WATER RESOURCES DEPARTMENT

MEMO July 29 ,20 15

TO: **Application #** LL-1665

FROM: **GW:** M. Thoma
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES
The source of appropriation is within or above a Scenic Waterway
☒ NO

☐ YES
Use the Scenic Waterway condition (Condition 7J)
☒ NO

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

☐ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.**

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 _____ 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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **July 29, 2016**

FROM: Groundwater Section **Michael J Thoma**
Reviewer's Name

SUBJECT: Application LL- **1665** 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: **Azalea Rojo LLC** County: **Linn**

A1. Applicant(s) seek(s) **0.6** cfs from **1** well(s) in the **Willamette** Basin, **Calapooia R** subbasin

A2. Proposed use **Establishment of vineyard (91 ac)** Seasonality: **March 1 – October 31 (244d)**

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	Proposed	1	Alluvium	0.6	14S/03W-12 NWNE	510'S, 2900' E of NW cor S12
2						
3						

* 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	325		5-15*		200-300	0-18	0-18					

Use data from application for proposed wells.

A4. **Comments:** *The applicant's POA is a proposed well with estimated depth provided on the application. SWL is estimated from what is reported on nearby well logs.

A5. ☒ **Provisions of the** Willamette (OAR 690-502) 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: OAR 690-502-0110(1)(e) has restrictions on type of use of the Calapooia River and tributaries. In the event that PSI is found, these rules may be applicable.

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) **7N (annual SWL reporting); Large Water-use Reporting**;
   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:** There are SWL data from wells in the area and producing from the same aquifer system but the majority of data are suspect and should not be considered necessarily accurate. However, it is likely that SWLs in the proposed alluvial aquifer are shallow and closely tied to surface water as the majority of well logs in the area report SWL between 5 and 15 fl bls. There are several groundwater POAs in the vicinity of the proposed POA but with an assumed high K and high storativity aquifer system (owing the its alluvial composition) it is unlikely that injury to existing groundwater rights will occur.

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**	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: Driller's logs for wells in the area generally report 50 to > 100 ft of alluvial material – primarily clay with sand/gravel – overlaying claystone bedrock. These layers of fine and coarse sediments likely create a semi-confined aquifer system with confinement increasing with depth.

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	**Courtney Cr**	**~310**	**310-325**	**1660**	☒	☐	☐	☐	☒
1	2	**Calapooia R**	**~310**	**315-325**	**6320**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: GW elevations in the area are near or above SW elevations, implying that groundwater and surface water are strongly connected.

Water Availability Basin the well(s) are located within: Calapooia R > Willamette R – AB Mouth (ID# 76)

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**	☐	**22.7**	☒	**< 1%**	☒
		☐	☐			☐		☐		☐

Comments: Interference with Courtney Cr. was estimated using the Hunt (2003) stream-depletion model. Result are very low given, primarily, the stream width and thickness of low-conductivity fine-grained layers near the surface and below the creek.

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?
			☐			☐		☐		☐

Comments:

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
1	**2**	%	%	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	%	%
Well Q as CFS				**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**		
Interference CFS				**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.				**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**
(B) = 80 % Nat. Q		**592**	**650**	**575**	**423**	**234**	**111**	**46**	**26**	**22.7**	**29.6**	**133**	**499**
(C) = 1 % Nat. Q		**5.92**	**6.50**	**5.75**	**4.23**	**2.34**	**1.11**	**0.46**	**0.26**	**0.23**	**0.30**	**1.33**	**4.99**
(D) = (A) > (C)													
(E) = (A / B) x 100		%	%	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**	**< 1 %**

(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:

Interference with the Calapooia River was not directly modeled but based on results of estimating stream-depletion with Courtney Cr (see Section C3a) interference will be < 1 % of the pumping rate (i.e., < 0.006 cfs) which is < 1% of the 80%-exceedance flows in the Calapooia River in all months.

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:** The applicant's proposed POA would be producing from an aquifer system that has been found to be hydraulically connected to Courtney Cr and the Calapooia River. The location of the proposed POA is < 1 mile from Courtney Cr and the rate requested is > 1% of the minimum 80%-exceedance flows in the river so OAR 690-009 requires the Department to assume that the proposed use will have the potential for substantial interference (PSI) with Courtney Cr. Although Courtney Cr is mapped as a partially intermittent stream on USGS topographic maps, the local Watermaster regulates on the creek annually and has expressed concerns that additional appropriation of hydraulically-connected groundwater could exacerbate problems within Courtney Cr. Hydraulic connection with the Calapooia River is note efficient enough to rise to the level of PSI.

References Used:

Gannet, M. W. and R. R. Caldwell. 1998. *Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington.* USGS Professional Paper 1424-A.

Hunt, B. 2003. *Unsteady Stream Depletion when Pumping from a Semiconfined Aquifer.* Journal of Hydrologic Engineering. Vol 8(1), pp 12-19

O'Conner, J. E., A. Sarna-Wojcicki, K. C. Wozniak, D. J. Polette, and R. J. Fleck. *Origin, Extent, and Thickness of Quaternary Geologic Units in the Willamette Valley, Oregon.* USGS Professional Paper 1620

Woodward, D. G., M. W. Gannett, and J. J. Vaccaro. 1998. *Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington.* USGS Professional Paper 1424-B.

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

Water Availability Analysis
Detailed Reports

CALAPOOIA R > WILLAMETTE R - AB MOUTH
WILLAMETTE BASIN

Water Availability as of 7/29/2016

Watershed ID #: 76 (Map) Exceedance Level: 80%
Date: 7/29/2016 Time: 10:49 AM

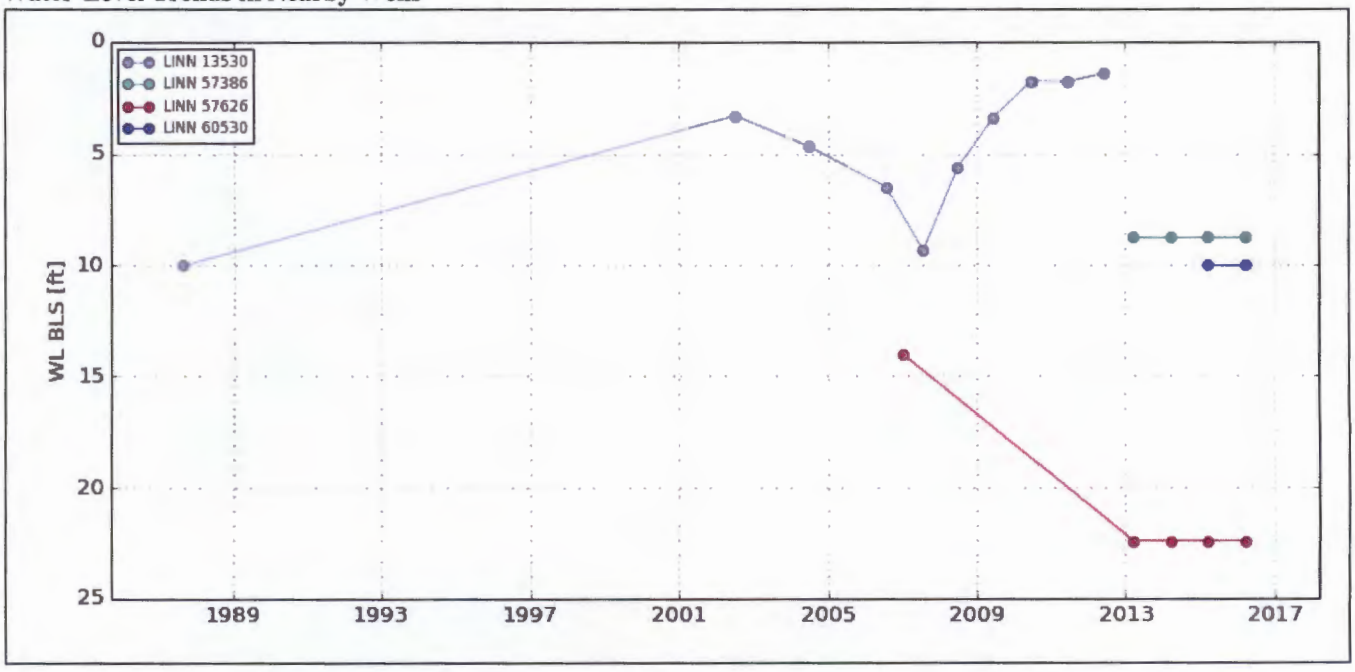
Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations | Water Rights | Watershed Characteristics

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	592.00	2.87	589.00	0.00	20.00	569.00
FEB	650.00	2.82	647.00	0.00	20.00	627.00
MAR	575.00	2.13	573.00	0.00	20.00	553.00
APR	423.00	1.82	421.00	0.00	20.00	401.00
MAY	234.00	6.83	227.00	0.00	20.00	207.00
JUN	111.00	12.50	98.50	0.00	20.00	78.50
JUL	49.00	19.30	29.70	0.00	20.00	9.69
AUG	26.00	13.80	12.20	0.00	20.00	-7.82
SEP	22.70	7.25	15.40	0.00	20.00	-4.55
OCT	29.60	1.38	28.20	0.00	20.00	8.22
NOV	133.00	1.88	131.00	0.00	20.00	111.00
DEC	499.00	2.83	496.00	0.00	20.00	476.00
ANN	404,000.00	4,570.00	399,000.00	0.00	14,500.00	385,000.00

Water-Level Trends in Nearby Wells

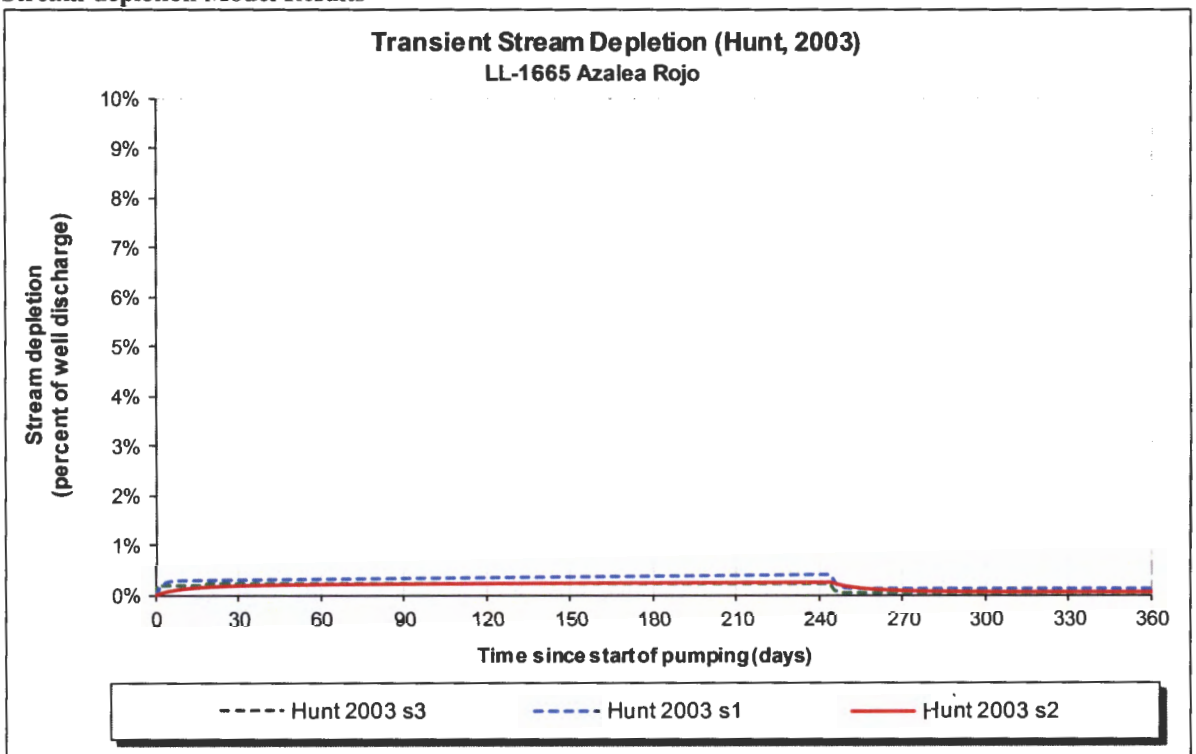


Date: 7/29/16

Version: 04/20/2015

Well Location Map

Stream-depletion Model Results



Output for Stream Depletion, Scenerio 2 (s2):	Time pump on (pumping duration) = 244 days											
Days	**30**	60	90	120	150	180	210	240	270	300	330	360
J SD	83.0%	88.0%	90.2%	91.5%	92.4%	93.0%	93.5%	94.0%	12.5%	7.1%	4.9%	3.7%
H SD 1999	0.3%	0.5%	0.6%	0.7%	0.8%	0.9%	1.0%	1.0%	0.8%	0.7%	0.7%	0.6%
H SD 2003	**0.18%**	**0.21%**	**0.22%**	**0.23%**	**0.23%**	**0.24%**	**0.24%**	**0.25%**	**0.08%**	**0.06%**	**0.05%**	**0.05%**
Qw, cfs	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600
H SD 99, cfs	0.002	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.005	0.004	0.004	0.004
H SD 03, cfs	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.000	0.000	0.000	0.000

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.60	**0.60**	0.60	cfs
Time pump on (pumping duration)	tpon	244	**244**	244	days
Perpendicular from well to stream	a	1660	**1660**	166	ft
Well depth	d	300	**300**	300	ft
Aquifer hydraulic conductivity	K	5	**50**	100	ft/day
Aquifer saturated thickness	b	200	**200**	200	ft
Aquifer transmissivity	T	1000	**10000**	20000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	**0.01**	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.01	**0.01**	0.01	ft/day
Aquitard saturated thickness	ba	20	**20**	20	ft
Aquitard thickness below stream	babs	15	**15**	15	ft
Aquitard porosity	n	0.3	**0.3**	0.3	
Stream width	ws	20	**20**	20	ft
Streambed conductance (lambda)	sbc	0.013	**0.013**	0.013	ft/day
Stream depletion factor	sdf	2.756	**2.756**	0.001	days
Streambed factor	sbf	0.022	**0.002**	0.000	
input #1 for Hunt's Q_4 function	t'	3.63E-01	**3.63E-01**	7.26E+02	
input #2 for Hunt's Q_4 function	K'	1.38E+00	**1.38E-01**	6.89E-04	
input #3 for Hunt's Q_4 function	epsilon'	3.33E-03	**3.33E-02**	3.33E-03	
input #4 for Hunt's Q_4 function	lamda'	2.21E-02	**2.21E-03**	1.11E-04	