

Groundwater Application Review Summary Form

Application # G- 19282

GW Reviewer Dennis Orlowski Date Review Completed: April 6, 2023

Summary of GW Availability and Injury Review:

Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in the Clackamas Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date April 6, 2023
 FROM: Groundwater Section Dennis Orłowski
 Reviewer's Name
 SUBJECT: Application G- 19282 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: Patterson Nursery Sales Inc. County: Clackamas

A1. Applicant(s) seek(s) 0.11 cfs from six well(s) in the Willamette Basin,
Clackamas subbasin

A2. Proposed use Nursery (9.0 acres) Seasonality: Year-round

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	CLAC 54178	1	Alluvium	0.11**	T2S/R4E-S31 NE-SW	2020' S, 360' E fr SW cor DLC39 38***
2	CLAC 56492	2	Alluvium	0.11**	T2S/R4E-S31 NE-SW	1600' S, 590' E fr SW cor DLC39 38***
3	CLAC 75335	3	Alluvium	0.11**	T2S/R4E-S31 SE-NW	920' S, 180' E fr SW cor DLC39 38***
4	CLAC 75720	4	Alluvium	0.11**	T2S/R4E-S31 NE-SW	1980' S, 140' W fr SW cor DLC39 38***
5	CLAC 72846	5	Alluvium	0.11**	T2S/R4E-S31 SW-NW	190' S, 220' W fr SW cor DLC39 38***
6	CLAC 75843	7	Alluvium	0.11**	T2S/R4E-S31 SW-NW	1370' S, 720' W fr SW cor DLC39 38***

* 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	345	248	122	12/1998	280	0-193	0-280	180-240	240-280	40	3	Bailer
2	345	20	122	1/2001	280	0-65, 175-195	0-280	--	--	80	--	Air
3	340	365	178	9/2019	380	0-161	0-290	--	290-380	100	--	Air
4	340	50	141	4/2020	329	0-190	0-261	--	249-329	120	105	Pump
5	335	2	138	1/2017	432	0-10, 10-175	0-357	--	227-242, 357-422	65	89	Pump
6	335	250	137	6/2020	400	0-161	0-363	246-306	250-400	180	62	Pump

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU area is located in the Clackamas River basin approximately 1/2 mile west of the unincorporated community of Eagle Creek, Oregon.

****** In Section 3 of the application the "Total maximum rate requested" is shown as 0.11 cfs (~50 gpm). The table within that same section then lists well specific rates for each of the proposed six POA; however, five of the six listed well-specific rates exceed the total maximum requested rate of 0.11 cfs. **Therefore, this review considers only the maximum 0.11 cfs rate applied to each of the proposed POA (and not the well-specific rates shown in the Section 3 table).**

******* The application map references all POA locations to "...the SW Corner DLC 39." **This is an incorrect reference corner, as confirmed by field verified locations for several of the existing wells, and by comparison to previous location descriptions for some of the same POA on other water rights** (also, some of these location references would place existing wells within or very near Eagle Creek, an obvious impossibility). The relative locational error exists because the application map incorrectly repeats the "DLC 39" label for two adjacent parcels; the easternmost parcel is actually DLC 38, not DLC 39. **Therefore, it appears that the intended corner reference should instead be to the SW corner of DLC 38 (or the SE corner of DLC 39). This review considers these latter reference corners, and not the incorrect references shown on the application map.**

Three of the proposed POA (CLAC 54178, CLAC 56492, CLAC 75335) are authorized POA for other nursery water rights: permits G-13961, G-15195, and G-15841; OWRD records indicate that the other three proposed POA (CLAC 75720, CLAC 72846, CLAC 75483) are not currently authorized POA for other water rights. The application states that "these wells supply water for nursery operations use on approximately 170 adjacent acres. **This application is for a permit to supply water to an additional 9.0 acres.**"

- 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 proposed POA are greater than ¼-mile from the nearest stream or surface water source and appear to produce groundwater from a confined alluvial aquifer system. Therefore, per OAR 690-502-0240, the relevant Willamette Basin rules (OAR 690-502-0040 & 690-502-0140) do not apply.
- A6. **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **None**
Comments: Not applicable.

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) 7N (annual measurements), 7J (Scenic Waterway);
 - 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 160 ft. below land surface;
 - c. **Condition** to allow groundwater production only from the alluvial 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 proposed POA wells obtain groundwater from relatively-thin (10-20 feet thick) layers of sand or sandstone, with some reported occurrences of gravel as well, that are generally at depths ranging from about 200 to 400 ft bls; these permeable layers are both overlain by and encased in thicker deposits of low-permeability silts and clays. These alluvial deposits have been classified as part of either the Troutdale Formation (Tolan, 2003) or Sandy River Mudstone (McFarland and Morgan, 1996). Hydrostratigraphically, the predominantly fine-grained sediments in this area have been assigned to the Willamette confining unit of Woodward et al. (1998), estimated at 200-400 ft thick in the area of interest, and to the Lower Sedimentary Unit (LSU) of Conlon et al. (2005). These sediments unconformably overlie volcanic mudflow deposits, andesitic lava flows, breccia, and tuff assigned to the Rhododendron Formation (Tolan, 2003).

Applicable water-level data is sparse, consisting solely of permit condition reporting from three existing Patterson Nursery wells: CLAC 54178, CLAC 56492, and CLAC 56693 (see attached hydrograph). These data extend from the early 2000s through 2009-2011, during which two of the wells showed moderate declines (~8-10 ft) and one showed an increase of about 5 feet. These wells are all used as pumping wells for nursery operations that are authorized to pump year-round, and thus the data are not particularly useful for evaluating potentially more widespread declines in the alluvial aquifer system. However, in nearby areas within the Eagle Creek/Clackamas River basin there is substantial anecdotal evidence to warrant concern about the capacity of the resource (e.g., interference complaints).

Relative to existing allocations for several of the POA wells at Patterson Nursery, the rate (0.11 cfs, ~50 gpm) and duty (nursery, new 9.0 acres vs an existing 170 acres) requested via this application is relatively small. Furthermore, the new POA wells proposed for this permit are generally farther away from other groundwater users, nearer to Eagle Creek. Consequently, it is not likely that the proposed use will injure other groundwater uses.

Despite this generally favorable conclusion, due to aquifer capacity concerns in nearby areas, coupled with a pronounced lack of contemporary water level data for the Patterson Nursery site, permit condition 7N is recommended to provide new data to assist in future management of the groundwater resource in this area.

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
All	Alluvium	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Past reported static water levels for the proposed POA are above the primary water-bearing sand and gravel deposits, which are overlain by several tens of feet (minimum) of low-permeability silt and clay beds. These factors indicate confined conditions in the local alluvial aquifer system tapped by the proposed POA.

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?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Eagle Creek*	205-215	180-285	1400	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Eagle Creek*	205-215	180-285	1850	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Eagle Creek*	205-215	180-285	2450	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	1	Eagle Creek*	205-215	180-285	1390	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	1	Eagle Creek*	205-215	180-285	2690	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	1	Eagle Creek*	205-215	180-285	1580	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Goose Creek	205-215	300-375	4400	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Goose Creek	205-215	300-375	4150	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Goose Creek	205-215	300-375	4000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	2	Goose Creek	205-215	300-375	4480	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	2	Goose Creek	205-215	300-375	3050	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	2	Goose Creek	205-215	300-375	4240	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: The estimated range of groundwater elevations is based primarily on reports from CLAC 73573 and CLAC 56693, both wells located at Patterson Nursery but not as proposed POA for this application; water level data from CLAC 54178 and CLAC 56492 (which are proposed POA) are also available, but their most recent measurements are from >~10 years ago. These estimated groundwater elevations are within the range of surface water elevations for SW 1 (Eagle Creek) within approximately one mile of the POA locations, which indicates hydraulic connection between the alluvial aquifer system and SW1. Local groundwater maps also show groundwater flowing towards and discharging to local streams (Gannett and Caldwell, 1998).

* Eagle Creek (SW1) discharges to the Clackamas River at a location about 3000-4000 feet west of the proposed POA locations; all of the POA are also hydraulically connected to the Clackamas River. However, because flow parameters for Eagle Creek are relatively more limiting than those for the Clackamas, PSI was evaluated for only the former (see section C3a).

Estimated groundwater elevations are at least 85 feet below the elevation of SW2 (Goose Creek) at perennial reaches within about one mile of the POAs; this suggests, at best, a very inefficient hydraulic connection, with SW2 being extensively buffered by the tens of feet of low permeability silts and clays that are present between the stream bottom and aquifer water-bearing zones. Thus, for this review the SW1 hydraulic connection with the proposed POA was assumed to prevail.

The depletion of SW1 flows by pumping of the proposed POAs will be attenuated, but not eliminated, by the low vertical hydraulic conductivity (permeability) of the clays and silts that lie between the deeper sands and gravels and the stream beds. Net impacts will be relatively small at the onset of pumping, but will increase with time until a new equilibrium between local recharge and discharge is reached. At that time depletion is expected to be relatively constant throughout the year.

Water Availability Basin the well(s) are located within: SW1: WID 96, Eagle Creek > Clackamas River – at mouth
SW2: WID 80 Clackamas River > Willamette River – 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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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"/>	MF96A	40.00	<input type="checkbox"/>	16.20	<input type="checkbox"/>	<<25%	<input type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	MF96A	40.00	<input type="checkbox"/>	16.20	<input type="checkbox"/>	<<25%	<input type="checkbox"/>
3	1	<input type="checkbox"/>	<input type="checkbox"/>	MF96A	40.00	<input type="checkbox"/>	16.20	<input type="checkbox"/>	<<25%	<input type="checkbox"/>
4	1	<input type="checkbox"/>	<input type="checkbox"/>	MF96A	40.00	<input type="checkbox"/>	16.20	<input type="checkbox"/>	<<25%	<input type="checkbox"/>
5	1	<input type="checkbox"/>	<input type="checkbox"/>	MF96A	40.00	<input type="checkbox"/>	16.20	<input type="checkbox"/>	<<25%	<input type="checkbox"/>
6	1	<input type="checkbox"/>	<input type="checkbox"/>	MF96A	40.00	<input type="checkbox"/>	16.20	<input type="checkbox"/>	<<25%	<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 #		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?
			<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: C3a: based on past stream depletion modeling experience in similar settings (Hunt, 2003), it is likely that interference at 30 days of continuous pumping at the maximum authorized rate will be much less than 25% of that rate. This conclusion is due largely to the presence of shallow, thick sequences of low-permeability silt and clay that exist between the stream beds and deeper, confined water-bearing sands and gravels.

C3b: not applicable.

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													
(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: Both SW 1 (Eagle Creek) and SW 2 (Goose Creek) are above the Clackamas River State Scenic Waterway. Due to the hydraulic connection between these streams and the alluvial aquifer in this area, the relevant State Scenic Waterway provisions apply to the proposed use (note recommended related condition 7J in Section B2c).**

References Used: Application file: G-19282.

Groundwater reviews: applications G-19238, G-19239, G-18514, G-18644, G-18729, G-18543.

Barlow, P., and Leake, J., 2012, Streamflow depletion by wells – understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey, Circular 1376, 84 p.

Bredehoeft, J., 2011, Hydrologic trade-offs in conjunctive use management: Ground Water, v. 49, no. 4, p. 468-475.

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, 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, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.

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

McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington: U.S. Geological Survey Water Supply Paper 2470-A, 58 p.

Theis, C.V., 1940, The source of water derived from wells: Essential factors controlling the response of an aquifer to development: Civil Engineering, Vol. 10, p. 277–280.

United States Geological Survey, 2013, National Elevation Dataset (NED) [DEM geospatial data]. 1/9th arc-second, updated 2013.

United States Geological Survey, 2017, Estacada quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Hood to Coast 2009, Portland, OR, May 27.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

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

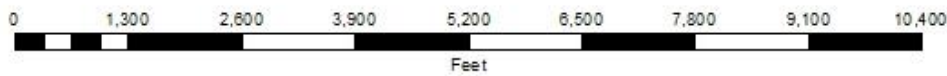
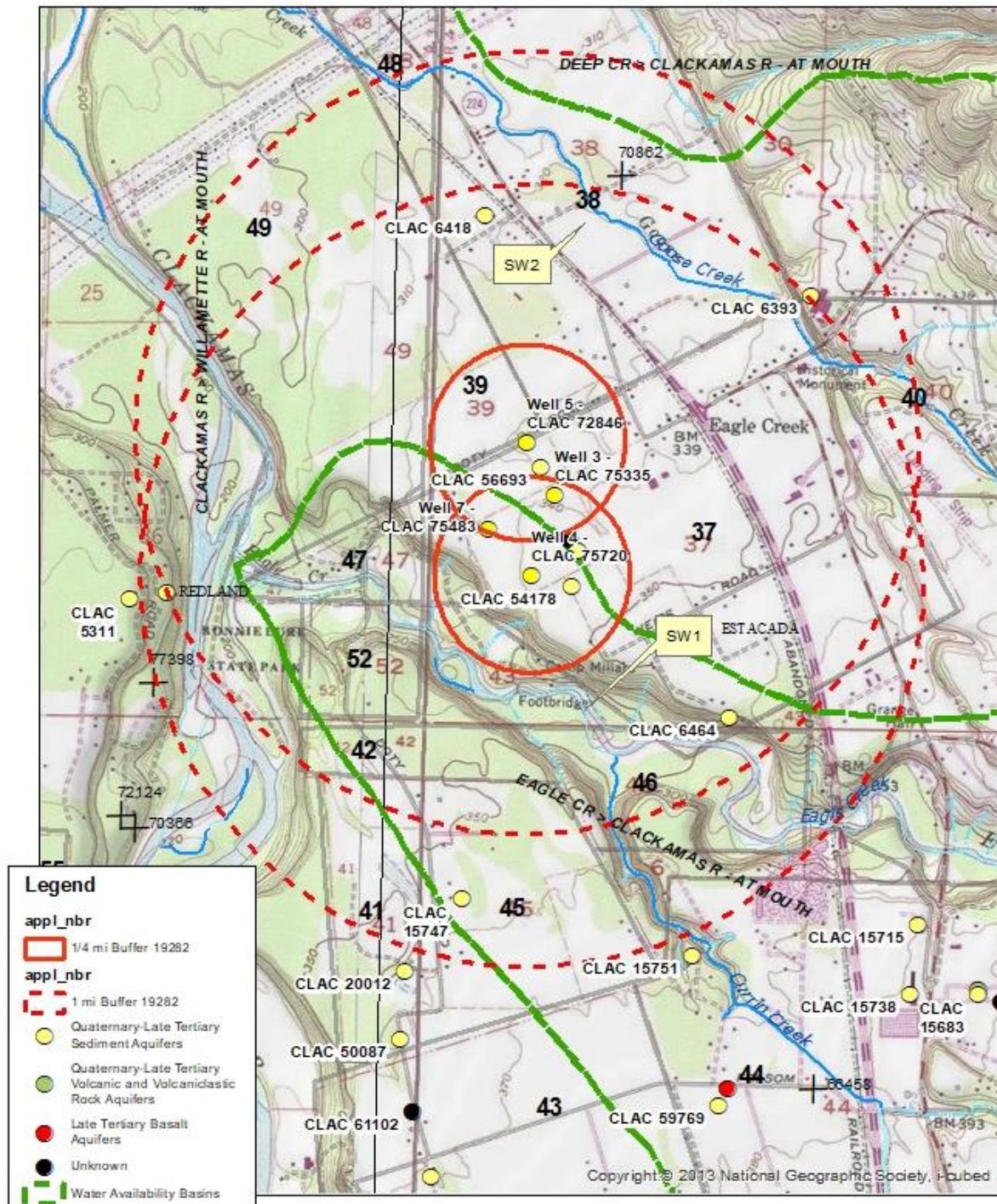
- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

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.**

Well Location Map

Application G-19282, Patterson Nursery T2S, R4E, Section 31



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Water Availability Tables

Water Availability Analysis Detailed Reports

EAGLE CR > CLACKAMAS R - AT MOUTH WILLAMETTE BASIN

Water Availability as of 4/5/2023

Watershed ID #: 96 (Map) Date: 4/5/2023

Exceedance Level: 80% Time: 3:12 PM

- Water Availability Calculation
- Water Rights
- Consumptive Uses and Storages
- Instream Flow Requirements
- Watershed Characteristics
- Reservations

Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	233.00	0.63	232.00	0.00	125.00	107.00
FEB	235.00	0.60	234.00	0.00	125.00	109.00
MAR	241.00	0.57	240.00	0.00	125.00	115.00
APR	279.00	0.64	278.00	0.00	125.00	153.00
MAY	271.00	1.26	270.00	0.00	125.00	145.00
JUN	132.00	1.74	130.00	0.00	100.00	30.30
JUL	54.50	2.98	51.50	0.00	100.00	-48.50
AUG	22.20	2.27	19.90	0.00	40.00	-20.10
SEP	16.20	1.04	15.20	0.00	40.00	-24.80
OCT	19.60	0.57	19.00	0.00	40.00	-21.00
NOV	74.90	0.57	74.30	0.00	125.00	-50.70
DEC	245.00	0.64	244.00	0.00	125.00	119.00
ANN	197,000.00	820.00	196,000.00	0.00	72,000.00	129,000.00

Water Availability Analysis Detailed Reports

CLACKAMAS R > WILLAMETTE R - AT MOUTH WILLAMETTE BASIN

Water Availability as of 4/5/2023

Watershed ID #: 80 (Map) Date: 4/5/2023

Exceedance Level: 89% Time: 3:03 PM

- Water Availability Calculation
- Water Rights
- Consumptive Uses and Storages
- Instream Flow Requirements
- Watershed Characteristics
- Reservations

Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	2,670.00	326.00	2,340.00	0.00	1,000.00	1,340.00
FEB	2,900.00	362.00	2,540.00	0.00	1,000.00	1,540.00
MAR	2,800.00	330.00	2,470.00	0.00	1,000.00	1,470.00
APR	3,010.00	399.00	2,610.00	0.00	1,000.00	1,610.00
MAY	2,740.00	398.00	2,340.00	0.00	1,000.00	1,340.00
JUN	1,620.00	309.00	1,310.00	0.00	1,000.00	311.00
JUL	980.00	309.00	671.00	0.00	1,000.00	-329.00
AUG	822.00	294.00	528.00	0.00	890.00	-362.00
SEP	833.00	283.00	550.00	0.00	890.00	-340.00
OCT	882.00	277.00	605.00	0.00	1,000.00	-395.00
NOV	1,630.00	324.00	1,310.00	0.00	1,000.00	306.00
DEC	2,650.00	328.00	2,320.00	0.00	1,000.00	1,320.00
ANN	2,110,000.00	238,000.00	1,870,000.00	0.00	711,000.00	1,200,000.00

Water-Level Measurements in Nearby Wells

Observation Well Data

