Environmental Appeal Board

Citation: *Consolidated Envirowaste Industries Inc. (The Answer Garden) v. Director, Environmental Management Act*, 2025 BCEAB 8

Decision No.: EAB-EMA-22-A018(a)

Decision Date: 2025-03-05

Method of Hearing: Conducted by way of hybrid written submissions and oral hearing concluding on July 26, 2024

Decision Type: Final Decision

Panel: Linda Michaluk, Panel Chair
Gary Lin, Panel Member
Cynthia Lu, Panel Member

Appealed Under: *Environmental Management Act*, S.B.C. 2003, c. 53

Between:

Consolidated Envirowaste Industries Inc. (The Answer Garden)

Appellant

And:

Director, *Environmental Management Act*

Respondent

Appearing on Behalf of the Parties:

For the Appellant: Michael Manhas, Counsel
Emma Russell, Counsel

For the Respondent: Micah Weintraub, Counsel
Megan Parisotto, Counsel

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FINAL DECISION

INTRODUCTION

[1] Consolidated Envirowaste Industries Inc. (also known as The Answer Garden) ("TAG" or the "Appellant") holds Waste Discharge Permit No. 12398 (the "Permit") issued under section 14 of the *Environmental Management Act,* SBC 2003, c. 53, (the "*Act*"). The Permit authorizes TAG to discharge effluent from its composting facility located in Abbotsford, BC. This appeal concerns a Permit amendment (the "Amendment") made on August 24, 2022, by the Director's Delegate (the "Delegate"), of the Ministry of Environment and Parks (the "Ministry") pursuant to section 16(1)(a) of the *Act.* The Director is the Respondent in this case.

[2] The Environmental Appeal Board (the "Board") is given the authority to hear this appeal under Section 100 of the *Act.* Section 102(2) of the *Act* allows the Board to conduct appeals by way of a new hearing, as is this case in this appeal.

[3] Section 103 of the *Act* specifies the powers of the Board in deciding an appeal:

> On an appeal under this Division, the appeal board may
>
> (a) send the matter back to the person who made the decision, with directions,
>
> (b) confirm, reverse or vary the decision being appealed, or
>
> (c) make any decision that the person whose decision is appealed could have made, and that the appeal board considers appropriate in the circumstances.

[4] The Appellant asks the Board to reverse the Amendment, or as an alternative to vary the Amendment. The Respondent requests that the Board confirm the Amendment and dismiss the appeal.

[5] The hearing was conducted by a hybrid written and oral process before a Panel of three members of the Board (the "Panel").

BACKGROUND

[6] TAG operates a composting facility at 27715 Huntingdon Road in Abbotsford, BC. TAG's operations occur on Agricultural Land Reserve lands subject to the provisions of the *Agricultural Land Commission Act* SBC 2002, c. 36. The Agricultural Land Commission (the "ALC") approved TAG's operations in a letter dated July 30, 1992, which stated that "a condition of this approval is that agricultural waste continue to comprise at least 50% of the raw material for the operation." The ALC's conditional approval is still in effect.

[7] TAG's operations use the windrow composting method where organic matter, or feedstock, is piled into rows where it passively heats and composts. TAG turns the piles at

regular frequencies as required for the composting process and by the *Organic Matter Recycling Regulation,* B.C. Reg. 18/2002.

[8] TAG's effluent consists of leachate and stormwater. Leachate is generated during the composting process and flows from the composting pad to an aeration lagoon, then to treatment wetlands. The treatment wetlands discharge into an unlined mixing basin, which also receives groundwater and stormwater inputs. The effluent from the mixing basin is ultimately discharged from TAG's property at the permitted discharge point ("SW6"). Prior to discharge, the stormwater is collected onsite by an unlined ditch and stormwater pipes which flow into a detention pond. From the pond, water is directed towards the mixing basin. Discharge from SW6 directly enters an unnamed tributary of Pepin Creek (the "Unnamed Tributary").

[9] The Unnamed Tributary flows under Huntingdon Road and joins Pepin Creek as it flows through Aldergrove Regional Park. Upstream of the park, Pepin Creek flows through a residential development and mixed-use agricultural land. Downstream, Pepin Creek flows through Aldergrove Regional Park to the Canada/USA border where it becomes known as "Double Ditch" in Washington State. Double Ditch is a tributary to the Nooksack River which ultimately flows into the ocean at Portage Bay, WA. Portage Bay is a designated shellfish harvesting area.

[10] This appeal concerns the Amendment, which requires TAG to achieve *Escherichia coli ("E. coli")* concentration limits in their discharge, and to sample for *E. coli* following significant rainfall events. *E. coli* are a sub-group of fecal coliform bacteria found naturally in humans and warm-blooded animals. There are many strains of *E. coli*; some strains are harmless while other strains may cause illness in humans and animals. *E.coli* concentrations are commonly reported as colony forming units ("CFU") or most probable number ("MPN") per unit of measure, often 100mL. CFU/100mL and MPN/100mL values are produced by different sampling and analysis methods, membrane filtration and multiple tube fermentation, respectively.

TAG's Permit and Compliance History

[11] TAG's Permit was first issued on August 2, 1994. The Permit was amended on September 25, 2002; May 28, 2020; August 18, 2020; and most recently on August 24, 2022 (the Amendment). The Permit authorizes TAG to discharge effluent meeting certain characteristics into the Unnamed Tributary. Effluent characteristics are measured at SW6, the point of compliance for the Permit. The Permit authorizes leachate to be discharged to the treatment wetland and then to the mixing basin, where it is mixed with groundwater and uncontaminated stormwater. TAG's leachate is diluted in the mixing basin by those inputs before being discharged at SW6.

[12] On June 22, 2018, the Ministry issued TAG Pollution Abatement Order 109499 (the "Pollution Abatement Order") due to impact to the environment from high concentrations

of fecal coliform and *E. coli* in TAG's discharge. The Pollution Abatement Order required TAG to submit an action plan detailing measures to reduce *E. coli* concentrations in their discharge to 400 CFU/100mL or less, complete monthly *E. coli* and fecal coliform sampling, and conduct *E. coli* single sampling immediately following any rainfall event exceeding 25mm in 24 hours (a Significant Rainfall Event or "SRE").

[13] On May 28, 2020, the Ministry amended the Permit and added requirements for TAG to conduct a Best Available Technology Assessment ("BAT") to determine the most effective options to mitigate potential impacts to the receiving environment; conduct and report on quarterly sampling for *E. coli*; and conduct receiving environment *E. coli* sampling at a location within Aldergrove Regional Park. The BAT was completed and submitted to the Ministry on January 29, 2021. TAG has partially adopted some measures recommended in the BAT.

[14] Since the Pollution Abatement Order was issued, TAG's corrective actions have included, but are not limited to: suspending receipt of commercial volumes of animal manure and bedding, installing new aerators in the aeration lagoon, and the purchase and use of new tarps to cover composting piles. On June 4, 2020, the Ministry cancelled the Pollution Abatement Order following the fulfillment of TAG's corrective action plan.

[15] Between October 2021 to May 2022, the Ministry and TAG corresponded on four drafts of the Permit amendment. The Amendment was issued August 24, 2022, and the Appellant appealed the Amendment on September 19, 2022.

[16] While TAG's corrective measures continue to be in place, the efforts have not reduced *E. coli* concentrations to levels that would reliably comply with the Amendment. The Amendment under appeal imposes new discharge limits for *E. coli* measured by quarterly sampling. The geometric mean concentration must be 200 CFU/100mL or less and immediate sampling concentration must be 400 CFU/100mL or less. The Amendment requires TAG to conduct immediate *E. coli* sampling within 24 hours of a SRE, at least 3 times per quarter.

Expert Opinions and Hearing Procedures

[17] The Panel received evidence by written submissions and in a four-day oral hearing. The parties' experts were cross-examined during the oral hearing. Additional lay witnesses were also called by the parties. The Director's Delegate appeared for cross-examination before the Panel during the oral hearing.

[18] The Appellant submitted the expert opinion report and expert opinion reply of Dr. Troy Vassos, PhD, FEC, P.Eng. (the "Vassos Opinion"). Dr. Vassos is qualified as an expert in the design and implementation of water and wastewater treatment systems, and the assessment and characterization of water, wastewater, effluent and receiving environments.

[19] The Respondent submitted the expert opinion reports and expert replies of Ms. Rosie Barlak, MSc., RPBio (the "Barlak Opinion") and Mr. Todd Adamsson, MSc., P.Eng. (the "Adamsson Opinion"). Ms. Barlak is qualified as an environmental impact assessment biologist specializing in water quality. Mr. Adamsson is qualified as an expert in designing, building, and assessing water management and treatment systems.

ISSUES

[20] The Panel identifies the following issues to be addressed in this appeal:

1. What is the threshold for the director in issuing a permit amendment on their own initiative under section 16(1)(a) of the *Act?*
2. Are *E. coli* concentration limits an appropriate permit requirement for the protection of the environment?
3. What is the risk, if any, associated with the *E. coli in* TAG's discharge to the environment?
4. If *E. coli* concentration limits are an appropriate permit requirement for protection of environment, what should the limits be for TAG's facility?
5. Is the SRE sampling requirement an appropriate compliance standard?
6. Should TAG be required to conduct additional on-site monitoring?

DISCUSSION AND ANALYSIS

What is the threshold for the director in issuing a permit amendment on their own initiative under section 16(1)(a) of the *Act?*

[21] Section 6 of the *Act* prohibits the introduction of waste to the environment without a valid permit. Section 14 of the *Act* gives the director (or their delegate) authority to issue permits authorizing the discharge of waste, subject to requirements for the protection of the environment.

> **Permits**
>
> **14** (1) A director may issue a permit authorizing the introduction of waste into the environment subject to requirements for the protection of the environment that the **director considers advisable** and, without limiting that power, may do one or more of the following in the permit:
>
> [...] (emphasis added).

[22] Section 16 of the *Act* gives the director (or their delegate) authority to initiate permit amendments:

Amendment of permits and approvals

> **16** (1) A director may, subject to section 14 (3) [permits], this section and the regulations, for the protection of the environment,
>
> (a) on the director's own initiative if the **director considers it necessary**, or
>
> (b) on application by a holder of a permit or an approval,
>
> amend the requirements of the permit or approval. (emphasis added).

[23] The Amendment was issued by the Delegate under the authority given in Section16(1)(a) of the *Act.*

Appellant's Submissions

[24] Section 16(1)(a) of the *Act* enables a director (or their delegate) to amend a permit on their own initiative if they consider it "necessary." The Appellant makes submissions on how the word "necessary" ought to be interpreted in this case. The Appellant submits guidance from the courts that the meaning of "necessary" is varied and contextual, including *T.L. v. British Columbia (Attorney General)*, 2023 BCCA 167 (CanLII) ("*T.L. v. British Columbia")*. The Appellant submits in this case, "necessary" should take on a meaning consistent with more than "useful" and along the lines of "indispensable" or "essential."

[25] The Appellant submits that the different language used between sections in the *Act* must be read as intentional and purposive. The Appellant submits it is critical for regulatory certainty that permit amendments are only made where necessary to protect the environment. The Appellant argues that the use of "advisable" in Section 14 of the *Act,* compared to the use of the word "necessary" in Section 16 means that director-initiated amendments under Section 16 have a higher threshold of justification than when issuing a permit under Section 14. The Appellant argues the differing language between these two sections means when the director initiates the permit amendment, the director bears the onus to prove that the amendment is necessary for the protection of the environment.

[26] The Appellant submits that where potential harm is speculative, if the director requires information that is not available, it would be appropriate to require additional monitoring. The results of additional monitoring would inform what, if any, further protection measures are required. The Appellant says the Respondent has prematurely amended the Permit in this case.

Respondent's Submissions

[27] The Respondent argues the Appellant places undue emphasis on the terms "advisable" and "necessary." The Respondent refers the Panel to *Laurie Mutschke v. Assistant Regional Waste Manager*, 2002 BCEAB 23 (CanLII) ("*Houston*") where the Board determined the test in amending a permit:

> is whether the amendment is for the protection of the environment, which, in the context of this statute, can include minimizing environmental impact. It is not, however, in the Panel's view, restricted to what is necessary for environmental protection. The Panel finds that to adopt a narrow interpretation is inconsistent with several provisions of the Act, (…)

[28] The Respondent submits that if the Panel finds an interpretation of the word "necessary" is required, it should be considered in the "broad, remedial legislative purpose of BC's environmental protection legislation," supporting a broad interpretation of the word "necessary" to be "something reasonably useful and proper" or "of greater or lesser benefit or convenience" as in *T.L. v. British Columbia*.

Panel's Findings

[29] The modern principle of statutory interpretation, as described in *Rizzo & Rizzo Shoes Ltd. (Re)*, 1998 CanLII 837 (SCC), [1998] 1 SCR 27 at paragraphs 20-24, is to interpret the language of a provision in light of the purpose, intent, and context of the legislation. In this appeal, the word "necessary" ought to be interpreted in the purpose, intent, and context of the *Act*.

[30] The Panel is further guided by section 8 of the *Interpretation Act* R.S.B.C. 1996, c. 238, where "every enactment must be construed as being remedial, and must be given such fair, large and liberal construction and interpretation as best ensures the attainment of its objects."

[31] In *Cobble Hill Holdings Ltd. v. Ronald Witherspoon,* 2014 BCEAB 1 (CanLII) ("*Cobble Hill")* paragraphs 87 to 92, the Board discusses examples of how the Board and Courts have considered the objects and purposes of the *Act.* In *Cobble Hill* at paragraph 91, the Board cites paragraph 54 of *Lynda Gagne v. Director, Environmental Management Act*, 2013 BCEAB 25 (CanLII) ("*Gagne*"):

> [54] Turning to the objects of the Act, the Panel finds that many sections of the Act provide mechanisms for the protection of the environment, including the sections that prohibit unauthorized waste discharges, address the remediation of contaminated sites, address pollution prevention and abatement, and create penalties for contraventions of the Act. Thus, the Panel finds that environmental protection is one of the objects of the Act.

[32] In *Cobble Hill* and *Gagne,* the Board concludes protection of the environment and preventing pollution of the environment are underlying objectives of the *Act*.

[33] The Appellant refers the Panel to *T.L. v. British Columbia*, which is a case related to child protection and the *Child, Family, and Community Service Act,* R.S.B.C 1996, c. 46. Ultimately, the court found in *T.L. v. British Columbia* that a restrictive interpretation of "necessary" was not appropriate once the word was considered in the context and purpose of that legislation. The Panel notes, however, that the legislation under

examination in *T.L. v. British Columbia* was not related to environmental protection, and since the interpretation of "necessary" is dependent on the statutory context and purpose, the Panel does not find this case helpful.

[34] Section 16(1)(a) of the *Act* provides that the director may, for the protection of the environment, if the director considers it necessary, amend the requirements of a permit. The Panel finds that the word "necessary" in this provision applies **to what the director considers necessary** to protect the environment and therefore empowers the director to apply discretion in this regard.

[35] When a new permit is approved under Section 14 of the *Act*, it is done with limited practical site-specific understanding of what may happen given the specific context of the permit. Therefore, permit requirements are set based on what the director considers "advisable," as they are future oriented with the goal of achieving the desired outcomes. After a permit is in place and the permit holder has been operating for some time, the director has more information on the actual operation and can, if the director considers it necessary, amend the permit to achieve the desired outcome, which under the *Act*, is the protection of the environment. Both Sections 14 and 16 of the *Act* give the director authority to exercise discretion in establishing permit requirements for the protection of the environment and there is no significant difference in the threshold the director is to consider in applying discretion in this regard.

[36] This analysis is also consistent with the Board's approach in *David Harris v. Director, Environmental Management Act,* 2010 BCEAB 14 (CanLII) (*"Harris")*, where the Board assessed the issue of "whether the Amended Permit protects the environment as required by the Act." In *Harris,* the Board found that "section 16 of the Act, together with the definition of environment in section 1, establish the criteria for a Director's decision" (para 159).

[37] The Panel does not accept the Appellant's argument to take a narrower consideration of what is meant by "necessary." While this Panel is not bound by previous decisions of the Board, we agree with the analysis presented in *Houston*. The Panel agrees with *Houston,* in that the test is "whether the amendment is for the protection of the environment" and is not restricted by what is "necessary" for the protection of the environment. The Panel finds that the threshold for the director to issue permit amendments on their own initiative under section 16(1)(a) of the *Act* is what the director considers necessary for the broad and remedial purpose of protection of the environment.

Are *E. coli* concentration limits an appropriate permit requirement for the protection of the environment?

Appellant's Submissions

[38] The Appellant relies upon the Vassos Opinion, which says that many health jurisdictions in North America and Europe use *E. coli* levels in water samples to estimate

the degree of health risk. The Vassos Opinion states *E. coli* concentrations, typically lower than total coliform and fecal coliform concentrations, have been found to correlate better with incidents of gastrointestinal illness. The Vassos Opinion states *E. coli* most closely fits the requirements of an ideal indicator of fecal contamination of fresh waters. However, the Vassos Opinion states, unless there is reason to believe *E. coli* contamination contains human pathogens, the observed epidemiological relationship between *E. coli* and disease transmission may not be valid.

[39] The Appellant submits it first became aware of *E. coli* in its discharge when it was issued the Pollution Abatement Order in 2018. The Appellant submits its *E. coli* discharges have decreased since 2018, as demonstrated by monitoring data since 2018.

[40] The Appellant argues that while it has reduced *E. coli* in its effluent since 2018, the data are unclear on whether there has been a material effect on conditions downstream. The Appellant argues that there is insufficient evidence to show that TAG is a material contributor to *E. coli* loading in the Pepin Creek watershed. The Appellant submits its discharge minimally contributes to Pepin Creek let alone the entire Nooksack River. The Appellant argues the available data raise more questions than answers. The Appellant suggests there are other significant *E. coli* inputs in the watershed.

[41] The Appellant argues efforts to address fecal coliform contamination in Washington State have been backsliding in recent years, while TAG has been improving the quality of its discharge. The Appellant submits that TAG's discharge affects a very small proportion of the Nooksack River watershed and there is insufficient evidence to show the extent which TAG's operations may impact shellfish bed openings or closures in Portage Bay, WA. The Appellant argues the Respondent falls short on establishing grounds to justify the need for the Amendment.

Respondent's Submissions

[42] The Respondent submits, by way of the Barlak Opinion, that *E. coli* is a form of fecal coliform bacteria, which is in turn a form of coliform bacteria. *E. coli* is an indicator organism used to identify fecal contamination in fresh water and indicate the possible presence of disease-causing bacteria and viruses. *E. coli* monitoring is a low-cost method to assess risk of illness caused when the contaminated water is ingested by people and animals. The Respondent submits that *E. coli* contamination can be correlated to other environmental impacts including odours, algal or bacterial blooms, and turbidity. For these reasons, controlling *E. coli* has many benefits to the receiving environment. The Barlak Opinion submits that because *E. coli* is less sensitive to environmental conditions and treatment processes than other coliform groups, monitoring *E. coli* is a conservative indicator of fecal contamination.

[43] The Respondent submits that TAG's operation is a known source of fecal coliforms, including *E. coli,* and they have been aware of high concentrations impacting the receiving

environment since December 2017. The Respondent submits that *E. coli* is an appropriate environmental indicator and permit requirement.

Panel's Findings

[44] The parties agree that *E. coli* is widely used as an indicator of fecal contamination in fresh water. The expert evidence filed by both parties supports the finding that *E. coli* is a widely used and cost effective indicator bacteria to assess the potential of fecal contamination in the environment, that *E. coli* concentrations in freshwater are used across many jurisdictions to indicate the possible presence of disease-causing bacteria, and that certain strains of *E. coli* can cause illness and infections in humans and other animals.

[45] Section 16(1)(a) of the *Act* gives the director authority to amend permit requirements for the protection of the environment. The environment, defined under the *Act,* includes water under which humans, animals and plants live or are developed. Waste discharge permits, such as the Amendment under appeal, authorize the discharge of effluent to the environment. Defined under the *Act*:

> **"effluent"** means a substance that is introduced into water or onto land and that
>
> (a) injures or is capable of injuring the health or safety of a person,
>
> (b) injures or is capable of injuring property or any life form,
>
> (c) interferes with or is capable of interfering with visibility,
>
> (d) interferes with or is capable of interfering with the normal conduct of business,
>
> (e) causes or is capable of causing material physical discomfort to a person, or
>
> (f) damages or is capable of damaging the environment.

[46] It follows then, if a substance is introduced to water known to support human, animal or plant life, and the substance has the effects listed in (a) to (f), the director is given authority under the *Act* to establish permit requirements to protect the environment. Effluent discharged from the Appellant's operations contains *E. coli* which is both widely accepted as an indicator of potential harm and may have the potential itself to cause the adverse effects contemplated in the definition of effluent.

[47] The expert evidence from both parties confirm that *E. coli* is widely used as an indicator of fecal contamination in freshwater, and fecal contamination can cause illnesses in humans and animals when the contaminated water is ingested. In this appeal, the parties did not argue that the protection of human health is not or should not be part of the consideration for the protection of the environment. As a result, the Panel finds that *E. coli* concentration limits are an appropriate indicator for the protection of the environment, which includes the protection of human health. Therefore, the Panel finds it appropriate to establish limits for *E. coli* concentrations as a waste discharge permit requirement for the protection of the environment.

What is the risk, if any, associated with the *E. coli* in TAG's discharge to the environment?

Appellant's Submissions

[48] The Appellant submits the discharge from its composting facility poses relatively little risk to the environment because it is not contaminated with human waste. The Appellant submits the *E. coli* standards relied on by the Respondent were developed to specifically address human waste contamination. The Appellant submits that its compost feedstock is comprised of household green waste and municipal organics. TAG does not receive human waste at its facility, and as of January 2022, stopped accepting animal manure and bedding. Therefore, the Appellant argues, its effluent should be considered low risk to the environment. The Appellant argues given this low risk it is not appropriate to amend the permit to include an *E. coli* concentration standard.

[49] The Appellant references the Vassos Opinion, which states animal derived wastes do not have the same risk as human waste. The Appellant submits the Health Canada Guidelines for Recreational Water Quality, Third Edition, 2012 (the "Health Canada 2012 RWQG") which notes that human and ruminant[1] feces pose the highest microbial risk to human health, whereas risks to human health from other animals' feces ranges from 10 to 6,000 times lower. Given recent operational changes, including suspending receipt of animal bedding and waste, the Appellant submits, the only identified *E. coli* sources are incidental from municipal waste and waste from onsite animals such as rodents and birds. The Appellant submits the sources of *E. coli* at its operation are at least an "order of magnitude" lower risk when "at equal concentration to human or ruminant derived waste." Additionally, the Appellant notes that while it previously received animal manure, that material was mostly horse manure and horses are not ruminants.

[50] The Appellant submits that *E. coli's* usefulness as an indicator of the level of pathogenic microbial contamination is tied to its source, whether human or animal. The Vassos Opinion states that *E. coli* concentrations have been found through research to correlate better with gastrointestinal illness and are considered the best indicator bacteria to determine health risk from pathogens associated with feces. The Vassos Opinion states that for *E. coli* detected in water to represent a human health risk, it must be associated with or originate from fecal matter that contains or could contain human pathogens. The Vassos Opinion concludes the presence of *E. coli* in TAG's effluent is due to fecal contamination from either pets or incidental animals and birds in the composting area. According to the Vassos Opinion, since there are no sources of human feces in TAG's feedstock, an increase in *E. coli* numbers would not be associated with increased human health risk.

[1] Cambridge Dictionary defines "ruminant" to mean "a type of animal that brings up food from its stomach and chews it again, for example a cow, sheep, or deer."

[51] The Appellant references the Vassos Opinion, which states *E. coli* criteria used in the Amendment were established as a receiving environment water quality standard to assess the potential risk for human disease transmission in recreational water bodies affected by human feces. The Vassos Opinion also states that the *E. coli* criteria contained in the Amendment was not established for use as effluent discharge criteria and that there is no epidemiological data to support the use of BC Recreational Water Quality Guidelines ("BC RWQG") for secondary recreational water applications.

[52] The Appellant asserts the Respondent has not clearly defined the environmental risks that the Amendment attempts to address. The Appellant submits that the downstream environmental risks are not as defined by the Respondent, and it was inappropriate to rely on the risk associated with primary contact recreation standards from the BC RWQG. The Appellant submits there is no evidence that the downstream areas are used for primary contact recreation to any meaningful extent. The Appellant submits that conditions to apply the BC RWQG are not present in this case and the BC RWQG was inappropriately used to determine the Amendment. Further, the Appellant argues the data are unclear or not available to show the impact on *E. coli* concentrations downstream of its discharge point, as a result of its discharges.

[53] The Appellant acknowledges there are downstream water users on Pepin Creek, including water licence holders. However, The Appellant argues there is not sufficient evidence to suggest the water licence holders have been impaired by *E. coli* levels in Pepin Creek. The Appellant submits that the presence of downstream water licences does not justify the *E. coli* concentration limit in the Amendment.

[54] The Appellant acknowledges the downstream shellfish beds at Portage Bay, WA. The Appellant submits its runoff reflects 0.004% of the water in the Nooksack River, therefore argues it has an extremely limited ability to affect *E. coli* concentrations at the shellfish beds.

[55] The Appellant argues that even without TAG's operations, the watershed is impacted by other *E. coli* inputs. The Appellant acknowledges the potential for cumulative effects of multiple dischargers to Pepin Creek. The Appellant highlights the Respondent's expert Ms. Barlak acknowledged in cross-examination that even if TAG were to cease operations, it is not known what effect that would have on the achievement of downstream *E. coli* concentrations standards. The Appellant submits that cumulative effects should not play a role in regulating a point source, such as TAG, that contributes minimally to environmental risk.

Respondent's Submissions

[56] Regarding the impact of TAG's discharge to the Unnamed Tributary and Pepin Creek downstream, the Respondent submits that historically these areas have contained much higher concentrations of fecal coliforms than in upstream sites, especially during, but not only during, high flow periods.

[57] The Respondent argues *E. coli* from TAG's discharge poses a direct risk to human health. The Respondent argues any limitations on harm, based on the source of the fecal contamination being from human waste or not, suggested by the Vassos Opinion are untrue. The Respondent submits the Barlak Opinion describes how food (and therefore food waste) can become contaminated with *E. coli*. The Barlak Opinion states that *E. coli* contamination in compost feedstock is possible from the food production chain and from prohibited items such as pet waste and animal bedding from household pets. The Respondent relies on the Adamsson Opinion, which states that *E. coli* can survive and grow on organic matter, and some pathogenic strains have been linked to food-borne outbreaks.

[58] The Respondent submits that several downstream uses, not limited to primary recreation, are considered when assessing the risk of TAG's discharge. These uses include general irrigation and providing habitat for aquatic life, including fish species at risk, salmonids, benthic invertebrates, amphibians and aquatic birds. The Respondent submits that the Unnamed Tributary has periodically exhibited extreme bacterial blooms and an unpleasant odour which have significantly impaired the usefulness of the environment, and that repeated occurrences of this type of filamentous bacteria can potentially result in the area suffering long term impairment. The Respondent submits water quality issues and complaints have been reported by users and managers of Aldergrove Regional Park. The Respondent submits that further downstream, across the Canada/USA border, the uses of the Nooksack River watershed include potable and non-potable uses, irrigation, recreation and shellfish harvesting at the river outlet in Portage Bay, WA. The Respondent submits complaints related to fecal coliform concentrations have also been received from downstream users in Washington State.

Panel's Findings

[59] As noted previously in this decision, the parties did not argue that human health should not be included within the scope of "protection of the environment" under the *Act*. The three experts in this appeal were not qualified as experts in assessing, characterizing, or differentiating the risk to human health of *E. coli* from human, ruminant, or other animal fecal sources. In the absence of qualified expert submissions on the characterization and differentiation of *E. coli* risks to human health, the Panel turns to the water quality guidelines submitted by the parties. A director establishing permit requirements under the *Act* is informed, but not bound, by water quality guidelines. Similarly, the Panel is not bound by these guidelines, however the guidelines provide important insight to understanding the risks of *E. coli*.

[60] The Panel considered the following guidance submitted by the parties:

- The *Health Canada Guidelines for Canadian Recreational Water Quality: Indicators of Fecal Contamination*, dated February 2023 ("Health Canada 2023 RWQG"), an update from the 2012 RWQG.

- The Ministry's *Microbial Indicators Water Quality Guidelines No. WQG-14* ("BC Microbial Indicators WQG"), which provides water quality criteria for microbiological indicators, including *E. coli*, considering the uses of water for drinking, wildlife, livestock, and irrigation.
- The BC RWQG.
- Health Canada's 2012 RWQG.

[61] BC's RWQG states that for most criteria, it adopts criteria for primary contact recreation from Health Canada's guidelines. The BC RWQG, dated 2019, adopts Health Canada's 2012 RWQG for *E. coli* and has not been updated to reflect the updates in the Health Canada 2023 RWQG. The Panel finds it reasonable to refer to the most recent version of the Health Canada 2023 RWQG, as the document was submitted by the parties, and both the Barlak and Vassos Opinions confirm the practice that BC generally adopts Health Canada's guidance with respect to *E. coli* in recreational waters.

[62] Health Canada's guidance is that human and ruminant feces pose the highest health risk. The Health Canada 2023 RWQG states:

> Quantitative microbial risk assessment (QMRA) has been used in numerous research studies to better understand the potential health impacts from human pathogens in recreational settings and to investigate the relative risks from different fecal sources. **QMRA modelling has generally shown that human and ruminant feces pose the highest risk of human health impacts, while feces from other animals poses a lower risk** (Schoen and Ashbolt, 2010; Soller et al., 2010b, 2015). These studies estimate that at similar levels of *E. coli* or enterococci, the risk to human health from other animals (e.g., gulls, pigs, chickens) ranges from 10 to 6000 times lower than the risks associated with municipal sewage. (page 24) (emphasis added).

[63] The Panel's view is the Amendment must reflect all legal requirements under the *Act* and any other regulatory regimes that apply to TAG's operation, such as the *Agricultural Land Commission Act*. The Panel notes that the Appellant has chosen to suspend the receipt of animal manure and bedding. This decision has put the Appellant out of compliance with the ALC approval condition in place since 1992. The Appellant has indicated it is working with the ALC to resolve the situation. Nevertheless, the ALC's conditional approval requires TAG's feedstock to consist of at least 50% agricultural waste. Therefore, the Panel makes its finding on risk with the assumption that TAG's feedstock includes agricultural waste, which may include ruminant waste, regardless of whether they are accepting such waste at this time. As a result, the Panel finds that since TAG's discharge has the potential to contain *E. coli* from ruminants' feces, which according to the Health Canada's 2023 RWQG, is considered as a high risk to human health, it is appropriate to consider that TAG's discharge poses a risk to the environment.

If *E. coli* concentration limits are an appropriate permit requirement for protection of environment, what should the limits be for TAG's facility?

Appellant's Submissions

[64] The Appellant asserts that the Respondent indiscriminately applied the BC RWQG as a compliance condition in the Amendment for *E. coli* concentrations. The Appellant submits that the *E. coli* concentrations described in water quality guidelines are ambient water quality guidelines and are inappropriate to apply as a point discharge standard or in establishing permit requirements.

[65] Dr. Vassos testified that ambient water quality guidelines are a poor fit to be used as discharge standards. However, Dr. Vassos did not provide an opinion on what guidelines, standards, or epidemiological studies may be more appropriate for determining point discharge *E. coli* limits in this case. When asked what an appropriate *E. coli* discharge standard for TAG may be, Dr. Vassos testified that standards are applied based on risk, and there is a case to be made for no standard to apply at TAG.

[66] The Appellant submits, based on the Vassos Opinion, there is no principled basis to apply *E. coli* standards derived from epidemiological studies on the health risks associated with human wastes to other contexts. The Vassos Opinion states that Health Canada did not intend for the recreational water quality guidelines to be used to set point discharge limits. The Vassos Opinion restates Health Canada's 2012 RWQG guidance for establishing *E. coli* guidelines for secondary recreational applications, where Health Canada suggests the application of a factor of 5 may be used to establish indicator limits: that is, an *E. coli* concentration of 1,000 CFU/100mL.

[67] The Appellant submits the Respondent has brought forward new justifications for the Amendment for the first time on appeal. The Appellant identifies these new grounds include concerns for downstream users in Washington State, concerns with shellfish harvesting in Portage Bay, WA, and concerns for achieving the BC/WA Nooksack River Transboundary Water Quality Task Group's Border Benchmark ("the Border Benchmark"). The Appellant argues the Respondent used these new grounds, referenced in the Barlak Opinion, to create new justification for the Amendment during this appeal. The Appellant argues the Respondent has failed to establish how these new grounds justify the Amendment.

[68] The broad goal of the BC/WA Nooksack River Transboundary Water Quality Task Group (the "Transboundary Group") and Border Benchmark was to address shellfish harvesting closures downstream of the Nooksack River. The Border Benchmark is an *E. coli* target recommended to be achieved at four Canada/USA border sampling stations, including one on Pepin Creek. The Transboundary Group, established in 2016 by BC and Washington State agencies, recommended short and long-term border benchmarks in 2019.

[69] The Appellant argues the Border Benchmark is also inappropriate to rely on when setting a discharge standard. The Appellant argues the Border Benchmark is an arbitrary standard with insufficient evidence and no epidemiological study to support the particular health or environmental risks it aims to manage. Furthermore, the Appellant submits that administrative decision makers must not consider themselves bound by non-binding policies and guidelines and must consider whether policies and guidelines are appropriate for the specific circumstances in which they may be applied.

[70] The Appellant submits that if the Panel is considering remitting the matter to the Director, to instead impose Dr. Vassos' recommended *E. coli* permit limit of 1,000 CFU/100mL based on annual median or geometric mean of 5 weekly samples in a 30-day period ("5-in-30 sampling") as this is consistent with Health Canada's 2012 RWQG guidance.

Respondent's Submissions

[71] The Respondent submits many downstream uses, not limited to primary recreation, were considered in deciding the Amendment. Therefore, several relevant *E. coli* standards informed the analysis for the Amendment. The Respondent relies on the Barlak Opinion, which states the *E. coli* limits set out in the Amendment are appropriate in these circumstances.

[72] The Barlak Opinion states that multiple *E. coli* guidelines could apply to Pepin Creek based on the known downstream water uses including aquatic life, irrigation and recreational use in Aldergrove Regional Park, farms and livestock in WA, and shellfish harvesting in Portage Bay, WA. The Barlak Opinion references *E. coli* values identified in the BC RWQG, Health Canada's 2012 RWQG, Washington State's Marine Use Criteria, BC's Microbial Indicators WQG, and the Border Benchmark. The *E. coli* guideline values re-stated by the Barlak Opinion include: Health Canada 2012 RWQG primary contact guideline values of ≤200 CFU/100mL (geometric mean) and ≤400 CFU/100mL (single-sample maximum); the Microbial Indicators WQG indicators of ≤1,000/100mL (geometric mean) for general irrigation, ≤385/100mL (geometric mean) for public or grazing access, and <200/100mL (maximum) for general livestock use. BC's Microbial Indicator WQG does not specify either CFU or MPN units. BC's Microbial Indicator WQG notes that while the two procedures for detecting coliforms are not directly comparable, the statistical confidence intervals overlap at low coliform levels and both types of units could be interpreted as equivalent and valid for assessing water quality criteria. The Health Canada 2023 RWQG was "in publication" when Ms. Barlak prepared her expert evidence.

[73] The Respondent submits the purpose of the Border Benchmark is to reduce Canada's contribution of fecal coliform to the Nooksack watershed, and that the goal of the Transboundary Group was re-opening shellfish harvesting in Portage Bay, an environmental goal of Washington State. To contribute to this goal, the Border Benchmarks were established. The Transboundary Group set the Border Benchmarks

based on statistical analysis, dilution and travel rates, and the probability of achievability. One border sampling station is on Pepin Creek and is downstream of TAG's discharge to the Unnamed Tributary. The Respondent submits the Border Benchmark is one of several relevant *E. coli* standards informing the decision on the Amendment.

[74] The short-term Border Benchmark was *E. coli* concentration 200 CFU/100mL, and long-term Border Benchmark to be achieved by 2024 was set at *E. coli* concentration of 100 CFU/100mL. Ministry staff noted in an internal memo that *E. coli* is the preferred indicator, the sampling should satisfy the Ministry's geometric mean calculation, and that sampling should occur in the wet and dry seasons.

[75] The Respondent argues the Ministry's adoption of the Border Benchmark, and Barlak's reference to the benchmark is consistent with the Board's findings in *Houston.* The Respondent submits in *Houston* the Board viewed it reasonable that the Ministry would consider provincial objectives and regional considerations when setting objectives for specific areas within the province.

[76] The Respondent submits that while the Border Benchmark may be newly referenced in the Barlak Opinion, it is a relevant reference point, and one of many relevant guidelines and standards considered when assessing risk to downstream values. The Respondent submits it is up to the Board to determine the applicability of standards and guidelines in this appeal.

[77] The Barlak Opinion provides several *E. coli* guidelines that may apply in Pepin Creek given the known water uses. Ms. Barlak stated in cross-examination that in her role as an Environmental Impact Biologist, she considers the most sensitive uses of a stream. The Barlak Opinion submits that guidelines are "usually chosen based on the most sensitive identified use in a watershed." The Barlak Opinion identified the most sensitive use immediately downstream of TAG's discharge to be primary contact recreation in Pepin Creek.

[78] The Barlak Opinion concluded that, considering all the watershed uses and multiple inputs into Pepin Creek, the Border Benchmark is justified at the border station and that the Amendment's quarterly and immediate sampling limits for *E. coli* are appropriate. The Barlak Opinion goes on to suggest a more protective (conservative) benchmark may be appropriate when considering cumulative effects in the watershed.

[79] The Respondent submits that this Amendment is part of several actions taken by the Ministry to help achieve the goal of the Border Benchmarks. Regarding the cumulative effects of other dischargers in the watershed, the Respondent argues that TAG is only being asked to bear the burden of its own discharge.

[80] The Respondent submits the Appellant bears the burden of proof, on the balance of probabilities, that the Amendment is not appropriate in the given circumstances. The Respondent points to the Board's Practice and Procedure Manual (page 33) (the "Manual") which states that:

> The general rule is that the burden or responsibility for proving a fact is on the person who asserts it. The fact is to be proved on a "balance of probabilities".

[81] The Respondent submits that appeals before the Board are *de novo,* parties are not limited to the record before the initial decision maker, and parties can rely on any relevant and admissible evidence. The Respondent argues that the Appellant has not asserted they have had insufficient information to prepare their case or reply to the Respondent's case. The Respondent submits there is no reason to deviate from the Board's general rule on burden of proof.

[82] The Respondent submits should the Panel consider an alternative relief is necessary, that the Panel consider imposing an immediate sampling limit of ≤1,000 units/100mL, and a quarterly (geometric mean) sampling limit of half that amount. The Respondent submits, Dr. Vassos' suggested 1,000 units/100mL limit should be considered the absolute maximum limit for immediate sampling.

Panel's Findings

Burden of Proof and Consideration of New Evidence

[83] Before the Panel addresses the specific *E.coli* limits set out in the Amendment, we will address the issues raised by the Appellant regarding the consideration of new evidence and burden of proof in this appeal.

[84] As noted at the outset of this decision, the *Act* gives the Board the authority to conduct appeals as a new (*de novo*) hearing. The Panel, in effect, "stands in the shoes" of the original decision-maker. This means that the Panel can confirm, reverse, or vary a decision of a decision-maker, and can also make any determination that was legally possible for the decision-maker to have made, based on the evidence before it (*Richmond Steel Recycling Ltd. v. Director, Environmental Management Act*, 2023 BCEAB 2 (CanLII)).

[85] A new hearing allows the Panel to hear and consider new and relevant information that was not originally before the decision maker. This is subject to any applications by the parties as to whether the Panel should accept the evidence and any findings regarding exclusion of evidence. As a result, any procedural defects that may be seen to have occurred when the decision was first made or on raising the new evidence after the initial decision was made are cured by the appeal process. In this appeal, the Appellant did not argue that the Panel should not receive certain evidence, nor was there any assertion that the Appellant had not had sufficient time to examine or rebut any of the evidence proffered. Therefore, the Panel finds that it can accept the new evidence submitted by the parties, including evidence pertaining to the Border Benchmark, in this appeal.

[86] The Appellant submits that the burden of proof is on the Respondent to establish that the Amendment was necessary, however, what is relevant in this case is the burden of proof in the appeal process. The Board's general position on burden of proof, as set out in its Manual, is that the responsibility for proving a fact rests with the person who asserts it,

and that the fact is to be proved on a "balance of probabilities." The Appellant appealed the Amendment. There is no compelling reason why the Respondent should bear the burden of proof, such as the Appellant not having access to the evidence needed to prove its case. Therefore, the Appellant bears the burden of proof and must present evidence to convince the Board that the Respondent should have made another decision based on the facts (*City of Cranbrook v. Assistant Regional Waste Manager*, 2009 BCEAB 6 (CanLII)).

[87] In the context of the *E. coli* concentrations, the Appellant has the burden of proof to establish that the limits should be different than what a set out in the Amendment.

Permit Requirements for E. coli Concentrations

[88] The Panel has already concluded that *E. coli* concentration limits are appropriate permit requirements for the protection of the environment. We have also concluded that TAG's discharge has the potential to contain *E. coli* from ruminants' feces, which is considered a risk to human health. Therefore, the Panel finds that it is appropriate to establish *E.coli* concentration limits in TAG's Permit. The issue that remains to be determined is what those concentration limits should be.

[89] To determine what *E. coli* concentration permit limits may be appropriate, the Panel must characterize the potential downstream uses of the Unnamed Tributary and Pepin Creek that may be impacted by the Appellant's discharge. Neither the Appellant, nor Dr. Vassos, provided alternative standards that should inform effluent point discharge criteria, but rather opined that the characterization of downstream uses did not align with actual uses.

[90] The absence of a point discharge standard or epidemiological studies specific to this type of risk does not mean that the director, or the Panel, must refrain from imposing *E. coli* concentration limits. The Panel has found that the *E. coli* in TAG's discharge should be considered a risk to the environment, therefore it is appropriate to set a permit limit using the best available evidence.

[91] The establishment of *E. coli* permit discharge limits in this case represents a risk management decision. As set out earlier in this decision, the Panel has found that neither party has referred the Panel to specific guidelines or standards that may exist for point discharges like TAG's effluent. The Panel finds that the best available information should be applied. In this case, the Panel considers the best available information to be the Health Canada 2023 RWQG and the BC Microbial Indicators WQG. The Health Canada 2023 RWQG are the most recent Health Canada recreational water quality guidelines and were relied upon during expert cross-examination and in the parties' submissions. Additionally, the Barlak and Vassos Opinions confirm the practice that BC generally adopts Health Canada's guidance with respect to *E. coli* in recreational waters. The BC Microbial Indicators WQG is the most recent water quality guideline related to non-recreational categories of water use.

[92] The Barlak Opinion identifies several designated uses of Pepin Creek downstream of TAG's discharge. These uses include aquatic life, irrigation in Aldergrove Regional Park, and recreational use such as dog walkers, picnicking and community events in the park. The Barlak Opinion notes that aside from some passive signage and wooden fences, there is no active way to prevent humans and pets from entering the waters of Pepin Creek within the park.

[93] The Respondent submits additional downstream uses of Pepin Creek (Double Ditch in the USA) include for irrigation, domestic water, livestock water, and recreation. The Appellant does not dispute these other downstream uses of Pepin Creek/Double Ditch. The parties agree indigenous shellfish harvest is a designated use in Portage Bay, WA, where the Nooksack River flows into the ocean. The Panel accepts these are all downstream uses of Pepin Creek/Double Ditch that could be impacted by *E. coli*. However, there is insufficient evidence submitted in this appeal to show if, or to what degree, the Appellant's discharge affects these downstream uses in Washington state. Additionally, the evidence in this appeal did not convincingly show to what degree the Appellant's discharge impacts the ability for BC to meet its Border Benchmark target.

[94] Instead, the Panel considers the impact of the Appellant's discharge more immediately downstream to be the most relevant factor. The Panel considers the potential uses of Pepin Creek north of the Canada/USA border to include recreation, irrigation, and aquatic life. The Health Canada's 2023 RWQG defines primary contact recreation to be:

> Recreational activity in which the whole body or the face and trunk are frequently immersed or the face is frequently wetted by spray, and where it is likely that some water will be swallowed. Inadvertent immersion, through being swept into the water by a wave or slipping, would also result in whole body contact. Examples include swimming, surfing, waterskiing, whitewater canoeing/rafting/kayaking, windsurfing and subsurface diving.

[95] Health Canada's 2023 RWQG defines secondary contact recreation as:

> Recreation activity in which only the limbs are regularly wetted and in which greater contact (including swallowing water) is unusual. Examples include rowing, sailing canoe touring, and fishing.

[96] Health Canada's guidance distinguishes primary and secondary recreation by the exposure risk of ingesting water given a specific activity. The evidence in this appeal does not establish known use of the Unnamed Tributary and Pepin Creek in Aldergrove Regional Park in manner consistent with Health Canada's 2023 RWQG description of primary contact recreation. The Panel agrees with the Appellant that there is no convincing evidence that the Unnamed Tributary and Pepin Creek within the park are used for primary contact recreation. The evidence establishes the potential for public users of Aldergrove Regional Park to come in contact with the water in Pepin Creek in ways consistent with the definition of secondary contact recreation.

[97] Next, the Panel turns to the water quality guidelines for insight on the potential *E. coli* criteria for these identified uses. Health Canada's RWQG from 2012 and 2023 have identified insufficient epidemiological data exists to derive fecal indicator limit values to protect secondary contact recreation users. As a result, Health Canada[2] applies the available primary contact recreation information to advise on a risk management decision for secondary contact recreation.

[98] Health Canada's 2012 RWQG advice related to secondary contact recreation is:

> Advice is provided that **the application of a factor of 5 to the existing geometric mean faecal indicator concentration used to protect primary contact recreation users may be used as an approach to establish faecal indicator limits.** These values represent a risk management decision based on the assessment of the expected exposure scenarios and potential health risks for the recreational water user, and represents a tolerable and reasonable approach to protecting users engaged in a voluntary activity. (emphasis added, page 5).

[99] Health Canada's 2023 RWQG advice for secondary contact recreation is:

> If it is determined that a water area is intended to be used for secondary contact recreation, **a direct multiplier based on the assumed ratio difference between the primary contact exposure volume and the desired secondary exposure scenario volume can be applied to the fecal indicator guideline values**. For example, using average ingestion volumes, the ratio between low ingestion activities, such as boating, fishing, and canoeing/kayaking without capsizing (3.8 mL/h; Dorevitch et al., 2011), and swimming (10 mL/h to 40 mL/h; Dorevitch et al., 2011; Dufour et al., 2017; U.S. EPA, 2019) is **approximately 3 to 8.** The choice of multiplier should consider the sources of fecal contamination in the waters, as human fecal sources are more likely to contain human pathogens than other non-point sources of contamination. **For example, in a water system that is impacted by human or ruminant fecal sources, the responsible authority may want to apply the conservative assumption of 3 times higher than the primary guideline value."** (emphasis added, page 31).

[100] The Health Canada 2023 RWQG guidance for secondary contact recreation is to apply an approximate 3 to 8 times multiplier to the primary contact values. The Health Canada 2023 RWQG primary contact recreation Beach Action Value ("BAV") is 235 CFU/100mL. BAV concentrations are applied to an individual sample result, rather than

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[2] The Health Canada 2012 RWQG expressed guidelines values as "geometric mean" and "single sample maximum". The geometric mean value is calculated based on a minimum of five samples. and is intended to indicate chronic water quality issues whereas the single sample maximum indicates immediate water quality issues. The Health Canada RWQG 2023 also used "beach action values" which were adopted from the US EPA and are similar to single sample maximums in that they indicate immediate water quality issues. (From Health Canada RWQG 2023, Appendix B).

averages or means. Health Canada (2023) states the geometric mean used to inform the BAV is 126 CFU/100mL. Health Canada suggests that recreational waters where the geometric mean is consistently higher than 126 CFU/100mL may not be suitable for primary recreation. In these guidelines, Heath Canada states methods with a MPN estimate are assumed equivalent to the CFU values given.

[101] The Health Canada 2023 RWQG cautions the multiplier should consider the sources of fecal contamination in the waters. The Health Canada 2023 RWQG advises that a water system impacted by human or ruminant fecal sources may want to apply a conservative assumption of 3 times higher than the primary contact value, and any calculated value would "represent a risk management decision." Earlier in this decision, the Panel found that the *E. coli* limit must be determined in consideration of ruminant sourced *E. coli*.

[102] In addition to recreational use, the Barlak Opinion identified aquatic life and a water licence for irrigation purposes. The BC Microbial Indicators WQG provides water quality criteria for non-recreational uses. The *E. coli* indicator value for general irrigation is ≤1,000 /100mL based on geometric mean calculated from 5-in-30 samples. No *E. coli* criteria values are provided in the BC Microbial Indicators WQG for wildlife or aquatic life.

[103] The Panel's view is that in this case, the adoption of the primary contact recreation *E. coli* criteria is overly cautious. Ms. Barlak described her role in determining the most sensitive uses of a watershed and making water quality recommendations based on the most sensitive uses. The language in section 16 of the *Act* reads "if the director considers it necessary" and does not limit the director to considering the most protective uses. A risk management decision means that neither the most or least sensitive use guideline would be universally applied, but the facts and context of each situation ought to be considered.

[104] According to the Health Canada 2023 RWQG, an exceedance of the *E. coli* BAV guideline triggers further actions by responsible authorities to investigate water quality issues, conduct immediate resampling, issue swimming advisories/beach notifications, and initiate corrective actions. Similarly, the BC RWQG states "an exceedance of the BC RWQG's presented in this document does not imply that unacceptable risks are present; but rather that the potential for adverse effects is increased, and additional investigation and monitoring should be considered." The BC Microbial Indicators WQG does not specify what actions are required to be taken if in exceedance of quality criteria values. The Panel is mindful that, under the *Act,* an exceedance of a permit discharge limit may be grounds for escalated enforcement actions including administrative penalties and permit cancellation.

[105] The Appellant argues that the Panel should consider setting a limit of 1,000 CFU/100 mL using an annual median or geometric mean of 5-in-30 sampling results, as recommended by Dr. Vassos. The Respondent argues that should the Panel see fit to vary the Amendment, that Dr. Vassos' proposed limit should be the absolute maximum immediate sampling limit; that the geometric mean limit should continue to be half that

amount; and that TAG could be given the flexibility to choose either CFU or MPN as the *E. coli* reporting unit in accordance with the Barlak Opinion.

[106] The Panel notes that Dr. Vassos' recommendation was based on there being no human or ruminant sources for the *E. coli* in TAG's discharge. The Panel considers this recommendation to be inappropriate in terms of the quarterly geometric mean limit as 1,000 CFU/100ml would be about 8 times the value used by Health Canada (2023). The Panel notes that the Respondent's consideration of 1,000 CFU/100mL as a single sampling limit and geometric mean limit of 500 CFU/100mL, is within the range of 3-8 times the Health Canada 2023 RWQG primary contact recreation BAV (as recommended for secondary contact recreation).

[107] Given the guidance provided in the available water quality guidelines as set out in the paragraphs above, and TAG's discharge *E. coli* sources, the Panel finds the Amendment unduly restrictive and it appropriate to vary the *E. coli* concentration limits in the Amendment. The Panel finds permit requirements of 1,000 units/100mL for immediate sampling, and 500 units/100mL for quarterly sampling – geometric mean to be appropriate. The Panel does not specify a reporting unit; either CFU/100mL or MPN/100mL may be selected by the Appellant. Once a unit is selected, all future *E. coli* reporting required in by the Permit should be done consistently in the same units.

Is the SRE sampling requirement an appropriate compliance standard?

Appellant's Submissions

[108] The Appellant submits the SRE sampling requirement as a compliance standard is unprecedented and not justified. The SRE requirement in the Amendment is contrary to the random sampling approach set out in various Ministry standards. The Appellant submits there is no basis in the Health Canada 2012 RWQG to suggest that an SRE based permit limit is an appropriate way to manage risk to downstream users.

[109] The Appellant submits the 5-in-30 sampling requirement is sufficient to monitor *E. coli*. The Appellant submits they are also open to expanding their fecal coliform sampling program for compost piles.

[110] The Appellant argues that the Respondent has not specified how or what environmental risk is addressed with the SRE sampling requirement. The Appellant argues the SRE sampling is onerous, and it is speculative to say that it will provide any benefits. The Appellant submits that the SRE sampling requirement poses other feasibility challenges, including having staff on standby and finding a lab to process the sample on weekends or holidays, which is not always possible.

[111] The Appellant argues that the relationship between SREs and elevated *E.coli* levels from TAG's operations is not well established in recent years. The Appellant submits several occurrences of high *E.coli* concentrations in Pepin Creek, downstream of TAG's

discharge, have been found without high levels of precipitation. The Appellant suggests some other major source of *E.coli* is present in the Pepin Creek watershed.

[112] The Vassos Opinion states that high precipitation flows cause resuspension of *E. coli* accumulated in bottom sediments. Dr. Vassos testified his experience has shown him that *E. coli* can persist and accumulate in sediment for a long time, and when these sediments are disturbed, extreme increases in *E. coli* can be found in the water. In Dr. Vassos' experience, the highest concentration is from "first flush," and occurs at the start of a rainfall event. According to Dr. Vassos, the sampling requirement imposed in the Amendment (within 24 hours of an SRE) would not capture the "first flush" as it takes 24 hours for the rainfall event to be recorded.

Respondent's Submissions

[113] The Respondent submits that the SRE sampling requirement contributes to a "legitimate and ongoing environmental protection objective," to improve water quality for a variety of downstream users of Pepin Creek, Fishtrap Creek, and the Nooksack River. The Respondent submits the Board ought to confirm the SRE sampling requirement including the ability to revisit after two years of sampling data has been collected. The Respondent submits that changes to the existing quarterly *E. coli* sampling regime is beyond the scope of this appeal, as the quarterly requirement pre-dated the Amendment.

[114] The Pollution Abatement Order in place from June 2018 to June 2020 required TAG to conduct and report on SRE sampling. As TAG was able to meet the monitoring regime required by the Pollution Abatement Order, the Respondent argues this demonstrates their ability to achieve the Amendment's SRE sampling requirement. The Respondent submits that during the 2-year Pollution Abatement Order period, sampling results showed high *E. coli* concentrations consistently followed SREs.

[115] The Respondent submits multiple justifications for the SRE sampling requirement. The Respondent points to fecal coliform monitoring program data from WA. The Respondent argues WA's data since 2015 shows that elevated fecal coliform counts in Fishtrap Creek and its tributary Pepin Creek. The Respondent submits that WA's data has historically found elevated fecal coliform bacteria during and after SRE's.

[116] The Respondent submits two expert opinions, which both describe the necessity of sampling in relation to precipitation events. The Barlak Opinion posits that there can be high variability in microbiological contaminants in ambient water and several aspects should be considered when determining impacts including seasonality, feedstock composition, and precipitation. The Barlak Opinion states that monitoring for *E. coli* during a rain event usually gives higher results than after the event, and this data is critical for managing to the most sensitive downstream uses. The Adamsson Opinion states that TAG's wastewater generation is tied to the precipitation rate. Mr. Adamsson's opinion is that monitoring should follow rain events closely to determine peak effluent concentrations.

Panel's Findings

[117] The expert opinions of Dr. Vassos, Ms. Barlak, and Mr. Adamsson each support the notion that *E. coli* concentrations are higher near the beginning of a rainfall event, compared to after the rainfall event is over.

[118] Further, the BAT submitted by the parties, reads in part:

> While SW1 (outlet of the treatment wetlands), with its *E. coli* counts, ranging between 5000 and 40000 CFU/100mL, showed to contribute greatly to the final *E. coli* counts at SW6, significant variations were observed in the *E. coli* counts at DP (detention pond). With counts ranging from less than 100 CFU/100mL to 12000 CFU/100mL, DP showed to have significant impact on the final *E. coli* counts at SW6. (page 19)
>
> and:
>
> While GW (groundwater from the artesian well) has a consistent quality throughout the year, the quality of DP and SW1 sources varies significantly as a result of **weather conditions and increased precipitations influence the flow and quality of the effluents.** These in turn, affect the final quality of the effluent at the point of compliance. (page 24, emphasis added)

[119] The Panel is not convinced by the Appellant's evidence and argument that *E. coli* concentrations in TAG's discharge are independent of precipitation events, and that potential surges in *E. coli* concentrations are not a risk to the environment. Given the expert evidence and submissions noted above, the Panel finds that in this case, sampling in association with significant rainfall events is a reasonable permit requirement.

[120] The Amendment relies on rainfall data measured and reported by Environment Canada's Abbotsford A Station. To capture "first flush" concentrations would require an alternative to relying on that station. The Panel did not receive sufficient evidence in this appeal to determine a suitable alternative. Recognizing the limits of using the Abbotsford A Station data, the Panel nonetheless considers this to be the best option discussed within the scope of this appeal.

[121] The Panel finds the SRE sampling program described in the Amendment to be a reasonable and practicable approach. The Panel confirms requirement for immediate sampling as required in Amendment Section 4.1.2 Table 1, and described in Table 2 Abbreviations number 2, 3 and 4.

Should TAG be required to conduct additional on-site monitoring?

Appellant's Submissions

[122] The Appellant submits it is open to further collaboration with the Ministry in the future and is committed to continual improvement on the site. The Appellant submits it is

"open to expanding" the sampling program for fecal coliform and *E. coli* from its piles for a limited time to provide more comprehensive data on potential sources of *E. coli* from its operations.

Respondent's Submissions

[123] The Respondent suggests in addition to the SRE sampling requirement, the Board may also consider an alternative order to "direct TAG to implement an onsite monitoring program, as suggested by Mr. Adamsson, and report the results of this program to the Director. This time-limited program should attempt to identify the background *E. coli* levels as well as the sources of *E. coli* on the site."

Panel's Findings

[124] The Panel agrees that an onsite monitoring program could yield information regarding information such as background *E. coli* levels, on site *E. coli* contributions and fluctuations of *E. coli* levels over time. This information could be useful to both the Appellant and the Respondent in terms of what, if any, infrastructure changes could be implemented onsite to assist with meeting the permit discharge limits, and what, if any, changes should be considered for those permit limits. However, there was insufficient evidence presented by the parties for the Panel to identify with any degree of certainty, the details of such a monitoring program. The Panel recommends the parties work together to identify a practicable onsite monitoring program that could provide additional information to support any potential future decisions on permit amendments.

DECISION

[125] The Panel allows the appeal in part and varies the *E. coli* concentration limits set out in the Amendment. The Panel varies the Amendment to allow the Appellant the option to choose between CFU/100mL or MPN/100mL units to measure *E. coli* concentrations. However, once a preferred unit is specified the Appellant must consistently report in the same units.

[126] The Panel varies section 1.1.2 of the Amendment with respect to *E. coli* discharge to:

Discharge Characteristics at SW6	Limit
E. coli (quarterly sampling – geometric mean)	≤ 500 units /100mL
E. coli (immediate sampling)	≤ 1000 units /100mL

[127] The Panel confirms requirements for Immediate *E. coli* sampling in Amendment section 4.1.2 Discharge Analysis "Table 1 Discharge Monitoring Program," however varies the reporting units as noted above, from "CFU/100mL" to "units/100mL."

Parameter mg/L or as specified	Location/Frequency	
	SW6	SW1
E. coli (units/100mL)	Quarterly[1]	Semi-annually
E. coli	Immediate[2, 3, ,4]	---

[128] All other aspects of the Amendment are confirmed.

"Linda Michaluk"

Linda Michaluk, Panel Chair
Environmental Appeal Board

"Gary Lin"

Gary Lin, Panel Member
Environmental Appeal Board

"Cynthia Lu"

Cynthia Lu, Panel Member
Environmental Appeal Board