

NANOOSE PENINSULA WATER SERVICE AREA
SUMMARY OF WATER SUPPLY NEEDS TO BUILD-OUT

Updated text, (Some figs)
July 3, 2013

Further to our discussion this morning and the recent understanding between Rob Warren of KWL, Russell Tibbles of Fairwinds, and Mike Donnelly of the RDN that it is O.K. for Koers & Associates to release population and water use data and assumptions used in recent assignments for the RDN on Nanoose water supply and distribution, I provide the following summary:

There are three assignments that apply (in chronological order):

1. Arrowsmith Water Service (AWS). Englishman River Intake, Treatment Facilities and Supply Mains. Phase 1 – Conceptual Planning, Budgeting and Scheduling. Associated Engineering, April 2011. Koers & Associates, as well as KWL, were sub-consultants to AE on this project. A copy of this report and appendices is available on line.
2. RDN. Nanoose Peninsula Water System. Development Cost Charges Study, Final Draft Report. Koers & Associates Engineering Ltd. May 2012. This report has not yet been adopted by the RDN. This study covers local distribution system improvements only.
- * 3. RDN. Nanoose Bulk Water Requirements. Review of a range of per capita water demand scenarios, population growth scenarios, and Nanoose groundwater availability scenarios, and the resulting need for additional water supply from the Englishman River Water Service (ERWS). May 2013.

Existing and Build-out Populations

There are some inconsistencies between the basic assumptions in these reports (reviews), for example, reports 1 and 2 each quote Nanoose Peninsula Water Service Area (NPWSA) build-out population and growth rate estimates from RDN staff. Report 1 projects 11,969 and a range of annual growth rates for Nanoose from 1.5 – 2.3%, and Report 2 projects 9,971 and a 2.0% annual growth rate. The report 1 assumptions do not achieve build-out until 2050 or later, whereas the report 2 assumptions achieve build-out by 2045. The existing NPWSA population was estimated by RDN staff at 4,803 for 2009 in report 1 and 5,085 for 2011 in report 2. Review 3 used the information contained in public report 1.

- * We suggest that the most realistic and likely conservative scenario is a total NPWSA build-out population of 11,969 (most recent public report), to be reached after 2050. The existing NPWSA population would be 5,190 for 2013, using the 4,803 estimate for 2009 and a 2% growth rate.
- * The difference, or 6,779 people, would be contributed by new development over the next 40+ years.

Per Capita Water Consumption

- * Report 1 suggests a conservative overall per capita conservation water consumption target of 1.375 m³/day per capita for the entire AWS service area, which also includes the City of Parksville, the Town of Qualicum Beach, and the French Creek Regional Service Area. Recent design demand determinations for Fairwinds by KWL suggest a figure of 1.168 m³/day per capita for the Nanoose service area. We understand this has been adopted by the RDN. Review 3 therefore used for its “most probable” Nanoose bulk water use scenario a target value for Nanoose of 1.168 m³/day per capita. We believe this is still a conservative number, and have used that number for the present summary review.

The maximum day water demands for the NPWSA are summarized as follows:

Present population (2013)	6,062 m ³ /day
Build-out population (2050+)	13,980 m ³ /day

Overall AWS Bulk Water Requirements

* Report 1 projected that, with overall estimated groundwater resources at 19,000 m³/day, the maximum day AWS surface water source requirement at full build-out (2050) would be between 46,329 and 21,218 m³/day, without Town of Qualicum Beach participation, depending on growth and per capita consumption scenarios. The AWS Englishman River water licence was issued for a maximum 24-hour withdrawal of 47,888 m³/day. There was no attempt made in Report 1 to project individual service area groundwater resources or individual service area bulk water requirements.

NPWSA Groundwater Availability

Review 3 considered four scenarios of available groundwater capacity for the NPWSA

- a. With the old NWSA (Beachcomber, Dolphin Beach) wells in service. These wells, #2, 3, 4, and 7, totaling 2,454 m³/day have been recently taken out of service due to water quality complaints.
- b. With the old NWSA wells out of service.
- c. With only Wallbrook Well #1 in service.
- d. With Wallbrook Wells #1, 2, 3 and 4 in service.

For long term sustained capacity estimates, the RDN Operations Department 2013 maximum sustained 24-hour NPWSA well capacity values (May 17, 2013) were multiplied by a factor 0.7 to estimate the maximum capacity over a period of continuous pumping for several weeks. It should be noted that the Wallbrook # 1 well, which is currently hooked up, was included for its rated "summer capacity" of 367 m³/day, but that the remaining Wallbrook wells, which have not yet been completed or connected to the system, are now assumed to be available due to the change in sanitary setback requirements, and have been rated at 70% of the preliminary rating by Dennis Lowen. We understand the final ratings are still to be confirmed based on pump testing by Fairwinds under the influence of interference from the irrigation wells on the Springford farm.

We believe the most realistic build-out scenario is for the old NWSA wells to remain off-line (unless treatment is provided for these wells), and for the other wells to be available at 70% (subject to confirmation of the Wallbrook well capacities noted above).

The current (2013) available total well capacity would be 2,534 m³/day or 387 igpm, of which 1,352 m³/day or 206 igpm is being provided from wells developed and paid for by Fairwinds (Fairwinds Wells # 1, 2, and 3 and Wallbrook Well # 1).

- * The NPWSA groundwater availability at build-out (2050) would be 3,636 m³/day or 556 igpm. All of the
* additional well capacity (1,102 m³/day or 168 igpm) would be provided by wells developed and paid for by Fairwinds (Wallbrook Wells # 2, 3, and 4).

NPWSA Requirement for ERWS Surface Water

Current 2013 Conditions – Maximum Day:

Design Water Demand	6,062 m ³ /day
Available Well Supply	<u>2,534 m³/day</u>
ERWS Surface Water Required	3,528 m ³ /day (7.4 % of ERWS water licence)

Build-out Conditions – Maximum Day:

Design Water Demand	13,980 m ³ /day
Available Well Supply	<u>3,636 m³/day</u>
ERWS Surface Water Required	10,344 m ³ /day (21.6 % of ERWS water licence)

ERWS Contribution from New Nanoose Development and Fairwinds:

* Based on the assumptions provided in this summary, the amount of surface water required from ERWS by new development in Nanoose is 10,344 – 3,528 = 6,816 m³/day (66%).

* The Fairwinds development has an ultimate population of 2,500 units x 2.2 people/unit = 5,500 people with a design water demand of 5,500 x 1.168 m³/day/capita = 6,424 m³/day. Of that total, it will have provided 2,454 m³/day in well capacity, leaving 3,970 m³/day to be provided for Fairwinds from ERWS, again, subject to confirmation of the Wallbrook well ratings.

* marks changes from June 25 copy.

Prepared by: Tony Koers

Tibbles, Russell

From: Tony Koers <dakoers@koers-eng.com>
Sent: Thursday, July 04, 2013 9:55 AM
To: Tibbles, Russell
Cc: David Scott; Rob Hoffman
Subject: FW: Fairwinds Meeting
Attachments: Scan0031.pdf; Scan0035.pdf

Good morning Russell,
Attached for your information.

Regards, Tony

Tony Koers
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Nanoose Bay, B.C. V9P 9J1
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From: Tony Koers
Sent: July-04-13 9:37 AM
To: GGarbutt@rdn.bc.ca
Subject: Fairwinds Meeting

Good morning Geoff:

Attached is a scan of my review notes of the spreadsheets produced by Fairwinds, which can serve as an unofficial record of our discussion. I did not take any other notes.

Let me know if you have any questions or comments. Rob Hoffman will call you regarding invoicing instructions for my work.

Regards, Tony

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July 3, 2013

received from Fairwinds.

discussed in meeting with RDN July 3, 2013

Nanoose - Water Demand & Supply Projections

AWS Licence 47,888 m3/day ✓

Population
Current 5,190 ✓
Projected (2050) 11,969 ✓
New Population 6,779 ✓

Per Capita Consumption
Original 1,375 m3/day ✓
Revised 1,168 m3/day ✓

NPWSA Maximum Day Water Demands
Present Population (2013) 6,062 m3/day 926 IGPM ✓
Build Out Population (2050) 13,980 m3/day 2,136 IGPM ✓

~~conversion:~~

conversion: 0.152756

NWPSA Well Capacity (70% Maximum Capacity)
Current 2,534 m3/day 387 IGPM ✓
Wall Brook 1,102 m3/day 168 IGPM ✓
Build Out (2045) 3,636 m3/day 555 IGPM ✓

← not including old NWSA wells & Claudet well.

NPWSA Requirement for ERWS Water (Max Day)

	Current 2013		Build Out	
	m3/day	IGPM	m3/day	IGPM
Design Water Demand	6,062	926	13,980	2,136
Available Well Supply	2,534	387	3,636	555
ERWS Water Required	3,528	539	10,344	1,580

- 21.6% of ERWS licence

ERWS Water for New Development 6,816 m3/day 1,041 IGPM ✓ 66% of ERWS water for new development

It was confirmed that these values used by Fairwinds conform with the "summary of water supply needs to build-out" presented by Tony Koers, dated June 25, 2013 revised July 3, 2013

July 3, 2013
 Received from Fairwinds
 discussed in meeting with RDN July 3, 2013

Nanoose - Simplified Analysis of Projected Water DCCs
 Note: Non-residential uses are ignored in this analysis for simplicity. \$/unit amount relates to average of all residential unit types.

Existing Users	Future Additions	Total
2,253	2,448	4,701
65%	35%	100%

Residential Dwelling Units:
 - to buildout
 - 20yr time horizon

NBPWS Capital Costs	
Existing User Allocation	New Development Allocation
2,448	4,701
1,190	3,443
35%	100%

DCC per Residential Unit
 100%
 73%

from May 2012 Draft PCC Report for Nanoose by Koers & Assoc.

NBPWS Water Capacity Additions (igpm)	
Total	To Service New Development
225,168	225
225,159	148
459	344
327	252

from May 2012 Draft PCC Report for Nanoose by Koers & Assoc.

NBPWS Water Capacity Additions (igpm)	
Total	To Service New Development
225,168	225
225,159	148
459	344
327	252

Existing "Bulk Water" DCC (1998)

First Amendment (~2014):

Wall Brook Wells (3 wells, excl. WB#1)	\$ 2,798,858	\$ -	0%	\$ 2,798,858
Claudet Rd Well (treatment)	2,000,000	941,176	47%	1,058,824
Other (NBPWS)	7,172,997	5,916,665	82%	1,256,332
Subtotal	\$ 11,971,855	\$ 6,857,841		\$ 5,114,014
Less: Applicable reserves from previous DCC				196,000
Total (Cumulative)				\$ 4,918,014

not if NWSA wells not in
 RDN purchase for Nanoose
 full grant
 of ERWS share for Nanoose
 \$1.3M

Second Amendment - ERWS Phase 1 (~2016):

ERWS Cost Allocation (\$37.5m x 26%)	\$ 9,750,000
Less: Senior Government Funding (currently in place) 26%	338,000
New/Incremental Capital	\$ 9,412,000
Add: Applicable DCC from previous (First) Amendment	\$ 6,211,920
Total (Cumulative)	\$ 15,623,920

based on ERWS wells not in NWSA wells not in

Proforma Adjustments (to be deleted LD/SC Economic Analysis)

Incl in SC/LD EA (to be removed):	
Capital Projects (reservoir etc)	\$ 922,858
Wall Brook Land at AV	940,000 (sunk cost)
Wall Brook Cost to Date for Next 3 Wells	186,000
Wall Brook Cost to Date Compl for next 3 wells	750,000
Total	\$ 2,798,858 (rebate/credit to apply)

this appears to also be included in the 1/12, 99 report total in the May 2012 PCC report

Net Effective DCC per Unit per current EA

Commercial msq	9125
Institutional msq	11520
Commercial msq	9125
Institutional msq	11520

Unknowns:
 1. Costs - inflation 2011 -> 2013
 2. % Allocation to EXISTING depending on NWSA wells in or out.
 3. Politics?

32 ML x 1000 = 8,320 m³/day
 = 1,271 igpm

1,488 - 1,091 = 397
 1,041 - 1,041 = 0
 142 - 50 = 92

10,458
 - P 2. Tony K summary
 - P 3 - summary

Supply Projections per T Koers Analysis (Jun/13)	
Total New Supply (per above)	m ³ /day
Required for Existing Development	4,266
Required for New Development	3,528
Contingency	6,816
	-922
	114

\$2,613
 \$6,740