Westend Regional Sewage Services Commission (WRSSC)

www.westendregionalsewageservicescommission.ca

BACKGROUND

WRSSC was established by regulation of the Government of Alberta in 1994. It is owned entirely by the Towns of Black Diamond and Turner Valley and is funded by both Towns according to their proportion of annual sewage flow.

FACILITIES

The facilities consist of an electrical building and lift station in Turner Valley, a trunk main from Turner Valley to the transfer lift station in Black Diamond where there are two over-flow ponds and a polishing pond, a complete mix cell, two partial mix cells and a blower building which provides aeration to the three cells. WRSSC also owns the bridge and all of the walking path east of the dog park in Black Diamond.

LICENSE TO OPERATE AND EFFLUENT REQUIREMENTS

Alberta Environment and Parks approved renewal of the WRSSC Licence to Operate in October of 2016 for a period of 10 years.

Under the Licence to Operate, WRSSC is required to meet the effluent limit of CBOD ≤ 25 mg/L and to monitor once per week the influent and effluent levels of TSS, total coliforms and faecal coliforms and to monitor once per month the influent and effluent levels of ammonia-nitrogen and phosphorous.

When the current License to Operate expires in 2026, WRSSC will be required to meet more stringent effluent requirements. The table below provides a summary of the current system performance in comparison with the future limits.

SYSTEM PERFORMANCE

Parameters	Current System Limits	Upgraded System Limits	Current System Average Performance
CBOD	≤ 25 mg/L	≤ 20 mg/L	2 to 18 mg/L
TSS	n/a	≤ 15 mg/L	2 to 20 mg/L
Ammonia-Nitrogen	n/a	≤ 6.4 mg/L (Winter), 5 mg/L (Summer)	13 to 35 mg/L
Total Nitrogen	n/a	≤ 15 mg/L	n/a
Total Phosphorus	n/a	≤ 0.5 mg/L	3 to 5 mg/L
Total Coliforms	n/a	≤ 1,000 UFC / 100 mL	13 to 2,500 UFC / 100 mL
Faecal Coliforms	n/a	≤ 200 UFC / 100 mL	15 to 700 UFC / 100 mL

As shown above, the current lagoon system performance cannot meet the future limits; therefore, the WRSSC facilities must be upgraded prior to the 2026 expiry date of the Licence to Operate.

FACILITY UPGRADES

The upgrades required to achieve the new effluent limits to improve CBOD, TSS, ammonia-nitrogen, total phosphorus and coliforms removal are proposed to take place in two stages.

Stage 1A

- **Upgrades to Transfer Lift Station**.
- **Addition of interconnecting piping** to allow operating the existing Partial Mix Cell in series.
- **Aeration System Upgrades** – Replace the existing coarse bubble diffusers in the Complete Mix cell and the two Partial Mix Cells with fine bubble diffusers. The new diffusers will allow for a more efficient transfer of oxygen; this will allow for better CBOD removal.
- **SAGR System** – Installation of a Submerged Attached Growth Reactor (SAGR) system (2 of 3 cells) downstream of the Partial Mix Cells for removal of Total Ammonia. The SAGR may also be able to provide additional CBOD and TSS polishing as well as disinfection.
- **Alum Injection** – Installation of chemical injection system for the removal of Total Phosphorus from the system through precipitation in Cell 4 (polishing cell).
- **Disc Filter** – Phosphorus removal is anticipated to be achieved through Alum injection which will generate additional particles. Should additional removal be required to avoid carry over in the effluent, a disc filter would be installed. The disc filter would also aid in the removal of algae should it form in the summer months.

• **River Diffuser** – Installation of a multi-port diffuser in the Sheep River to allow for more efficient mixing of the effluent as it enters the river.

Stage 1B

• **UV System** – It is anticipated that the future system will be able to handle coliforms through the proposed Stage 1A processes. After two years of operation of the Stage 1A processes, it is recommended that an assessment be completed to determine if the approval requirements are being met or if additional disinfection is required. Should the coliform requirements not be met in the Stage 1A upgrades, a UV system would be installed.

Stage 2

• **Partial Mix Cell** – Construction of a third Partial Mix Cell with fine bubble aeration to allow for additional CBOD and TSS removal time.

• **SAGR System** – Installation of a third SAGR Cell for additional Total Ammonia removal for future flows.

COST ESTIMATE

	Description	Stage 1A	Stage 1B	Stage 2
1.0	General Requirements	$951,000	$25,000	$376.000
2.0	Transfer Lift Station Upgrade	$514,000		
3.0	Upgrade to Existing Cells (Cells 1A, 1B, 2, 3A, 3B)	$330,000		
4.0	New Partial Mix Cell (Cell 3C)	$40,000		$1,043,000
5.0	New SAGR System (Cell 3D-1, 3D2, 3D-3)	$2,258,000		$1,126,000
6.0	Aeration System (All Cells & SAGR System)	$2,111,000		$753,000
7.0	Chemical Storage Building (Alum)	$698,000		
8.0	Fine Screening and UV Disinfection Building	$1,199,000	$223,000	
9.0	Outlet to Sheep River	$788,000		
Subtotal		**$8,889,000**	**$248,000**	**$3,298,000**
	Contingency (20%)	$1,778,000	$50,000	$660,000
	Engineering (15%)	$1,600,000	$45,000	$594,000
	Third Party Testing (3% - civil work)	$100,000		$78,000
Total (Rounded)		**$12,370,000**	**$340,000**	**$4,630,000**
Grand Total (2017$)		**$17,340,000**		

WRSSC anticipates there will be rate increases in the future once the upgrades have been completed and the full costs of construction and finance are known.

RESOURCES TO HELP YOU HELP US WITH SUSTAINABILITY

Everything you pour down the sink or flush down the toilet effects the strength of sewage WRSSC treats to produce clean water that can then be discharged to the Sheep River. Go to the WRSSC website for access to some links that provide more information about sewage treatment processes and what actions you can take to help sustain efficiency of our sewage treatment facilities. www.westendregionalsewageservicescommission.ca