boundaries are to far removed to affect the area of interest, helping to validate the model.

6.5 Results of MODFLOW Computer Analyses

Table 1 summarizes calibration runs. A comparison of models using the new model grid with the model grid in the previous report shows minor discrepancies. Discrepancies include slightly larger drawdowns and river depletions. This is not unusual in numerical computer modeling and resulted when cell dimensions were reduced to give a different resolution to the modeled area (Wang, H.F., and Anderson, M.P., 1982). This phenomonen does not change the validity of a computer model, insted, the change to a smaller grid spacing gives a more accurate picture of the groundwater system.

Figures 3-6 show the potentiometric surface as calculated by MODFLOW for the Small Lens and Overbank Deposit Models, as well as confining layer geometries. Figures 3 and 5 show the potentiometric surface after 30 days of drought. Figures 4 and 6 show the potentiometric surface after 30 days of pumping under drought conditions. Table 2 summarizes the drawdowns and depletions in East 18 Golf Course Wells 1 and 2 for each model run. Appendix C, an accompanying volume, contains computer input and output for both models.

It should be noted that in calculating depletion and drawdown in the East 18 Golf Course Well 1, an averaging method had to be used. Well 1 was located after construction of the computer grid and its location fell on the boundary between two cells. Since the model calculates depletions from the center of cells, and since depletions are sensitive to the distance wells are located from the river, the depletion of Well 1 was obtained by averaging depletions from the two adjacent cells.

Using the Small Lens Model, East 18 Golf Course Well 1 depletes the Sandy and Salmon rivers by 8% of its pumping rate (350 gpm), and Well 2 depletes the rivers by 2% of its pumping rate (355 gpm). Depletion using both wells totals 5% of the total pumping rate of 705 gpm.

Using the Overbank Model, East 18 Golf Course Well 1 depletes the rivers by 24% of its pumping rate, and Well 2 depletes the rivers by 17% of its pumping rate. Depletion using both wells totals 20.5% of the total pumping rate of 705 gpm.

6.6 Discussion of Results

Depletion totals for the wells on the East 18 Golf Course probably lie between those calculated using the Small Lens Model and those calculated using the Overbank Model. Since actual confinement conditions are unknown at the east end of the modeled area, these two values can be considered a range of the possible depletion that would exist if the wells were permitted.

It should be noted that the computer models were run under drought conditions which included no allowance for groundwater recharge from the bedrock that encloses the alluvial fill in the site area, recharge from summer precipitation, or recharge from golf course irrigation. The only source of recharge to the aquifer was through the constant head cells representing the rivers and model boundaries. Allowance for recharge will decrease the computed depletion values.

We conclude that depletion of the Sandy and Salmon rivers lies between 5% and 20.5% of the total pumping rate of 705 gpm, or 35.25 gpm to 144.52 gpm (.08 cf/s to .32 cf/s), during the driest part of the year. As noted previously, depletion potential is accentuated by assumptions that were applied to the computer analyses. These assumptions include no allowance for groundwater recharge from the bedrock that encloses the alluvial fill in the site area, or recharge from summer precipitation. Also, computed depletion values were obtained under groundwater conditions existing at the end of a 30 day summer drought condition. All of the above conditions make the overall analyses conservative.

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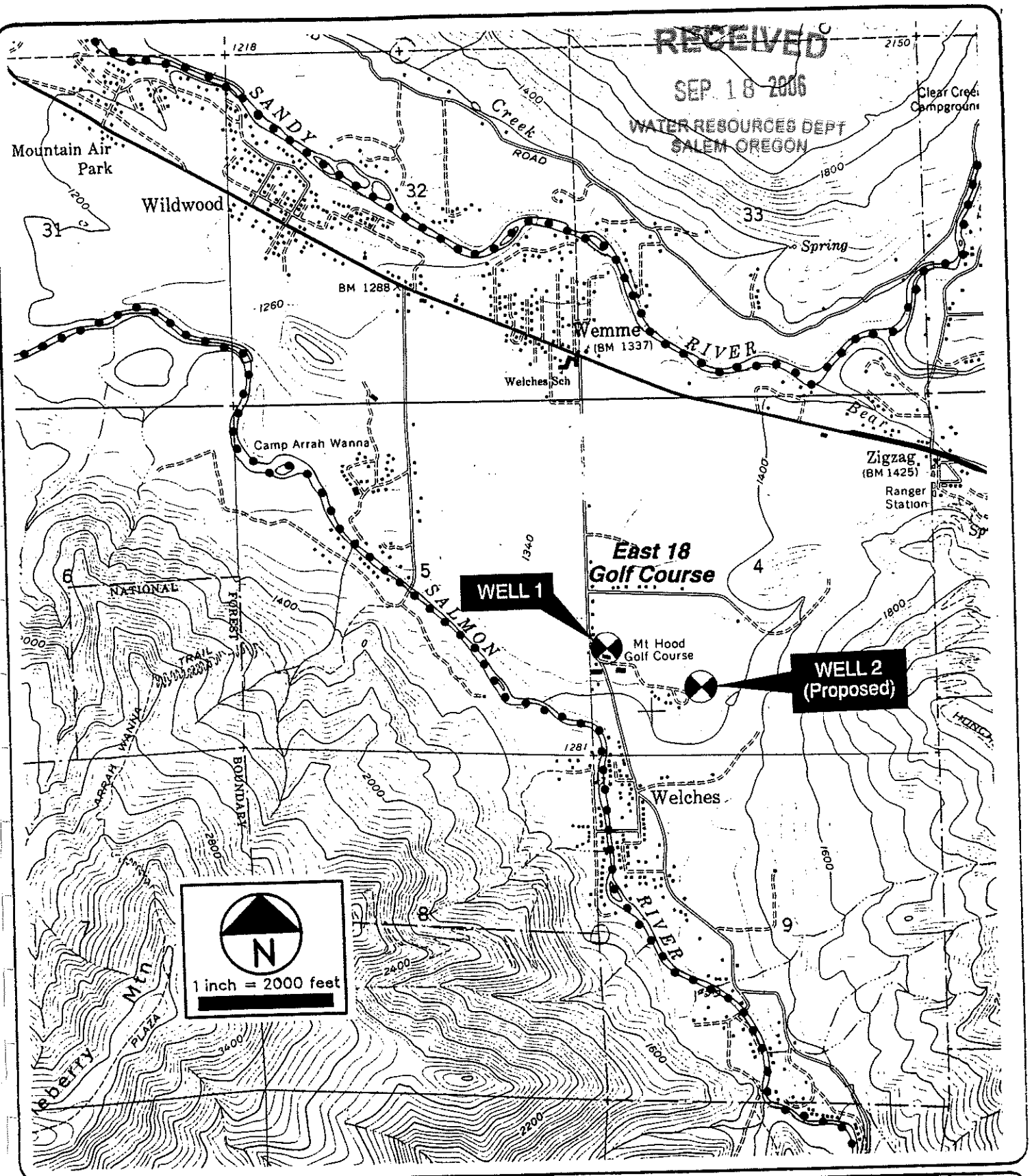
Wang, H.F., and Anderson, M.P. 1982, Introduction to Groundwater Modeling, Finite Difference and Finite Element Methods, W.H. Freeman and Company, New York, 237pp.

Appendix A - Figures



DESIGNED: MSH DRAWN: MSH CHECKED: DJN PROJECT NO. 215 094	DAVID J. NEWTON ASSOCIATES INCORPORATED CIVIL & GEOLOGICAL ENGINEERING 1201 S.W. 12TH AVE., SUITE 620 PORTLAND, ORE. 97205 • 228-7718	LOCATION MAP AND PHYSIOGRAPHY OF SITE AREA **The Resort at the Mountain Ground Water Evaluation**	DATE April 1991 FIGURE 1

Y CONDITIONS
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LEGEND

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.S. Contours

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FIGURE
2

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GRID AND BOUNDARY CONDITIONS
FOR COMPUTER MODELS

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215094 - RRW-BASE

FIGURE
3

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SMALL LENS – NO WELLS

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215094 – RRW–SLNW

FIGURE
4

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SMALL LENS – WITH WELLS

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POTENTIOMETRIC SURFACE
OF STATIC CONDITIONS -
OSIT MODEL

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LEGEND

- itant Head Boundary
- Flow Boundary
- .S. Contours
- onal Potentiometric Surface
- nt of Confining Layer

FIGURE 5

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OVERBANK DEPOSIT - NO WELLS

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FIGURE
6

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OVERBANK DEPOSIT - WITH WELLS

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Appendix B - Tables

TABLE 1 -- CALIBRATION RUNS

		Drawdown		River Depletion	
	(gpm)	(new grid)	(old grid)	(new grid)	(old grid)
Small Lens Model West Golf Course Well 1	280	90.3	87.8	19%	18%
Overbank Model West Golf Course Well 1	280	90.9	89.1	23%	21%

TABLE 2 -- EAST 18 GOLF COURSE MODEL RESULTS

SMALL LENS MODEL		Location		Depletion
WELL	(gpm)	(Row,Column)	Drawdown	(as % of Pumping Rate)
Well 1	350	24,19	54.3	7%
Well 1	350	25,19	50.8	9%
Well 1 Actual	350	*	52.55	8%
Well 2	355	26,24	64	2%
Well 1 & 2	705	25,19 26,24	57.2 65.8	6%
Well 1 & 2 Actual	705	*	----	5%

OVERBANK MODEL		Location		Depletion
WELL	(gpm)	(Row,Column)	Drawdown	(as % of Pumping Rate)
Well 1	350	24,19	85.6	23%
Well 1	350	25,19	79.3	25%
Well 1 Actual	350	*	82.45	24%
Well 2	355	26,24	113.9	17%
Well 1 & 2	705	24,19 26,24	100.4 128.5	20%
Well 1& 2 Actual	705	*	----	20.5%

* Note: Depletion estimated using average between two boardering cells. See text for discussion.