

**ESTES
SURVEYS_{LLC}**SURVEYS
CONSULTING

LAND & WATER RIGHTS

Bruce A. Estes, PLS, CWRE

60382 Arnold Mkt. Rd.
Bend, OR 97702
(541) 382-7391
FAX 382-7391~~PO Box 17519~~
~~Salem, OR 97305-7519~~
~~(503) 585-7596~~
~~FAX 585-7598~~

June 5, 2008

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JUN 09 2008

WATER RESOURCES DEPT
SALEM, OREGONBob Rice, Water Right Transfer Specialist
Water Resources Department
725 Summer St. NE, Suite A
Salem, OR 97301-1271

Dear Mr. Bob:

Re: T-10358

Some time ago you informed me that you needed the capacity of the various ditches on the Whitehorse Ranch to complete the transfer from irrigation to storage. On May 15 I measured them. The calculations are attached. The ranch is now calling the main delivery from the diversion dam the main canal (channel going north from the dam formerly known as Ditch #2). Ditch #1 is still the ditch to the east side of the canyon as shown on the transfer map.

Ditch #1 can carry 50.7 cfs. The calculations were included in the transfer application. The main canal has been heavily scoured out and now has a huge channel near the dam. The current configuration calculates to be 1845 cfs for a total of 1895.7 cfs capacity at the dam. However it would be nearly impossible to pass that much flow through the dam so there are a number of culverts through the dam to provide for passage without destroying the dam itself. The two reservoirs now have the ability to capture some of the flood water to reduce further damage to the main canal.

Ditch #2 diverts from the main canal in the NE $\frac{1}{4}$ NW $\frac{1}{4}$ of section 24. I have enclosed a copy of the Whitehorse quad which identifies the ditches. Ditch #2 was 422.6 cfs and the main canal was 219.4 cfs. The total capacity of Ditch #1, ditch #2 and the main canal to Whitehorse Road is therefore 692.7 cfs.

The majority of the Whitehorse Creek use is from Ditch #2, but there are numerous ditches below Whitehorse Road on the ranch that divert from the main canal for the next several miles north of the road. They use all the water available. Hopefully this gives you the information needed. If you have any questions just call. I will be at (785) 686 - 4004 for the next several weeks.

Sincerely,



Bruce A. Estes, PLS, CWRE

cc David Herman, Whitehorse Ranch

Whitehorse Ranch calcs

Main canal & ditches measured May 15, 08

Main canal 300' blw diversion dam

$$A = 10 \times 20 = 200 \text{ ft}^2$$

$$S = \frac{7}{100} = .007$$

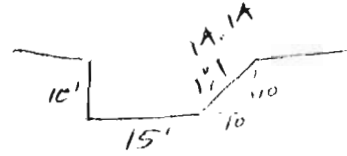
$$R = \frac{200}{39.14} = 5.1099$$

$$Q = \frac{1.486}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

$$= \frac{1.486}{.04} \cdot 200 \cdot 5.1099^{2/3} \cdot .007^{1/2}$$

$$= 37.15 \cdot 200 \cdot 2.9667 \cdot .0837$$

$$= \underline{1845 \text{ cfs}}$$



(Heavily scoured out)

Ditch #1 measured earlier & calculated to be 50.7 cfs

Capacity at diversion dam 1895.7 cfs

Ditch #2 near well E

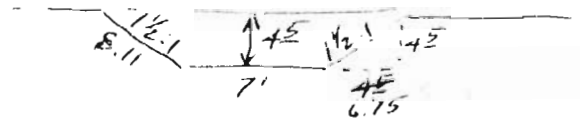
$$A = 4.5 \times 13.75 = 61.875 \text{ ft}^2$$

$$R = \frac{61.875}{23.22} = 2.6647$$

$$Q = \frac{1.486}{.035}$$

$$= 42.457 \cdot 61.875 \cdot 2.6647^{2/3} \cdot .007^{1/2}$$

$$= 422.6 \text{ cfs}$$



Main Canal at Whitehorse Ranch Rd.

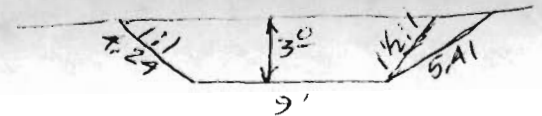
$$A = 3.0 \times 12.75 = 38.25 \text{ ft}^2$$

$$R = \frac{38.25}{18.65} = 2.0509$$

$$Q = \frac{1.486}{.035} \cdot 38.25 \cdot 2.0509^{2/3} \cdot .007^{1/2}$$

$$= 42.457 \cdot 38.25 \cdot 1.6142 \cdot .0837$$

$$= 219.4 \text{ cfs}$$



Capacity to Whitehorse Road.

Ditch #1 50.7 cfs

Ditch #2 422.6 cfs

Main 219.4

692.7 cfs

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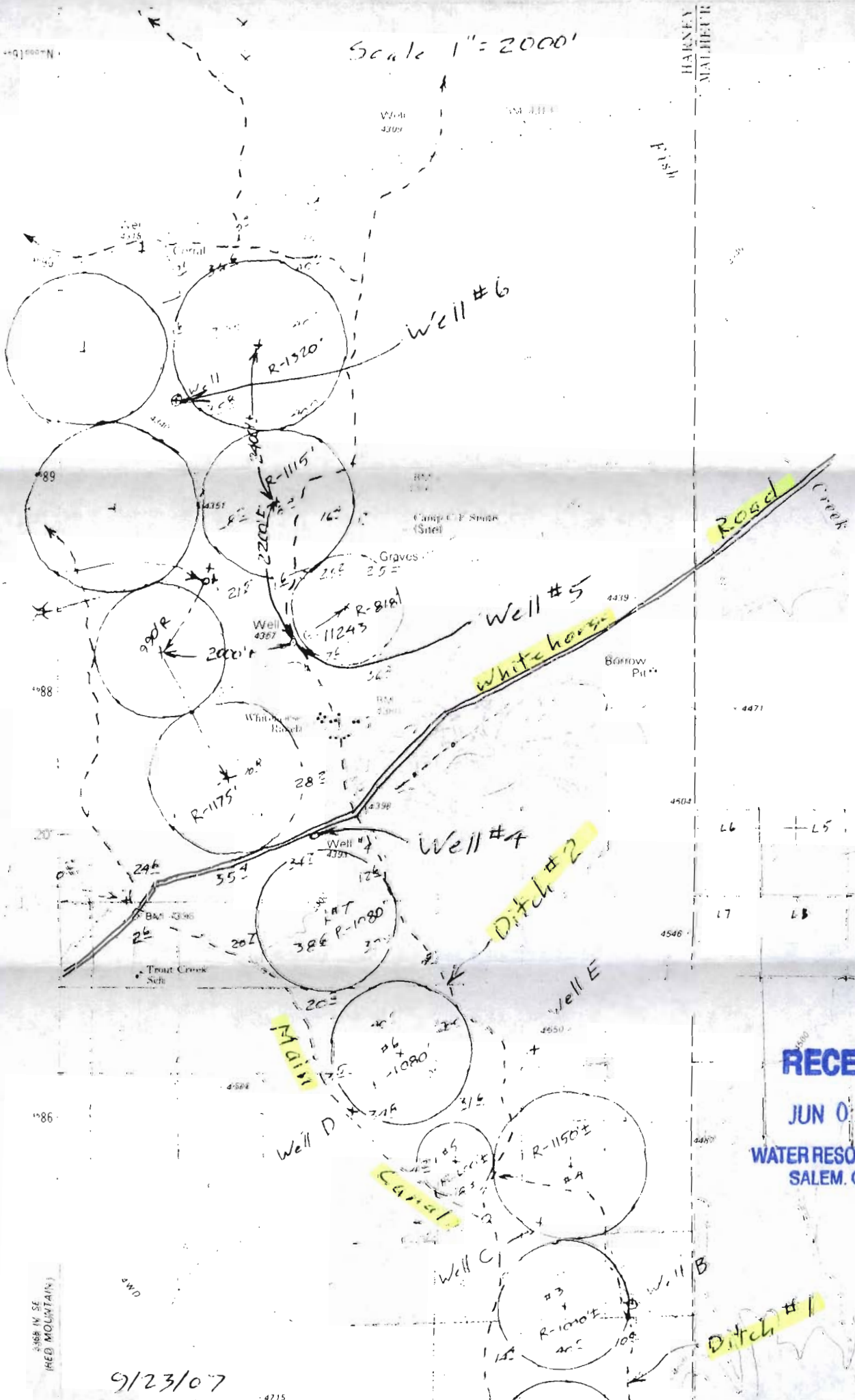
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WATER RESOURCES DEPT
SALEM, OREGON

Scale 1" = 2000'

HARNEY
VALLEY

BM 4360



11
200' W
1/4 E COR

Road Creek

Whitehorse

Ditch #2

Main

Canal

Ditch #1

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WATER RESOURCES DEPT
SALEM, OREGON

3968 N. SE
(RED MOUNTAIN)

9/23/07
9/24/07

4715