

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date November 9, 2015

FROM: Groundwater Section Aurora Bouchier  
Reviewer's Name

SUBJECT: Application G- 18125 Supersedes review of \_\_\_\_\_  
Date of Review(s)

**PUBLIC INTEREST PRESUMPTION; GROUNDWATER**

**OAR 690-310-130 (1)** *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation.**

**A. GENERAL INFORMATION:** Applicant's Name: Tom Schmidt County: Yamhill

A1. Applicant(s) seek(s) 0.056 cfs from 2 well(s) in the Willamette Basin,  
Yamhill subbasin

A2. Proposed use irrigation of 24 acres Seasonality: May 1 – October 31

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

| Well | Logid     | Applicant's Well # | Proposed Aquifer* | Proposed Rate(cfs) | Location (T/R-S QQ-Q) | Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36 |
|------|-----------|--------------------|-------------------|--------------------|-----------------------|--|
| 1    | YAMH 6308 | 1                  | Alluvium          | 0.056              | 4S/5W-36 SWSE         | 2115' S, 115' E fr center S 36                                   |
| 2    | YAMH 6311 | 2                  | Alluvium          | 0.056              | 4S/5W-36 SESW         | 2400' S, 15' W fr center S 36.                                   |
| 3    |           |                    |                   |                    |                       |  |
| 4    |           |                    |                   |                    |                       |  |
| 5    |           |                    |                   |                    |                       |  |

\* Alluvium, CRB, Bedrock

| Well | Well Elev ft msl | First Water ft bls | SWL ft bls | SWL Date | Well Depth (ft) | Seal Interval (ft) | Casing Intervals (ft) | Liner Intervals (ft) | Perforations Or Screens (ft) | Well Yield (gpm) | Draw Down (ft) | Test Type |
|------|------------------|--------------------|------------|----------|-----------------|--------------------|-----------------------|----------------------|------------------------------|------------------|----------------|-----------|
| 1    | 150              | 50                 | 15         | 5/8/1981 | 110             | 0-20               | 0-80                  | 70-110               | 53-110                       | 15               |                |           |
| 2    | 150              | 55.5               | 18         | 8/8/1970 | 60              | 0-45               | 0-55.5                | -                    | -                            | 10               |                |           |
|      |                  |                    |            |          |                 |                    |                       |                      |                              |                  |                |           |
|      |                  |                    |            |          |                 |                    |                       |                      |                              |                  |                |           |

Use data from application for proposed wells.

A4. **Comments:** On the application, the requested rate of use is 0.33 acre-feet. A limited license (LL1571) was issued in 2015. It was applied for by the same applicant using the same two wells as this application. As 0.33 acre-feet is not a rate, the rates evaluated in this review are those spelled ou LL-1571, namely 15 gpm from Well 1 (YAMH 6308) and 10 gpm from Well 2 (YAMH 6311).

A5.  **Provisions of the Willamette** Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water  **are**, or  **are not**, activated by this application. (Not all basin rules contain such provisions.)  
 Comments: The wells are greater than ¼ mile from surface water sources, and produce from a confined aquifer, to the pertinent rules (OAR 690-52-0240) do not apply.

A6.  **Well(s) #** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, tap(s) an aquifer limited by an administrative restriction.  
 Name of administrative area: \_\_\_\_\_  
 Comments: \_\_\_\_\_

**B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070**

B1. **Based upon available data**, I have determined that groundwater\* for the proposed use:

- a.  is over appropriated,  is not over appropriated, or  **cannot be determined to be** over appropriated during any period of the proposed use. \* This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b.  **will not** or  **will** likely be available in the amounts requested without injury to prior water rights. \* This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c.  **will not** or  **will** likely to be available within the capacity of the groundwater resource; or
- d.  **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
  - i.  The permit should contain condition #(s) 7C;
  - ii.  The permit should be conditioned as indicated in item 2 below.
  - iii.  The permit should contain special condition(s) as indicated in item 3 below;

- B2. a.  **Condition** to allow groundwater production from no deeper than \_\_\_\_\_ ft. below land surface;
- b.  **Condition** to allow groundwater production from no shallower than \_\_\_\_\_ ft. below land surface;
- c.  **Condition** to allow groundwater production only from the \_\_\_\_\_ groundwater reservoir between approximately \_\_\_\_\_ ft. and \_\_\_\_\_ ft. below land surface;
- d.  **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

**Describe injury** –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

B3. **Groundwater availability remarks:** The area around wells 1 & 2 is underlain by less than 60 feet of Willamette Silt which is underlain by a series of sand and gravel beds interbedded with silts and clays (Gannett and Caldwell, 1998). The water table occurs near land surface in the Willamette Silt which acts as a confining unit. Well yields in section 36 (4S/5W) range from 12-30 gpm with a median yield of about 24 gpm. The requested rates of 10 and 15 gpm are consistent with the productive capacity of the aquifer system.

Water-level trends in the area are largely unknown as there are few nearby observation wells. The hydrograph for YAMH 7310 (~2.2 miles to the south, see hydrograph below) suggests that groundwater level in the alluvial aquifer is locally reasonably stable.

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\_\_\_\_\_

\_\_\_\_\_

**C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040**

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

| Well | Aquifer or Proposed Aquifer | Confined                            | Unconfined               |
|------|-----------------------------|-------------------------------------|--------------------------|
| 1    | Alluvium                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2    | Alluvium                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|      |                             | <input type="checkbox"/>            | <input type="checkbox"/> |
|      |                             | <input type="checkbox"/>            | <input type="checkbox"/> |
|      |                             | <input type="checkbox"/>            | <input type="checkbox"/> |

**Basis for aquifer confinement evaluation:** Published reports show the alluvial aquifer as being confined by the overlying Willamette Silt. Static water levels in well logs YAMH 6308 and YAMH 6311 are above the depth at which water was first encountered when constructing the wells, corroborating the confined nature of the aquifer.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

| Well | SW # | Surface Water Name              | GW Elev<br>ft msl | SW Elev<br>ft msl | Distance<br>(ft) | Hydraulically Connected?            |                          |                          | Potential for Subst. Interfer. Assumed? |                                     |
|------|------|---------------------------------|-------------------|-------------------|------------------|-------------------------------------|--------------------------|--------------------------|---|-------------------------------------|
|      |      |                                 |                   |                   |                  | YES                                 | NO                       | ASSUMED                  | YES                                     | NO                                  |
| 1    | 1    | Perennial trib. to S Yamhill R. | 135               | 99-113            | 1,760            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input checked="" type="checkbox"/> |
| 2    | 1    | Perennial trib. to S Yamhill R. | 132               | 99-113            | 1,500            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input checked="" type="checkbox"/> |
| 1    | 2    | S Yamhill River                 | 135               | 99-113            | >1 mile          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input type="checkbox"/>            |
| 2    | 2    | S Yamhill River                 | 132               | 99-113            | >1 mile          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input type="checkbox"/>            |
|      |      |                                 |                   |                   |                  | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input type="checkbox"/>            |
|      |      |                                 |                   |                   |                  | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input type="checkbox"/>            |

**Basis for aquifer hydraulic connection evaluation:** Published water table maps show that groundwater flows towards, and discharges into, the South Yamhill River and its perennial streams (Woodward et al., 1998).

**Water Availability Basin the well(s) are located within:** 162 (S YAMHILL R> YAMHILL R- AB COZINE CR) and 163 (S YAMHILL R> YAMHILL R- AT MOUTH). Pumping impacts will occur in both WABs.

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked  box indicates the well is assumed to have the potential to cause PSI.

| Well | SW # | Well < ¼ mile?           | Qw > 5 cfs?              | Instream Water Right ID | Instream Water Right Q (cfs) | Qw > 1% ISWR?            | 80% Natural Flow (cfs) | Qw > 1% of 80% Natural Flow? | Interference @ 30 days (%) | Potential for Subst. Interfer. Assumed? |
|------|------|--------------------------|--------------------------|-------------------------|------------------------------|--------------------------|------------------------|------------------------------|----------------------------|---|
| 1    | 1    | <input type="checkbox"/> | <input type="checkbox"/> | MF162                   | 15.00                        | <input type="checkbox"/> | 40.30                  | <input type="checkbox"/>     | 15%                        | <input type="checkbox"/>                |
| 2    | 1    | <input type="checkbox"/> | <input type="checkbox"/> | MF162                   | 15.00                        | <input type="checkbox"/> | 40.30                  | <input type="checkbox"/>     | 16%                        | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

|  | SW # |  | Q <sub>w</sub> > 5 cfs?  | Instream Water Right ID | Instream Water Right Q (cfs) | Q <sub>w</sub> > 1% ISWR? | 80% Natural Flow (cfs) | Q <sub>w</sub> > 1% of 80% Natural Flow? | Interference @ 30 days (%) | Potential for Subst. Interfer. Assumed? |
|--|------|--|--------------------------|-------------------------|------------------------------|---------------------------|------------------------|--|----------------------------|---|
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/>  |                        | <input type="checkbox"/>                 |                            | <input type="checkbox"/>                |
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/>  |                        | <input type="checkbox"/>                 |                            | <input type="checkbox"/>                |
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/>  |                        | <input type="checkbox"/>                 |                            | <input type="checkbox"/>                |
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/>  |                        | <input type="checkbox"/>                 |                            | <input type="checkbox"/>                |

**Comments:** Based on published geologic maps, the well construction listed on YAMH 6308 and YAMH 6311, and the elevation range (within a 1-mile distance from the wells) of the perennial tributary to the South Yamhill River, it appears that the tributary has largely cut through the Willamette Silt and may have a relatively efficient hydraulic connection with the aquifer. The tributary stream depletion at 30 days was estimated using the Hunt 1999 model and assuming a 3 foot clogging layer beneath the streambed. The Instream Water Right and Natural Flow are for WAB 162 (S YAMHILL R>YAMHILL R – AB COZINE CR).

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

| <b>Non-Distributed Wells</b> |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Well                         | SW# | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|                              |     | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   |
| Well Q as CFS                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Interference CFS             |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>Distributed Wells</b>     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Well                         | SW# | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|                              |     | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   |
| Well Q as CFS                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Interference CFS             |     |     |     |     |     |     |     |     |     |     |     |     |     |
|                              |     | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   |
| Well Q as CFS                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Interference CFS             |     |     |     |     |     |     |     |     |     |     |     |     |     |
|                              |     | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   |
| Well Q as CFS                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Interference CFS             |     |     |     |     |     |     |     |     |     |     |     |     |     |
|                              |     | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   |
| Well Q as CFS                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Interference CFS             |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(A) = Total Interf.</b>   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(B) = 80 % Nat. Q</b>     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(C) = 1 % Nat. Q</b>      |     |     |     |     |     |     |     |     |     |     |     |     |     |

|                     |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| (D) = (A) > (C)     | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| (E) = (A / B) x 100 | % | % | % | % | % | % | % | % | % | % | % | % |

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

**Basis for impact evaluation:** Impacts to streams greater than 1 mile were not calculated as the requested rate of 0.056 cfs is less than 1% of the 80% natural flows for both affected WABs for all months of the year.

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C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

- C5.  **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:
  - i.  The permit should contain condition #(s) \_\_\_\_\_;
  - ii.  The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** \_\_\_\_\_

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**References Used:** \_\_\_\_\_

Conlon, T. D., Wozniak, K. C., Woodcock, D., Herrera, N.B., Fischer, B.J. Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-Water Hydrology of the Willamette Basin, Oregon: U. S. Geological Survey Scientific Investigations Report 2005-5168.

Gannett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-A.

Herra, N. B., Burns, E. R., and Conlon, T. D. 2014, Simulation of groundwater flow and the interaction of groundwater and surface water in the Willamette Basin and Central Willamette subbasin, Oregon: U.S. Geological Survey Scientific Investigations Report 2014-5136, 152 p., <http://dx.doi.org/10.3133/sir20155136>.

Hunt, B., 1999, Unsteady stream depletion from ground water pumping: Ground Water, v. 37, no. 1, p. 98-102.

Woodward, Dennis G., Gannett, Marshall W., and Vaccaro, John J., 1998 Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-B.

Nearby well logs and water level data. In particular information from YAMH 6308, YAMH 6311, and YAMH 7310.

**D. WELL CONSTRUCTION, OAR 690-200**

D1. Well #: \_\_\_\_\_ Logid: \_\_\_\_\_

D2. **THE WELL does not appear to meet current well construction standards based upon:**

- a.  review of the well log;
- b.  field inspection by \_\_\_\_\_;
- c.  report of CWRE \_\_\_\_\_;
- d.  other: (specify) \_\_\_\_\_

D3. **THE WELL construction deficiency or other comment is described as follows:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

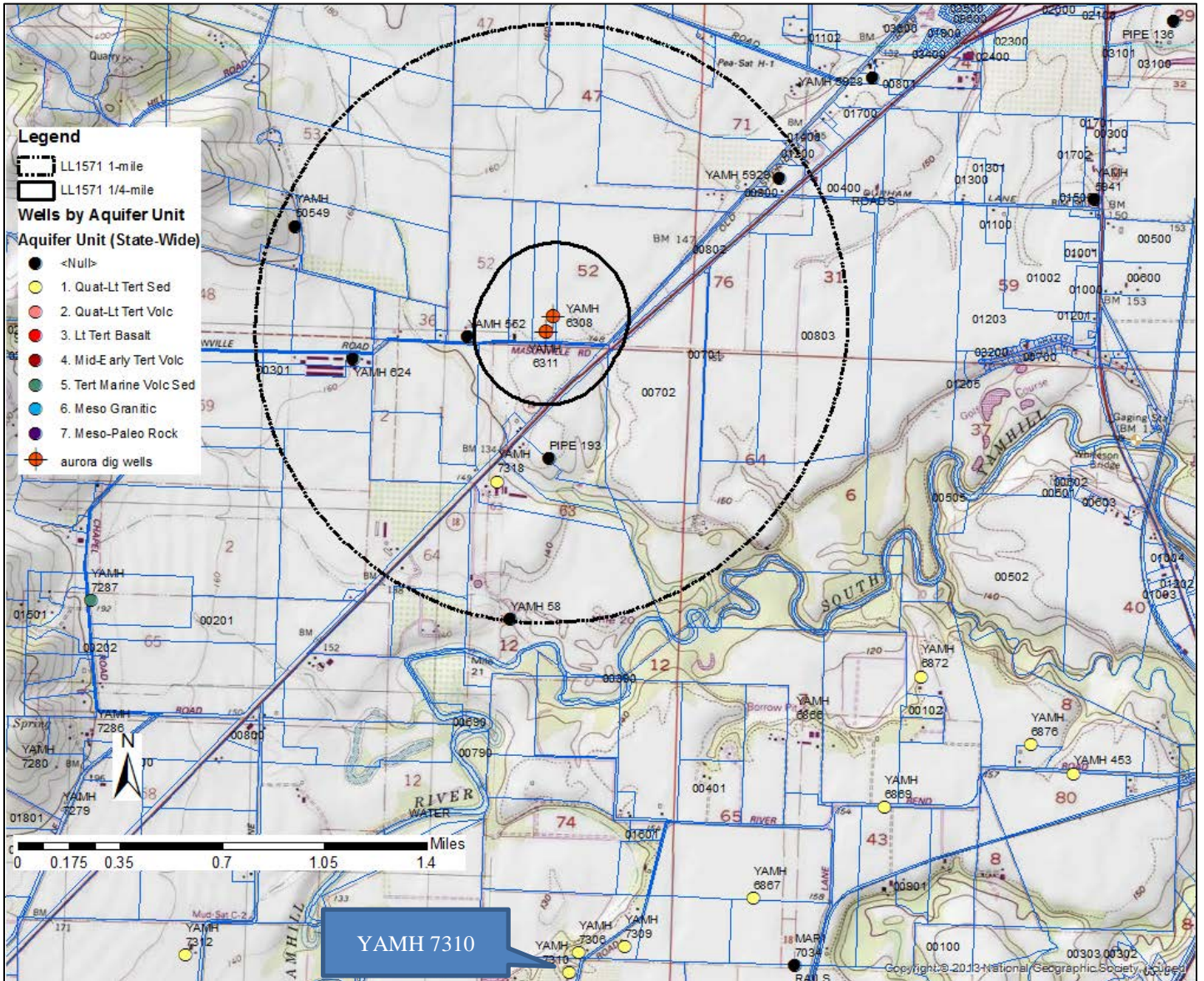
D4.  Route to the Well Construction and Compliance Section for a review of existing well construction.

**Water Availability Tables**

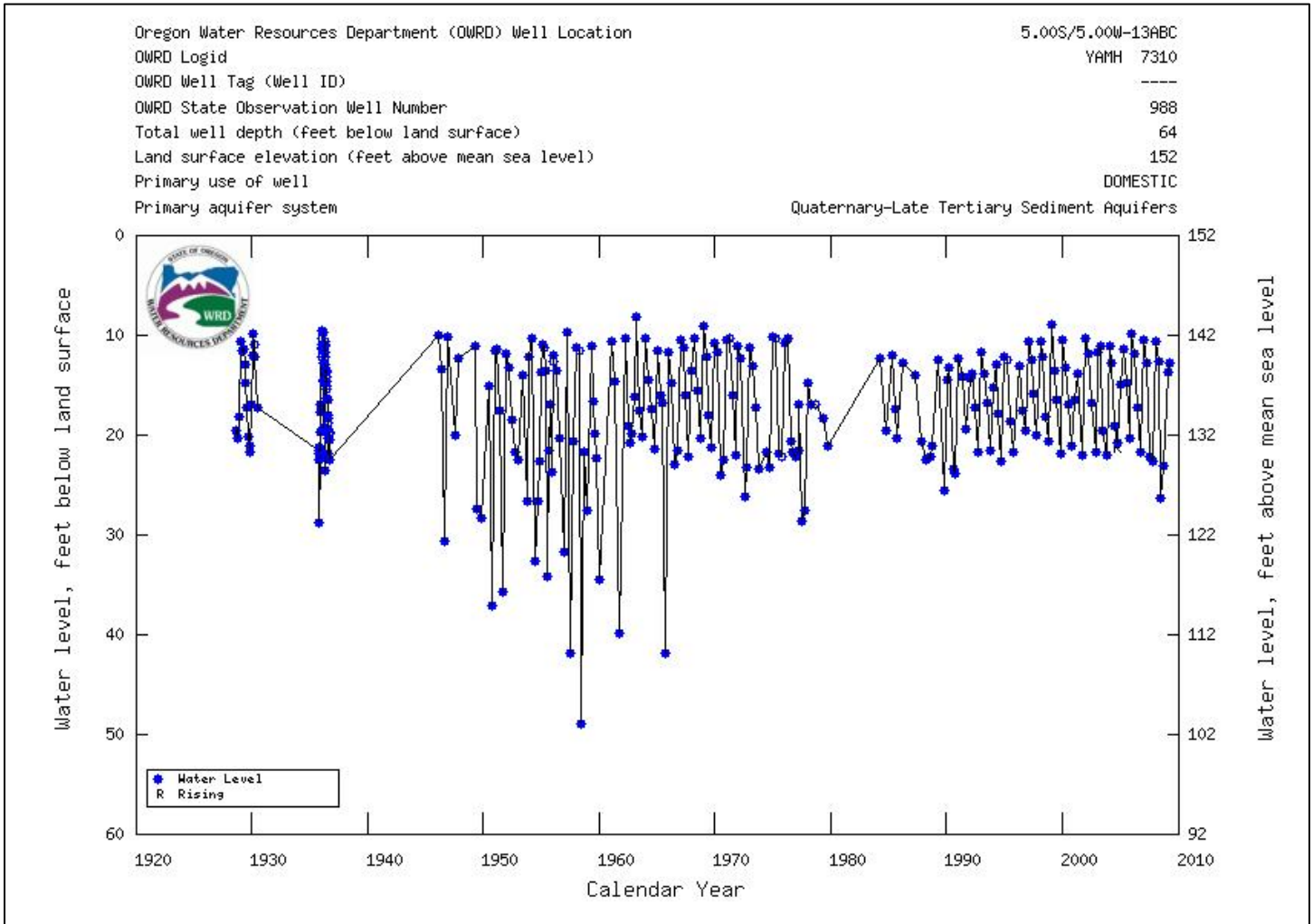
| DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION                                  |                     |   |                      |                      |  |                     |
|--|---------------------|---|----------------------|----------------------|--|---------------------|
| Watershed ID #: 162<br>Time: 4:15 PM   |                     | S YAMHILL R > YAMHILL R - AB COZINE CR<br>Basin: WILLAMETTE |                      |                      | Exceedance Level: 80<br>Date: 11/06/2015 |                     |
| Month  | Natural Stream Flow | Consumptive Use and Storage                                 | Expected Stream Flow | Reserved Stream Flow | Instream Requirements                    | Net water Available |
| Monthly values are in cfs.<br>Storage is the annual amount at 50% exceedance in ac-ft. |                     |   |                      |                      |  |                     |
| JAN  | 1,290.00            | 29.80   | 1,260.00             | 0.00                 | 15.00                                    | 1,250.00            |
| FEB  | 1,470.00            | 27.90   | 1,440.00             | 0.00                 | 15.00                                    | 1,430.00            |
| MAR  | 1,260.00            | 20.00   | 1,240.00             | 0.00                 | 15.00                                    | 1,230.00            |
| APR  | 764.00              | 15.20   | 749.00               | 0.00                 | 15.00                                    | 734.00              |
| MAY  | 378.00              | 23.90   | 354.00               | 0.00                 | 15.00                                    | 339.00              |
| JUN  | 171.00              | 44.20   | 127.00               | 0.00                 | 15.00                                    | 112.00              |
| JUL  | 79.00               | 66.70   | 12.30                | 0.00                 | 15.00                                    | -2.65               |
| AUG  | 47.70               | 55.70   | -8.05                | 0.00                 | 15.00                                    | -23.00              |
| SEP  | 40.30               | 34.20   | 6.10                 | 0.00                 | 15.00                                    | -8.90               |
| OCT  | 53.80               | 9.37  | 44.40                | 0.00                 | 15.00                                    | 29.40               |
| NOV  | 363.00              | 14.90   | 348.00               | 0.00                 | 15.00                                    | 333.00              |
| DEC  | 1,220.00            | 28.10   | 1,190.00             | 0.00                 | 15.00                                    | 1,180.00            |
| ANN  | 847,000             | 22,400  | 825,000              | 0                    | 10,900                                   | 815,000             |

| DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION                                  |                     |   |                      |                      |  |                     |
|--|---------------------|---|----------------------|----------------------|--|---------------------|
| Watershed ID #: 163<br>Time: 4:16 PM   |                     | S YAMHILL R > YAMHILL R - AT MOUTH<br>Basin: WILLAMETTE |                      |                      | Exceedance Level: 80<br>Date: 11/06/2015 |                     |
| Month  | Natural Stream Flow | Consumptive Use and Storage                             | Expected Stream Flow | Reserved Stream Flow | Instream Requirements                    | Net Water Available |
| Monthly values are in cfs.<br>Storage is the annual amount at 50% exceedance in ac-ft. |                     |   |                      |                      |  |                     |
| JAN  | 1,330.00            | 35.00   | 1,300.00             | 0.00                 | 200.00                                   | 1,100.00            |
| FEB  | 1,520.00            | 33.00   | 1,490.00             | 0.00                 | 200.00                                   | 1,290.00            |
| MAR  | 1,300.00            | 19.00   | 1,280.00             | 0.00                 | 200.00                                   | 1,080.00            |
| APR  | 783.00              | 18.30   | 765.00               | 0.00                 | 200.00                                   | 565.00              |
| MAY  | 386.00              | 26.20   | 360.00               | 0.00                 | 200.00                                   | 160.00              |
| JUN  | 174.00              | 48.60   | 125.00               | 0.00                 | 150.00                                   | -24.60              |
| JUL  | 81.00               | 74.20   | 6.83                 | 0.00                 | 62.00                                    | -55.20              |
| AUG  | 49.50               | 61.70   | -12.20               | 0.00                 | 62.00                                    | -74.20              |
| SEP  | 41.70               | 37.20   | 4.53                 | 0.00                 | 62.00                                    | -57.50              |
| OCT  | 55.00               | 9.44  | 45.60                | 0.00                 | 150.00                                   | -104.00             |
| NOV  | 365.00              | 18.20   | 347.00               | 0.00                 | 200.00                                   | 147.00              |
| DEC  | 1,250.00            | 33.00   | 1,220.00             | 0.00                 | 200.00                                   | 1,020.00            |
| ANN  | 872,000             | 25,000  | 847,000              | 0                    | 114,000                                  | 743,000             |

Well Location Map

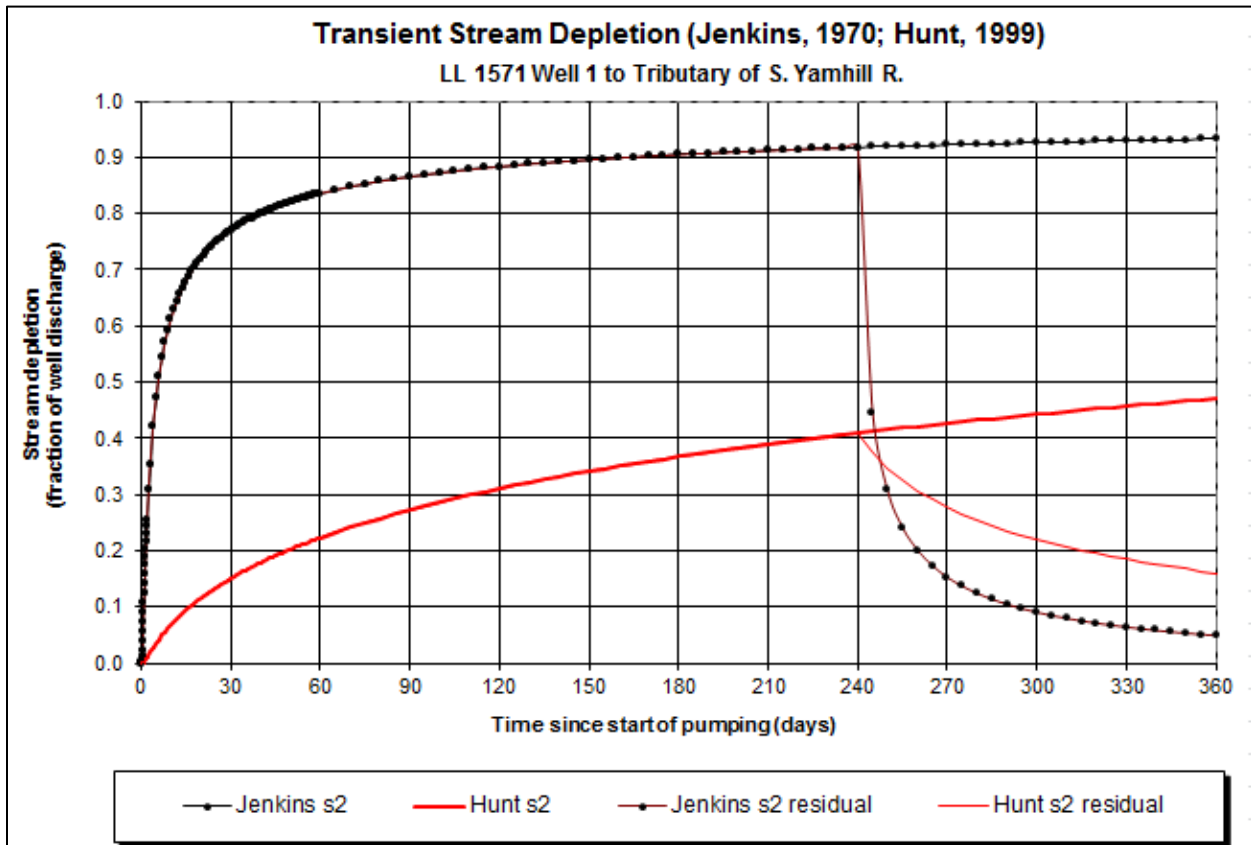


### Water-Level Trends in YAMH 7310



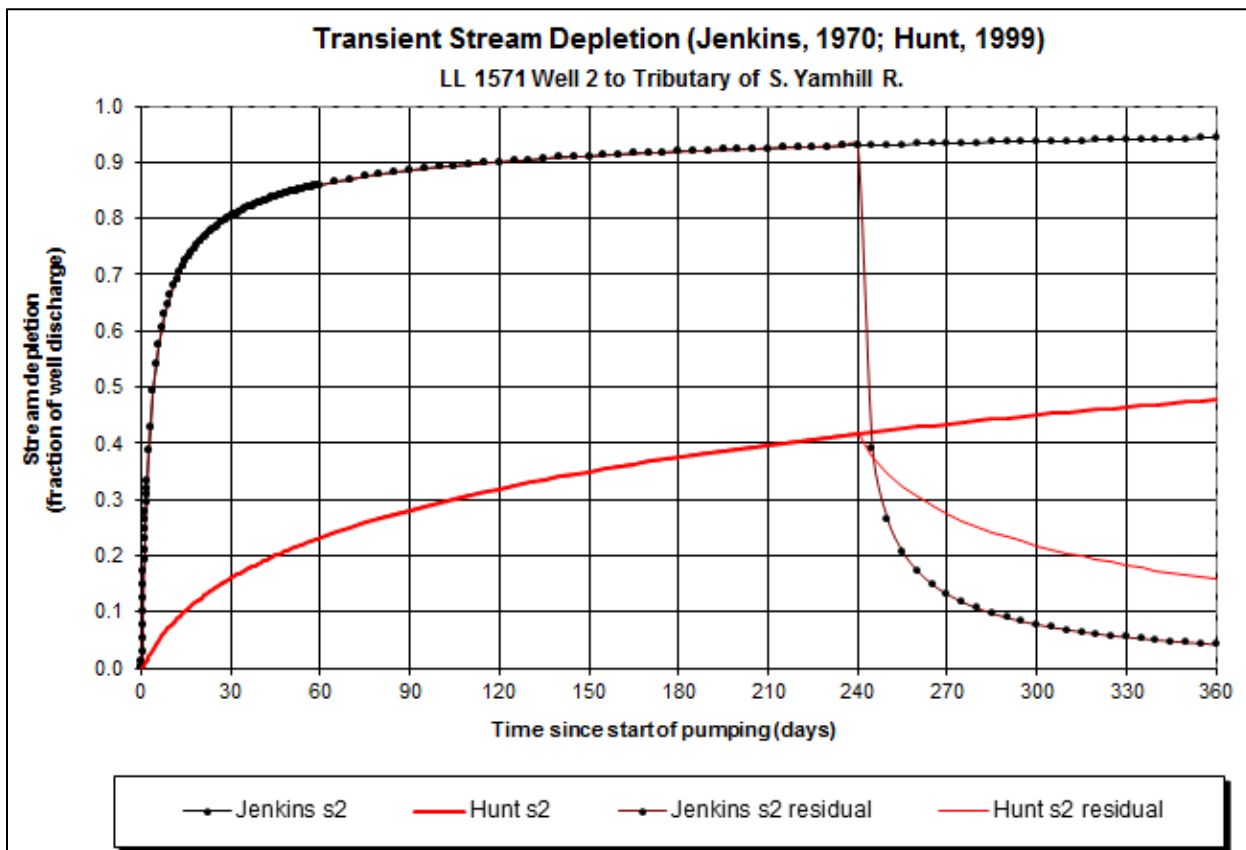


Stream Depletion Model Results



| Output for Hunt Stream Depletion, Scenerio 2 (s2): |       |       |       |       |       |       |       |       |       |       |       |       |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Time pump on = 240 days                            |       |       |       |       |       |       |       |       |       |       |       |       |
| Days   | 30    | 60    | 90    | 120   | 150   | 180   | 210   | 240   | 270   | 300   | 330   | 360   |
| Qw, cfs  | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 |
| Jenk SD s2 %                                       | 76.93 | 83.57 | 86.55 | 88.34 | 89.56 | 90.47 | 91.17 | 91.74 | 15.28 | 9.04  | 6.40  | 4.91  |
| Jen SD s2 cfs                                      | 0.043 | 0.047 | 0.048 | 0.049 | 0.050 | 0.051 | 0.051 | 0.051 | 0.009 | 0.005 | 0.004 | 0.003 |
| Hunt SD s2 %                                       | 15.04 | 22.29 | 27.25 | 31.05 | 34.14 | 36.74 | 38.98 | 40.95 | 27.66 | 21.99 | 18.47 | 15.98 |
| Hunt SD s2 cfs                                     | 0.008 | 0.012 | 0.015 | 0.017 | 0.019 | 0.021 | 0.022 | 0.023 | 0.015 | 0.012 | 0.010 | 0.009 |

| Parameters:                       |     | Scenario 1  | Scenario 2  | Scenario 3  | Units     |
|-----------------------------------|-----|-------------|-------------|-------------|-----------|
| Net steady pumping rate           | Qw  | 0.056       | 0.056       | 0.056       | cfs       |
| Distance to stream                | a   | 1760        | 1760        | 1760        | ft        |
| Aquifer hydraulic conductivity    | K   | 30          | 30          | 30          | ft/day    |
| Aquifer thickness                 | b   | 20          | 20          | 20          | ft        |
| Aquifer transmissivity            | T   | 600         | 600         | 600         | ft*ft/day |
| Aquifer storage coefficient       | S   | 0.001       | 0.001       | 0.001       |           |
| Stream width                      | ws  | 20          | 20          | 20          | ft        |
| Streambed hydraulic conductivity  | Ks  | 0.01        | 0.01        | 0.01        | ft/day    |
| Streambed thickness               | bs  | 3           | 3           | 3           | ft        |
| Streambed conductance             | sbc | 0.066666667 | 0.066666667 | 0.066666667 | ft/day    |
| Stream depletion factor (Jenkins) | sdf | 5.162666667 | 5.162666667 | 5.162666667 | days      |
| Streambed factor (Hunt)           | sbf | 0.195555556 | 0.195555556 | 0.195555556 |           |



| Output for Hunt Stream Depletion, Scenerio 2 (s2): |       |       |       |       |       |       |       |       |       |       |       | Time pump on = 240 days |  |  |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------|--|--|
| Days   | 30    | 60    | 90    | 120   | 150   | 180   | 210   | 240   | 270   | 300   | 330   | 360                     |  |  |
| Qw, cfs  | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056                   |  |  |
| Jenk SD s2 %                                       | 80.26 | 85.97 | 88.52 | 90.05 | 91.10 | 91.87 | 92.47 | 92.96 | 13.10 | 7.73  | 5.47  | 4.19                    |  |  |
| Jen SD s2 cfs                                      | 0.045 | 0.048 | 0.050 | 0.050 | 0.051 | 0.051 | 0.052 | 0.052 | 0.007 | 0.004 | 0.003 | 0.002                   |  |  |
| Hunt SD s2 %                                       | 15.95 | 23.19 | 28.11 | 31.88 | 34.94 | 37.52 | 39.74 | 41.69 | 27.47 | 21.80 | 18.29 | 15.82                   |  |  |
| Hunt SD s2 cfs                                     | 0.009 | 0.013 | 0.016 | 0.018 | 0.020 | 0.021 | 0.022 | 0.023 | 0.015 | 0.012 | 0.010 | 0.009                   |  |  |

| Parameters:                       |     | Scenario 1  | Scenario 2  | Scenario 3  | Units     |
|-----------------------------------|-----|-------------|-------------|-------------|-----------|
| Net steady pumping rate           | Qw  | 0.056       | 0.056       | 0.056       | cfs       |
| Distance to stream                | a   | 1500        | 1500        | 1500        | ft        |
| Aquifer hydraulic conductivity    | K   | 30          | 30          | 30          | ft/day    |
| Aquifer thickness                 | b   | 20          | 20          | 20          | ft        |
| Aquifer transmissivity            | T   | 600         | 600         | 600         | ft*ft/day |
| Aquifer storage coefficient       | S   | 0.001       | 0.001       | 0.001       |           |
| Stream width                      | ws  | 20          | 20          | 20          | ft        |
| Streambed hydraulic conductivity  | Ks  | 0.01        | 0.01        | 0.01        | ft/day    |
| Streambed thickness               | bs  | 3           | 3           | 3           | ft        |
| Streambed conductance             | sbc | 0.066666667 | 0.066666667 | 0.066666667 | ft/day    |
| Stream depletion factor (Jenkins) | sdf | 3.75        | 3.75        | 3.75        | days      |
| Streambed factor (Hunt)           | sbf | 0.166666667 | 0.166666667 | 0.166666667 |           |

Relative Elevation Profile

