PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section   Date **January 15, 2016**

FROM: Groundwater Section   **Aurora C Bouchier**

                   Reviewer's Name

SUBJECT: Application G- **18178**   Supersedes review of **na**

                           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: **Curt Johnston** County: **Yamhill**

A1. Applicant(s) seek(s) **0.67** cfs from **1** well(s) in the **Willamette** Basin,

    Yamhill subbasin

A2. Proposed use **Irrigation (60 acres)** Seasonality: **April - October**

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 24	1129	Alluvial	0.67 (300 gpm)	T4S/R3W-31 NW-SW	1625' N, 620' E fr SW cor S 31
2						
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	105	20	5/3/1990	159	0-20	+2-159	-	115-155	400	-	A

Use data from application for proposed wells.

A4. **Comments:** This review is based on a rate of 0.67 cfs.

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 well (YAMH 24) is located greater than ¼-mile from a surface water body and produces from a confined aquifer, so the pertinent rules (OAR 690-502-0240) 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 <u>groundwater</u>* 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 applicant's well is located in an area that contains low-permeability silt and clay from land surface to a depth of approximately 100 feet below land surface. A 40 feet thick package of sand and gravel interbedded with silt and clay underlies the low-permeability silt. Underlying the sand and gravel is a sequence of mostly fine grained alluvium with thin beds of sand and gravel (Gannett and Caldwell, 1998, and Woodward et al., 1998).

Water levels in nearby wells appear fairly stable since the mid 1940's. However, additional development in the area speaks to the need for annual static water level measurements.

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	**Alluvial**	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: YAMH 24 and other nearby well logs report static water levels many tens of feet above the water bearing zone at which water was first encountered, indicating confined conditions.

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 ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	**1**	**West Fork of Palmer Creek**	**132**	**132**	**2720**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Published water tables maps indicate that groundwater in the alluvial aquifer flows towards, and discharges into, nearby perennial streams (Conlon et al., 2005, and Woodward et al., 1998). The elevation of the West Fork of Palmer Creek ranges from 110-150 feet within a mile of the well.

Water Availability Basin the well(s) are located within: 30200801: YAMHILL R> WILLAMETTE R- AT MOUTH

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**	☐	☐	**na**	**na**	☐	**66.9**	☐	**<<25%**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts <u>by total appropriation</u> 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 #		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?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: <u>The interference at 30 days was estimated using the Hunt 2003 model.</u>

_____

_____

_____

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.

Non-Distributed Wells

Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

Distributed Wells

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													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													

(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: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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:** _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

References Used:
Application file for G-18178.

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.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Woodward, Dennis BG., 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, especially well logs for: YAMH 24, YAMH 65, YAMH 712, YAMH 1852, YAMH 5952, YAMH 6819, YAMH 6837, YAMH 50702, YAMH 51624, and YAMH 55101.

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 _____ ;
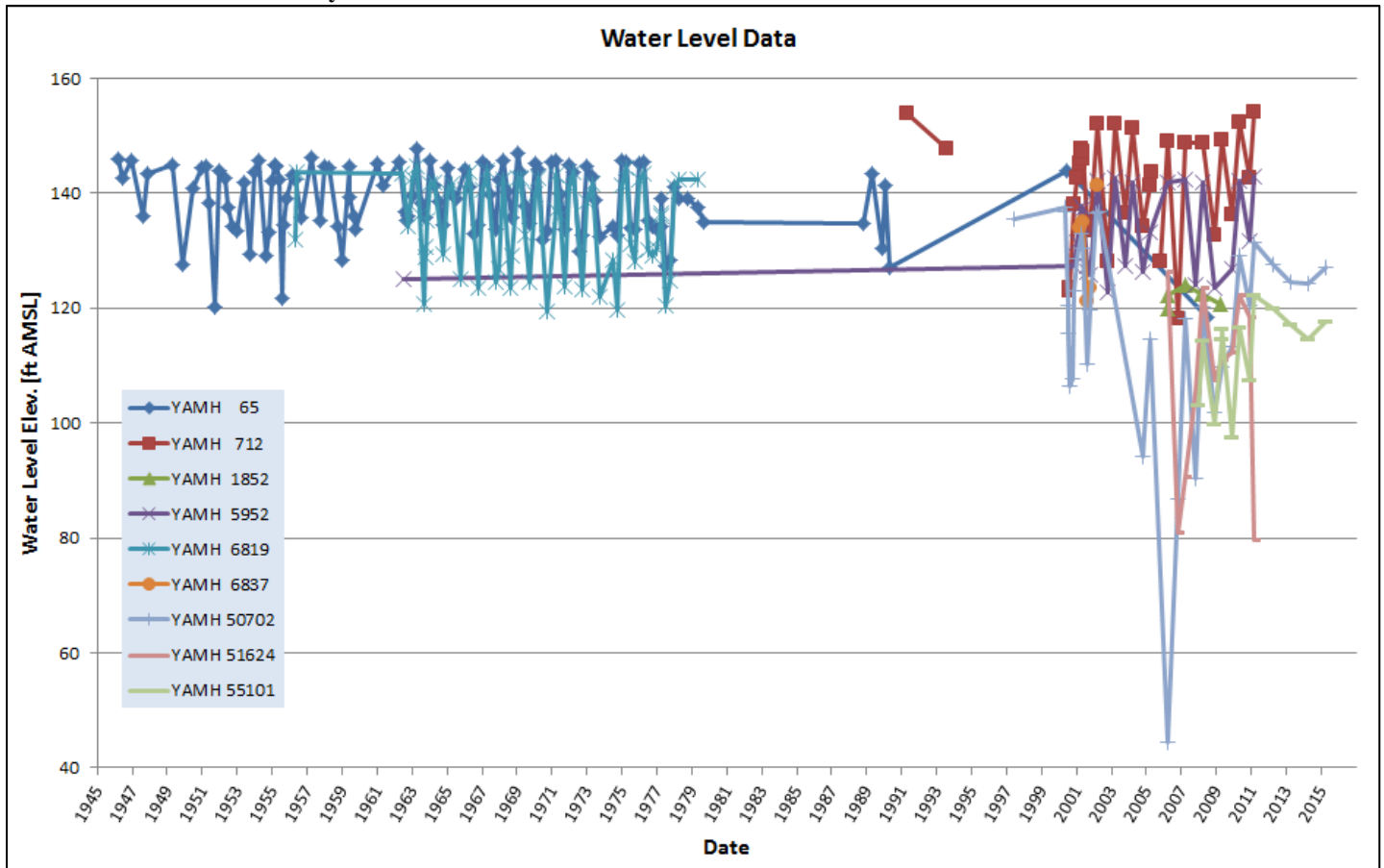 c. ☐ report of CWRE _____ :
  d. ☐ other: (specify) _____
      _____

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**

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              DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

                        YAMHILL R > WILLAMETTE R - AT MOUTH
Watershed ID #: 30200801            Basin: WILLAMETTE              Exceedance Level: 80
Time: 2:45 PM                                                        Date: 01/15/2016
------------------------------------------------------------------------------------
Month        Natural      Consumptive     Expected      Reserved      Instream        Net
             Stream        Use and         Stream        Stream    Requirements      Water
              Flow         Storage          Flow          Flow                   Available
------------------------------------------------------------------------------------
                            Monthly values are in cfs.
                 Storage is the annual amount at 50% exceedance in ac-ft.
        .............................................................................
 JAN       1,840.00          69.80       1,770.00          0.00         31.70     1,740.00
 FEB       2,070.00          67.50       2,000.00          0.00         31.70     1,970.00
 MAR       1,760.00          43.40       1,720.00          0.00         31.70     1,680.00
 APR       1,060.00          52.00       1,010.00          0.00         31.70       976.00
 MAY         523.00          65.50         458.00          0.00         31.70       426.00
 JUN         232.00          88.40         144.00          0.00         31.70       112.00
 JUL         108.00         112.00          -3.59          0.00         31.70       -35.30
 AUG          66.90          99.20         -32.30          0.00         31.70       -64.00
 SEP          56.50          64.30          -7.82          0.00         31.70       -39.50
 OCT          72.50          17.10          55.40          0.00         31.70        23.70
 NOV         462.00          37.80         424.00          0.00         31.70       392.00
 DEC       1,670.00          66.60       1,600.00          0.00         31.70     1,570.00
 ANN     1,180,000          47,300     1,130,000             0         23,000     1,110,000
------------------------------------------------------------------------------------
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Well Location Map

G-18178, Johnston

Water-Level Trends in Nearby Wells

Transient Stream Depletion Model Results

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)
G-18178 t W. Fork Palmer Creek
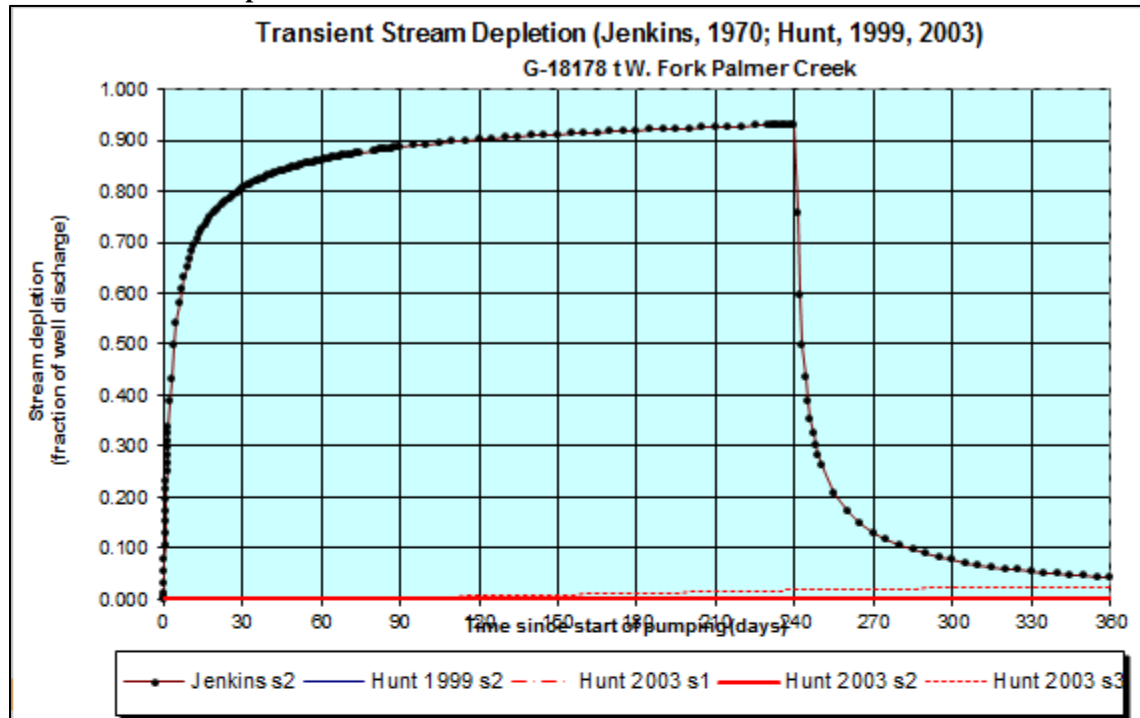
Output for Stream Depletion, Scenerio 2 (s2):					Time pump on (pumping duration) = 240 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	80.4%	86.1%	88.6%	90.1%	91.2%	91.9%	92.5%	93.0%	13.0%	7.7%	5.4%	4.2%
H SD 1999	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
H SD 2003	0.03%	0.04%	0.05%	0.05%	0.06%	0.06%	0.06%	0.06%	0.03%	0.02%	0.01%	0.01%
Qw, cfs	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670
H SD 99, cfs	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
H SD 03, cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.67	0.67	0.67	cfs
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	a	2720	2720	2720	ft
Well depth	d	159	159	159	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer saturated thickness	b	40	40	40	ft
Aquifer transmissivity	T	2000	2000	2000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.001	1	ft/day
Aquitard saturated thickness	ba	100	100	100	ft
Aquitard thickness below stream	babs	70	70	70	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	10	15	20	ft
Streambed conductance (lambda)	sbc	0.001429	0.000214	0.285714	ft/day
Stream depletion factor	sdf	3.699200	3.699200	3.699200	days
Streambed factor	sbf	0.001943	0.000291	0.388571	
input #1 for Hunt's Q_4 function	t'	0.270329	0.270329	0.270329	
input #2 for Hunt's Q_4 function	K'	0.369920	0.036992	36.992000	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	0.001943	0.000291	0.388571	