August 25, 2015

Ms. Tracey Braun, M. Sc.
Director, Environmental Approvals
Manitoba Conservation and Water Stewardship
123 Main St Suite 160
Winnipeg MB R3C 1A5

Subject: **NOTICE OF ALTERATION REQUEST FOR STEPHENFIELD REGIONAL WATER TREATMENT PLANT MEMBRANE REJECT WATER DISCHARGE – License No. 2847**

Dear Ms. Braun,

In accordance with the Environment Act (Section 14), this submission is a request for a minor alteration to the current Environment Act Licence (EAL) No. 2847 for the Pembina Valley Water Cooperative. Under the Environment Act Section 2, the proposed development would be classified as a Class 1 Development, waste disposal from a water treatment plant. Please find enclosed a cheque for the $500 fee for this alteration review.

Under EAL No. 2847, the Stephenfield water treatment plant (WTP) currently operates using a cold lime softening water treatment process, with process waste (except filter backwash wastewater) and the weeping tile of the reservoir discharging into a two-cell sludge pond facility southeast of the WTP. The subnantant waste from the ponds infiltrates through the pond bottom and is collected by a weeping tile system conveying the liquid waste to the Boyne River downstream of the dam.

The proposed process change will replace the existing cold lime softening treatment process with microfiltration and nanofiltration membranes. These membranes will increase the plant's treated water production capacity from 20 L/s to 40 L/s; greatly improving the finished water quality; while also removing the sludge wastewater component when compared to the current cold lime softening system.

Each cell in the two-cell sludge pond facility consists of an estimated sludge volume capacity of 638 m^3 (0.3 m depth) and a storage volume capacity of 3,414 m^3 (1.5 m depth).

The proposed dual membrane system will consist of Asahi Kasei microsa hollow fiber microfiltration elements, followed by a hybrid spiral wound membrane nanofiltration platform consisting of both Dow FilmTec NF-90 and NF270 elements. All water treated by the microfiltration membranes will be treated by the nanofiltration

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, MB R3T 6B8

Phone: 204-477-6650
Fax: 204-474-2864
www.wspgroup.ca

membranes producing potable water meeting both Manitoba's Drinking Water Safety Act and Guidelines for Canadian Drinking Water Quality.

The proposed membrane system will produce two kinds of wastewater: wastewater which contains cleaning chemicals requiring neutralization; and membrane rejection wastewater containing only the reject constituents of the raw water source. The frequency and estimated volumes are tabulated below.

Wastewater Destination	Process	Type	Frequency	Cleaning and Rinse Volume per Event (both trains, m^3)	Total Yearly Volume (m^3)
Return to lake	MF – EFM	Non-chemical	Alternate day	0.19	34.7
	MF – CIP	Non-chemical	Monthly	0.37	4.4
	MF/NF Reject Water	Non-chemical	Fluctuates based on water consumption demand. Maximum demand assumes 20 hours per day at 17.6 L/s and 2C.	2,534	924,910
To sludge ponds	MF – EFM	Chemical	Alternate day	12.9	2,354.3
	MF– CIP	Chemical	Monthly	25.7	308.4
	NF – CIP	Chemical	Monthly	109.8	1,317.6

* Microfiltration (MF), nanofiltration (NF)
* Enhanced flux maintenance (EFM), clean in place (CIP)

The discharge of membrane reject water, which contains no process chemicals, is of no worse quality than the current granular filter backwash wastewater which is discharged via a long outfall pipe into the lake, south of the intake. Based upon the above conservative operational forecasts, the estimated volume of non-chemical wastewater returned to the lake from the membrane process will be 924,910 m^3 per year. It is proposed that the current filter backwash outfall line will return this wastewater into the lake.

Membrane cleaning wastewaters, including EFM and CIP wastewaters, may contain various redox species (from the use of sodium hypochlorite), pH adjustment solutions (sodium hydroxide, citric acid, etc.), antiscalants, in addition to the particulate matter and foulants removed from cleaning. Wastewater containing these cleaning compounds will range from a low and to a high pH pending on cleaning routine, membrane operation and extent of fouling. This waste will be collected in a sludge pit and then conveyed to the existing sludge pond facility. If neutralization is needed, a result of the low and high pH cleaning solutions, pH control can take place within the sludge pit prior to discharging to the pond facility.

Using the above conservative operational forecasts, the estimated yearly wastewater volume produced would be 3,980 m^3 per year. This volume does not exceed the total estimated storage capacity of the two pond facility.

Under the condition that all chemical based wastewaters will be directed to the pond cells and that the plant is maximizing its cleaning routine, each individual cell could provide a storage capacity of approximately 10 to 11 months (without infiltration) for the micro- and nano-filtration EFM and CIP wastewaters. With the two cells operating together, the residence time of the neutralization wastewaters is doubled further extending residence time.

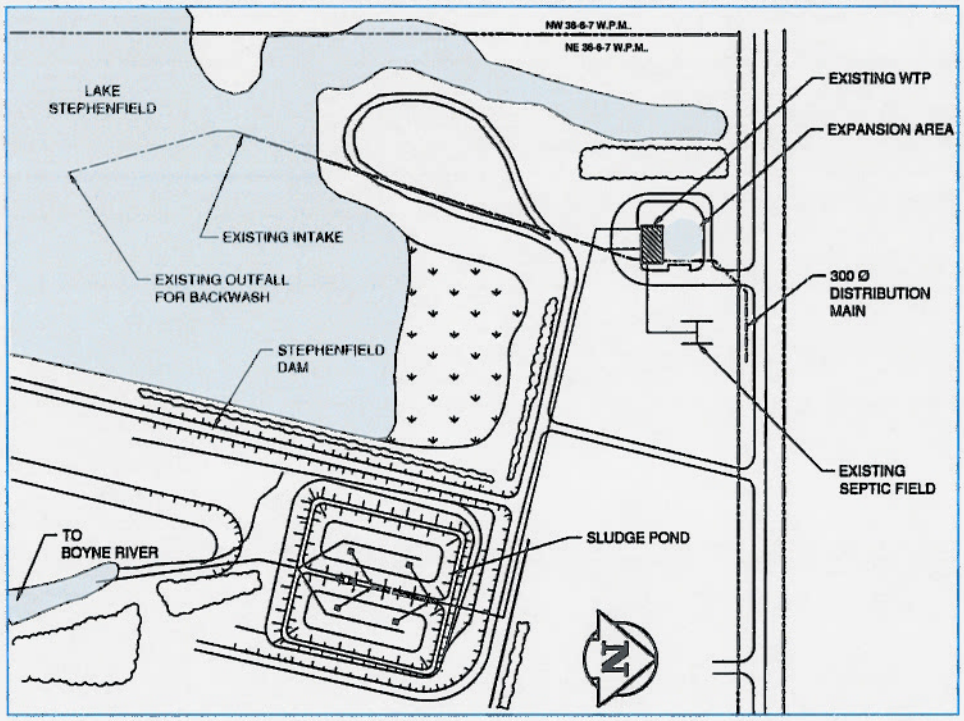

Figure 1: General Site Plan

A site plan drawing highlighting additional detail has been enclosed. If there are any questions regarding this submission, please contact the undersigned.

Yours truly,

Justin Rak-Banville, M.Sc., P. Chem., C. Chem., EP
Water Specialist

Encl. Cheque.