

Long List Option No.1 – Wastewater Treatment (Meet Regulatory Discharge Standards)

Option 1 would meet federal and provincial regulatory requirements for secondary treatment with discharge to open marine waters (the treatment plant outfall extends 2,825 m from shore at Cape Lazo into the Strait of Georgia and the discharge diffuser is 60 m below water at low tide). As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements needed to protect the environment according to provincial regulations. If no additional requirements are identified, the B.C. Municipal Wastewater Regulation (MWR) and the Canada Wastewater Systems Effluent Regulations (WSER) would apply to Option 1. These include:

Municipal Wastewater Requirements

Secondary treatment for up to two times average dry weather flow (2xADWF):

- 5-day Biochemical Oxygen Demand (BOD5): max. day 45 mg/L
- Total suspended solids (TSS): max. day 45 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)

Primary treatment for flows in excess of 2xADWF (interim):

- 5-day Biochemical Oxygen Demand (BOD5): max. day 130 mg/L
- Total suspended solids (TSS): max. day 130 mg/L
- Note: If flows are > 2xADWF during storm or snowmelt event with a less than 5-year return period, a discharger must have a liquid waste management plan or specific study and implement the plan's or study's measures.

WSER

- 5-day Biochemical Oxygen Demand (BOD5): monthly avg. not to exceed 25 mg/L
- Total suspended solids (TSS): monthly avg. not to exceed 25 mg/L
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15°C
- Note: The WSER standards apply to the combined discharge – this may require chemical addition to enhance primary treatment or other measures to ensure that the secondary treatment bypass does not cause the combined effluent to exceed the WSER discharge standards for BOD5 and TSS

An EIS was completed for the treatment plant discharge in 2010; this showed that disinfection of the effluent to achieve a fecal coliform count of less than 8000/100 mL in the discharge would be required to protect local shellfish resources outside the initial dilution zone (IDZ). Disinfection to this standard was assumed for Option 1.

Note: Plant data from 2013 to 2017 show that the number of days when flows exceeded 2xADWF ranged from 0 days (2013) to 31 days (2015) – over the 5 years of record, flow exceeded 2xADWF on a total of 58 days (the total volume of flow greater than 2xADWF represented only about 1% of the total plant flow over that period)

Visit: www.comoxvalleyrd.ca/lwmp

Email: engineering@comoxvalleyrd.ca

Phone: 250-334-6000



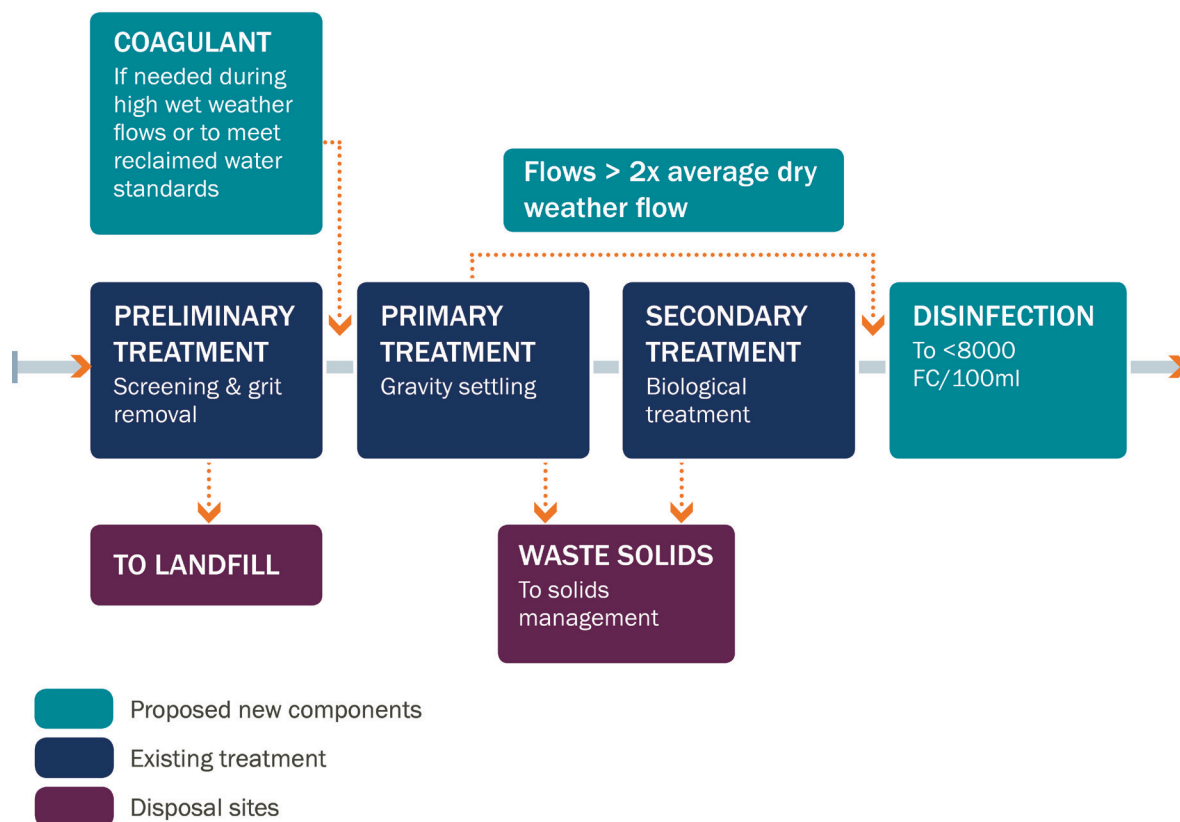
comoxvalleyrd.ca   

Advantages

- Meets regulatory requirements for discharge to open marine waters
- Avoids the cost of subjecting relatively infrequent high wet weather flows to secondary treatment
- Coagulating (thickening) chemicals can be added to enhance primary treatment if needed when flows exceed average dry weather flows
- Includes disinfection to protect shellfish resources outside the initial dilution zone

Disadvantages

- Flows in excess of average dry weather flows would bypass secondary treatment and so would not receive biological treatment



Visit: www.comoxvalleyrd.ca/lwmp

Email: engineeringservices@comoxvalleyrd.ca

Phone: 250-334-6000

 **Comox Valley**
REGIONAL DISTRICT

comoxvalleyrd.ca   

Long List Option No.2 – Wastewater Treatment (Provide Secondary Treatment for all Flows)

Option 2 is similar to Option 1, except that there would be no wet weather bypass of secondary treatment for increased flows. For Option 2, the entire plant influent flow would pass through secondary treatment (this is the current configuration of the treatment plant). As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements that might be needed to address protection of the receiving environment. For Option 2, it was assumed that the disinfection process would be designed to achieve recreational standards in the undiluted effluent. The following treatment and discharge standards would apply to Option 2:

Secondary treatment for the entire plant flow:

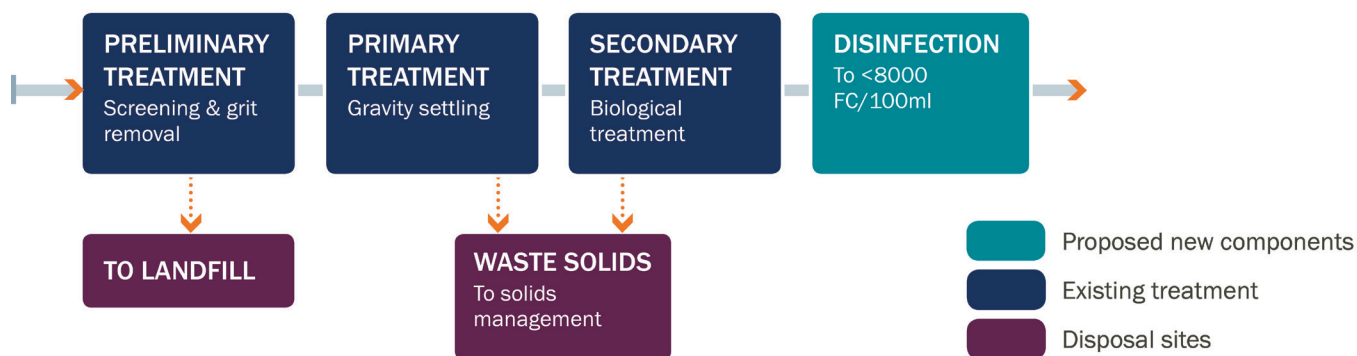
- 5-day Biochemical Oxygen Demand (BOD₅): max. day 45 mg/L, monthly avg. not to exceed 25 mg/L
- Total suspended solids (TSS): max. day 45 mg/L, monthly avg. not to exceed 25 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15°C
- Disinfection - fecal coliforms not to exceed 200 FC/100 mL

Advantages

- Exceeds regulatory requirements for discharge to open marine waters
- Entire plant flow is subjected to secondary (biological) treatment
- Includes enhanced disinfection to protect shellfish resources
- Effluent meets standards for reclaimed water use for lower likelihood for direct human contact

Disadvantages

- Secondary treatment must be sized to accommodate all wet weather flows, increasing capital and operating costs compared to Option 1



Visit: www.comoxvalleyrd.ca/lwmp

Email: engineeringservices@comoxvalleyrd.ca

Phone: 250-334-6000

 **Comox Valley**
REGIONAL DISTRICT

comoxvalleyrd.ca   

Long List Option No.3 – Wastewater Treatment (Advanced Treatment for Increased Flows)

Option 3 would incorporate the same preliminary, primary and secondary treatment processes as Option 2. In addition, Option 3 would include advanced (tertiary) filtration of the secondary treated effluent for increased flows during wet weather events to enhance removal of suspended solids. As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements that might be needed to address protection of the receiving environment. For Option 3, the disinfection process would be designed to achieve a higher standard than Option 2 but would still only be treated to a standard of 'lower likelihood for direct human contact'. The following treatment and discharge standards would apply to Option 3:

Advanced treatment (tertiary filtration) for flows up to 2xADWF:

- 5-day Biochemical Oxygen Demand (BOD5): max. day 10 mg/L, avg. 5 mg/L
- Total suspended solids (TSS): max. day 10 mg/L, avg. 5 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15°C
- Future addition of processes that are proven for removal of emerging contaminants at municipal wastewater plants

Primary treatment for flows in excess of 2xADWF (interim):

- 5-day Biochemical Oxygen Demand (BOD5): max. day 130 mg/L
- Total suspended solids (TSS): max. day 130 mg/L
- Note: If flows are > 2xADWF during a storm or equivalent snowmelt event with a less than 5-year return period, a discharger must (have a liquid waste management plan or specific study and implement the plan's or study's measures.
- Disinfection of combined effluent - fecal coliforms not to exceed 200 FC/100 mL

Note: Plant data from 2013 to 2017 show that the number of days when flows exceeded 2xADWF ranged from 0 days (2013) to 31 days (2015) – over the 5 years of record, flow exceeded 2xADWF on a total of 58 days (the total volume of flow greater than 2xADWF represented only about 1% of the total plant flow over that period).

SEE OVER FOR FURTHER DETAILS

Visit: www.comoxvalleyrd.ca/lwmp

Email: engineering@comoxvalleyrd.ca

Phone: 250-334-6000



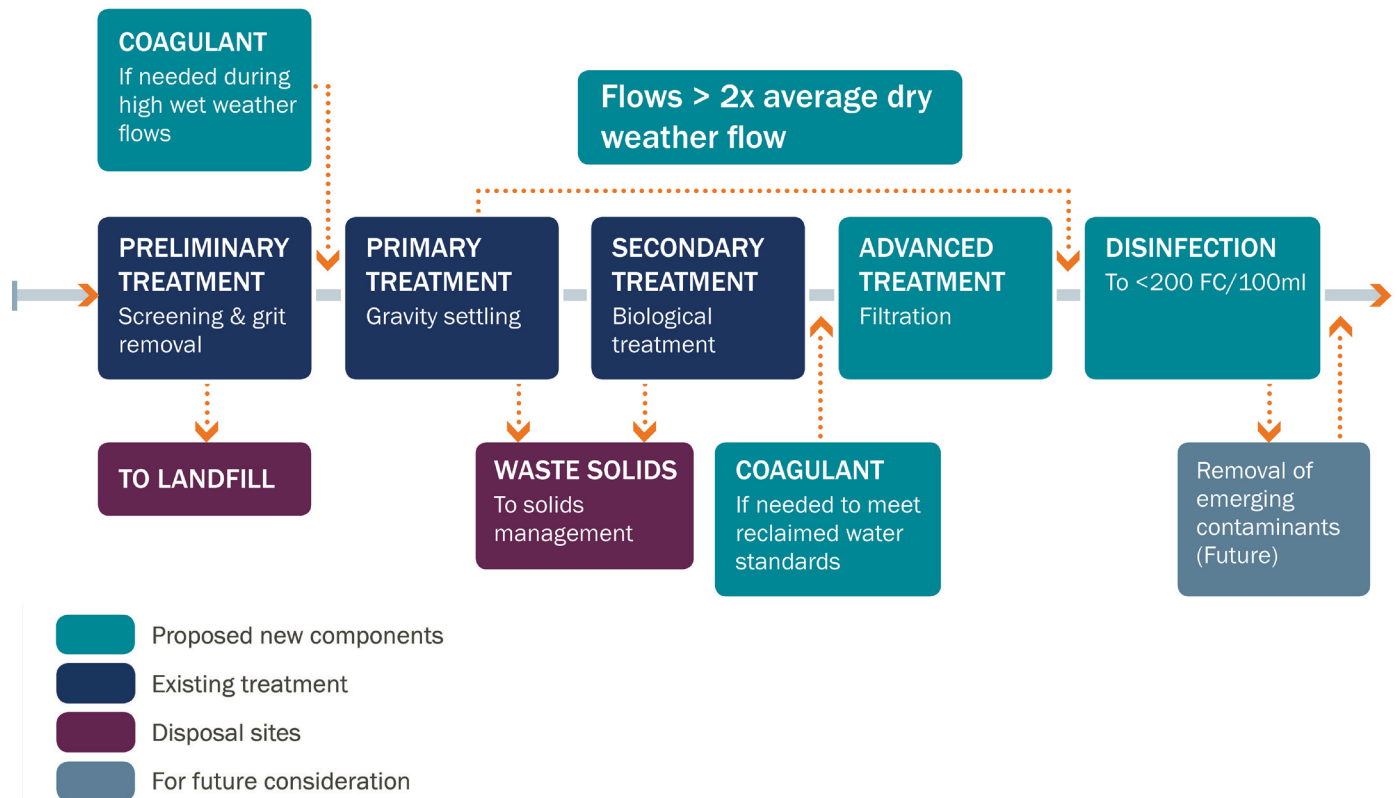
comoxvalleyrd.ca   

Advantages

- Exceeds regulatory requirements for discharge to open marine waters
- Majority of plant flow is subjected to advanced (tertiary) treatment
- Includes enhanced disinfection to protect shellfish resources
- Combined effluent meets standards for reclaimed water use for lower likelihood for direct human contact
- Ability to increase coagulation (thickening) and disinfection to meet standards for moderate or greater likelihood for direct human contact

Disadvantages

- Higher capital and operating costs than Options 1 and 2
- Flows > twice the average dry weather flow do not pass through advanced treatment
- Higher operational costs if treating reclaimed water to greater likelihood for direct human contact



Visit: www.comoxvalleyrd.ca/lwmp

Email: engineeringservices@comoxvalleyrd.ca

Phone: 250-334-6000

Comox Valley
REGIONAL DISTRICT

comoxvalleyrd.ca   

Long List Option No.4 – Wastewater Treatment (Provide Secondary Treatment for all Flows)

Option 4 would incorporate the same preliminary, primary, secondary, and advanced (tertiary) treatment processes as Option 3. However, for Option 4, the entire plant influent flow would pass through advanced (tertiary) filtration to enhance removal of suspended solids. As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements that might be needed to address protection of the receiving environment. For Option 4, the disinfection process would be designed to achieve shellfish standards in the undiluted effluent, and disinfection could be increased to meet the reclaimed water standards for greater direct human contact if desired. This is the highest standard proposed. The following treatment and discharge standards would apply to Option 4:

Advanced (tertiary) treatment for the entire plant flow:

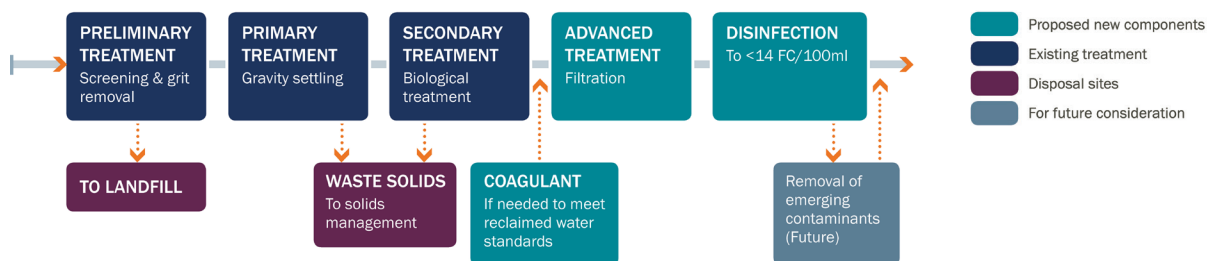
- 5-day Biochemical Oxygen Demand (BOD₅): max. day 10 mg/L, avg. 5 mg/L
- Total suspended solids (TSS): max. day 10 mg/L, avg. 5 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15°C
- Disinfection - fecal coliforms not to exceed 14 FC/100 mL
- Future addition of processes that are proven for removal of emerging contaminants at municipal wastewater plants

Advantages

- Exceeds regulatory requirements for discharge to open marine waters
- Entire plant flow is subjected to advanced (tertiary) treatment
- Includes enhanced disinfection to protect shellfish resources
- Effluent meets standards for reclaimed water use for greater likelihood for direct human contact

Disadvantages

- Higher capital and operating costs than Options 1, 2 and 3
- Higher operational costs if treating reclaimed water to greater likelihood for direct human contact



Visit: www.comoxvalleyrd.ca/lwmp

Email: engineering@comoxvalleyrd.ca

Phone: 250-334-6000

 **Comox Valley**
REGIONAL DISTRICT

comoxvalleyrd.ca   