

Planning/Water Appeals Commission
4th Floor
92 Ann Street
Belfast
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Dear Sir/Madam

Dalradian Gold Curraghinalt Project (the Project) – Conjoined Local Inquiry in relation to LA10/2017/1249/F, LA10/2019/1386/F, LA11/2019/1000/F, AIL2024_0008, AIL2024_0009, TrC 080/20_1 and TrC 081/20_1

Thank you for your recent correspondence in relation to the above-mentioned Project. Loughs Agency is the statutory body charged with, under the Foyle Fisheries Act (Northern Ireland) 1952 and the Foyle and Carlingford Fisheries (Northern Ireland) Order 2007, the conservation, protection and development of inland fisheries within the Foyle and Carlingford systems, the promotion of development of Loughs Foyle and Carlingford, and catchments for commercial and recreational purposes in respect of marine, fisheries and aquaculture issues and the development of marine tourism.

Executive Summary

In summary, Loughs Agency is of the opinion that this discharge application, (with regards to its environmental determinations made in the proposed Discharge Criteria for Curraghinalt mine), is fundamentally flawed. Loughs Agency has reviewed the supporting documents for the Proposed Discharge Criteria and has noted several overarching issues which are consistent across both documents listed below..

These issues can be generally classified under following themes:

- Factually incorrect information presented as data
- Outdated survey results and datasets
- Apparent inappropriate application of international standards
- Failure to appropriately consider impacts on surrounding watercourses, in particular; the Curraghinalt Burn and the Pollanroe Burn, in the context of salmonid populations.

Loughs Agency has concerns regarding the water quality parameters and standards proposed within this application. Such issues are further compounded by the failure to consider surrounding watercourses, which have been proven to contain the site selection features in the form of salmonid populations, through electrofishing surveys carried out by Loughs Agency and an external consultant (see Appendix 1 of Dalradian Gold Curraghinalt Project – Conjoined Local Inquiry in relation to LA10/2017/1249/F, LA10/2019/1386/F, LA11/2019/1000/F, AIL2024_0008, AIL2024_0009, TrC 080/20_1 and TrC 081/20_1).

In this Statement of Case Loughs Agency has reviewed each section of the Discharge Criteria for Curraghinalt mine and associated documents and highlighted concerns in detail. Loughs Agency has also provided summary data which directly contradicts the findings of the assessment and brings into question the conclusions which have been drawn regarding the impact of the scheme and the efficacy of mitigation measures put forward.

All information and extracts presented below are sourced from the following documents with a) and b) representing:

A). Proposed Discharge Criteria for Owenkillew River and Curraghinalt Burn – V3.0 October 2020

B). Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn – V3.0 October 2020

Section 1 (figure 1) of Proposed Discharge Criteria for Owenkillew River and Curraghinalt Burn and Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn state that data has been collected for the period July 2015 to December 2019. This data is now five to nine years old. Loughs Agency is concerned with the validity of the survey data given the length of time that has passed from the initial baseline surveys to the present.

- Baseline water quality data has been updated to be consistent with datasets used in the 2020 Surface Water Impact Assessment (SWIA) for the mine site. The baseline data used covers the period July 2015 to end December 2019. This approach includes new data collected from January 2019 to December 2019, and excludes data collected from 2011 to 2014 which used a different laboratory with different detection limits to the post-July 2015 samples. This updated data set is considered the most representative of current baseline conditions and the use of data measured at the same laboratory allows consistency in the analysis of data.

Figure 1

Section 1 (figure 2a) states that the Curraghinalt Burn has been identified as being of '*low ecological sensitivity*' and, as such, is being held to the standards for human drinking water. Loughs Agency attended an electrofishing survey in 2022 carried out by consultants working on behalf of the applicant (see Appendix 1 – referenced above). **Salmonid species were present, and this information has not been subsequently presented as part of this discharge consent.** The details of this electrofishing assessment are included in Appendix 1 of the Gold Mine SOC (LA10_2017_1249_F). The presence of salmonids within the Curraghinalt Burn elevates the level of consideration given to the watercourse. The Curraghinalt Burn is entitled to environmental standards for the protection of aquatic life as opposed to standards for human drinking water.

As part of the Environmental Impact Assessment for the Curraghinalt Mine Project, the Curraghinalt Burn was identified as being of low ecological sensitivity and the Owenkillew River identified as being of high ecological sensitivity. Based on this work environmental standards for the protection of aquatic life are applied at the Owenkillew River, with standards for human drinking water applied in the Curraghinalt Burn.

Figure 2a

Section 1 (figure 2b) states that the Pollanroe Burn has been identified as being of '*low ecological sensitivity*' and, as such, is being held to the standards for human drinking water. Loughs Agency attended an electrofishing survey in 2022 carried out by consultants working on behalf of the applicant. **Salmonid species were present, and this information has not been subsequently presented as part of this discharge consent.** The details of this electrofishing assessment are included in Appendix 1 of the Gold Mine SOC (LA10_2017_1249_F). The presence of

salmonids within the Pollanroe Burn elevates the level of consideration given to the watercourse. The Pollanroe Burn is entitled to environmental standards for the protection of aquatic life as opposed to standards for human drinking water.

As part of the Environmental Impact Assessment for the Curraghinalt Mine Project, the Pollanroe Burn was identified as being of low ecological sensitivity and the Owenreagh River identified as being of high ecological sensitivity. Based on this work, environmental standards for the protection of aquatic life are applied at the Owenreagh River, with standards for human drinking water applied in the Pollanroe Burn.

Figure 2b

Section 1 Table 1-1 (figure 3) in both proposed discharge criteria documents provides a summary of scoping assessment for water quality parameters. Loughs Agency has concerns about the parameters being omitted. The applicant claims there are no NI standards for Electrical Conductivity (EC) and Orthophosphate; however, limits for these are available. Furthermore, the applicant has opted to monitor for “Visible Oil and Grease” in lieu of extractable petroleum hydrocarbons (EPHs) and mineral oils, despite Environmental Quality Standards (EQS) being available for a wide range of EPHs and mineral oils typically listed as polyaromatic hydrocarbons (PAHs).

Table 1-1: Summary of Scoping Assessment for Water Quality Parameters (excluding metals)

Parameters	Units	Included in Assessment
Physical Parameters		
pH (Lab)	s.u	Included
EC (Lab)	µS/cm	No NI standard and not considered parameter of concern at mine
TDS	mg/L	No NI standard and not considered parameter of concern at mine
TSS	mg/L	Included
Temperature	°C	Included
Anions and Nutrients		
Alkalinity	mg/L as CaCO ₃	No NI standard and not considered parameter of concern at mine
Chloride	mg/L	Included
Sulphate	mg/L	Included
Fluoride	mg/L	Included
Calcium	mg/L	No NI standard and not considered parameter of concern at mine
Potassium	mg/L	No NI standard and not considered parameter of concern at mine
Magnesium	mg/L	No NI standard and not considered parameter of concern at mine
Sodium	mg/L	Included
Total Ammonia	mg/L as N	Included
Nitrite	mg/L as N	Included
Nitrate	mg/L as N	Included
Orthophosphate	mg/L as P	No NI standard and not considered parameter of concern at mine
Cyanide Parameters		
Free Cyanide	mg/L	No longer required for processing / no addition of cyanide at the mine; not included
Total Cyanide	mg/L	No longer required for processing / no addition of cyanide at the mine; not included
Organics		
TOC	mg/L	No standard requested by NIEA
BOD	mg/L	Included
COD	mg/L	No standard requested by NIEA
Microbiological		
Faecal Coliforms	CFU/100ml	No standard requested by NIEA
Parameters		
Total Coliforms	CFU/100ml	No standard requested by NIEA
Enterococci	CFU/100ml	No standard requested by NIEA
E.Coli	CFU/100ml	No standard requested by NIEA
*Visible Oil and Grease	mg/L	Included as trace limit only (i.e., not included in calculations)

* Included in lieu of EPH and Mineral Oil

Figure 3

Section 2. Environmental Quality Standards (EQS) and Drinking Water Standards

Table 2-1 (figure 4) in both proposed discharge criteria documents summaries EQS values for parameters that are defined through legislation. Loughs Agency has concerns with the water quality guidelines employed through this application. The Water Supply (Water Quality) Regulations (Northern Ireland) 2007 (SR 147) is listed as a source for EQSs; this document had been revoked and replaced with The Water Supply (Water Quality) Regulations (Northern Ireland) 2017 at the time of the application.

Table 2-1 summarises EQS values for parameters that are defined through legislation:

- SR 351 The Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015.
- The Water Supply (Water Quality) Regulations (Northern Ireland) 2007 (SR 147) as amended by SR 2009/246, SR 2010/128 and SR 2015/363.

Figure 4

Loughs Agency are of the opinion that EQS should be applied in light of the identification of salmonid populations within the burn.

Section 2.1 (figure 5) in both proposed discharge criteria documents notes current consultation on the Drinking Water Directive with regard to reducing lead concentration from 10 µg/L to 5 µg/L. The Loughs agency seeks clarification on this value.

We note current consultations on the Drinking Water Directive (https://ec.europa.eu/info/law/better-regulation/initiatives/com-2017-753_en), which include a consultation related to lowering the lead drinking water standard from 10 µg/L to 5 µg/L. The report uses the current legislative standard (10 µg/L), but updates to the standards will be reviewed through the consenting process.

Figure 5

Table 2.2 (figure 6) in both proposed discharge criteria documents states that, "*guideline values for water quality parameters for which there are no statutory EQS values, but where EQS values can be determined through reference to standards from other parts of the world and other standards/guidelines relevant to the study area, but which are not legislated standards.*" Loughs Agency questions the relevance of using another nation's guidelines (e.g., Canadian Environmental Quality Guidelines.) for water quality parameters for which there are no statutory EQS values. Loughs Agency requires clarification and assurances that guidelines such as those used in Canada are not only appropriate for small tributaries in the Foyle area but also transferable to the potential species and habitats likely to be impacted.

Table 2-2 identifies guideline values for water quality parameters for which there are no statutory EQS values, but where EQS values can be determined through reference to standards from other parts of the world and other standards/guidelines relevant to the study area, but which are not legislated standards. These guidelines include:

Figure 6

Table 2.2 (figure 7) in both proposed discharge criteria documents shows non-statutory guidelines values for parameters and states that the relationships between turbidity (TSS-10 NTU) and TSS concentrations (mg/L) need to be developed in the field. As the smaller watercourses have a lower dilution factor than rivers such as the Owenkillew, **Loughs Agency insists** (as the competent authority as set out in The Foyle Fisheries Act (Northern Ireland) 1952 and The North/South Co-operation (Implementation Bodies) (Northern Ireland) Order 1999) **that TSS discharges into both the Curraghinalt Burn and Pollanroe Burn do not**

exceed 25 mg/l. If the applicant is to determine TSS in terms of NTU in place of mg/l, Loughs Agency require satisfactory evidence that the standards for the two measures are equivalent.

Parameter	Unit	Standard	Source of guideline / Comment
<i>Physical</i>			
pH	s.u.	6.2 – 7.3	^a BS EN 16859:2017
Temperature	°C	2°C above ambient river temperature compared to annual 98%ile temperature	^b SEPA (2016)
BOD	mg/L	1 - 1.4	BS EN 16859:2017; used as standard in this report for BOD
BOD	mg/L	1.5	NIEA requirement for treated sewage effluent. With 13% decrease in average BOD concentrations in receiving water against baseline
TSS	mg/L	25	^c Freshwater Fish Directive
TSS	NTU	10	^a BS EN 16859:2017. Relationships between turbidity and TSS concentrations (mg/L) need to be developed in the field. Testing is ongoing.
Heavy metals and other toxic substances		Refer to Water Framework Directive limits (i.e., SR251 as per Table 1-1)	BS EN 16859:2017

Figure 7

Table 2.3 (Figure 8) in both proposed discharge criteria documents provides drinking water standards from other jurisdictions for parameters not covered in Northern Ireland drinking water standards. Loughs Agency is of the opinion that when no local standards exist, using drinking water parameters from other jurisdictions may provide a temporary guideline, but it comes with challenges, especially when considering the discharge of this water back into river systems. If water treated to meet another jurisdiction's drinking water standard is discharged into rivers, it could have unintended

ecological impacts. Drinking water standards are designed to protect human health, not necessarily the health of river ecosystems. **Due to the presence of salmonids, both the Curraghinalt Burn and Pollanroe Burn are entitled to the same protection as the Owenkillew River SAC and Owenreagh River ASSI to support aquatic life rather than drinking water standards.**

Table 2-3 presents drinking water standards from other jurisdictions for water quality parameters that are not covered in the Water Supply (Water Quality) Regulations (Northern Ireland) 2007. The WHO standard is used where available and carried forward to the assessment. For chromium a combination of the WHO and EU guideline for total chromium (CrIII + CrVI) of 50 µg/L and the UKTAG guideline for CrVI of 10 µg/L was used, giving values of total chromium of 50 µg/L, CrVI of 10 µg/L and CrIII the difference between these two values, or 40 µg/L.

Figure 8

Section 2.1 (figure 9a and figure 9b) notes a maximum water temperature standard of 20°C or 2°C above ambient river temperature compared to annual 98%ile temperature. Loughs Agency notes that water temperature should not exceed 18°C regardless of ambient river temperature.

Water temperature is one of the primary abiotic factors affecting the composition and functioning of freshwater ecosystems, and its alteration can have significant effects on biological communities. Aquatic communities are predominantly made up of ectothermic animals, which are unable to control or maintain their own internal body temperatures. The extent to which water temperature will affect an organism will depend upon

that particular species' sensitivity to water temperature fluctuations. Water temperature thresholds may also vary within a species depending on life history stage. Organism reactions to increased water temperature will also vary, ranging from mortality, behavioural changes, and physiological changes to changes in fecundity and susceptibility to disease.

Given the complex nature of riparian ecosystems, it is important to consider how a sudden increase in water temperature, as a result of a discharge, might affect the most sensitive life history stage of the most vulnerable species in the ecosystem. It is vital to consider the impact of sudden temperature increases at all trophic levels. Macroinvertebrates are the primary food source for fish and higher trophic levels. A sustained increase in water temperatures (above 20°C) can result in the mortality of more susceptible macroinvertebrate species, thereby reducing the abundance of available prey for fish and thus impacting fish populations.

All fish species will be fundamentally impacted by changes in ambient water temperature to some extent. However, vulnerable cold-water fish species, such as salmonids, are of particular concern. The Curraghinalt Burn, is hydrologically connected to the Owenkillew River, which is a Special Area of Conservation for which Atlantic salmon is one of the site selection features. The Pollanroe Burn, is hydrologically connected to the Owenreagh River, which is an Area of Special Scientific Interest for which Atlantic salmon is one of the site selection features. The current global decline in Atlantic salmon populations means that there is a need to preserve all potential salmonid habitat, particularly that which is within

catchments with internationally important salmon populations such as the Foyle.

Increases in water temperature will adversely affect all stages of salmonid lifecycles. Lethal temperatures for trout and salmon depend on life stage, origin of stock, acclimatisation period, and exposure time. While adult trout and Atlantic salmon can withstand short exposure times to higher temperatures (maximum 26.7°C trout; 29.5°C Atlantic salmon), both species have been shown to exhibit strong avoidance behaviour of water temperatures exceeding 19–20°C. Beyond this limit, both species show signs of thermal stress, including reduced feeding, reduced swimming activity, and increased heart rates. Studies show egg development of salmonids is highly subjective to water temperature. Salmonid eggs have been shown to optimally develop around 8°C. Studies examining egg development at increased temperatures reported high rates of mortality in both salmon and trout at temperatures of 12–13 °C and above during incubation. High water temperatures have also been shown to adversely affect salmonid migration behaviours, fecundity, and survival rates.

The ambient conditions in the receiving water course will have an impact on the severity of the warm water discharge. In-stream water temperature, air temperature, flow rates, and depth will all impact how the warm water will influence conditions. However, as this is a singular standard set regardless of time of year, climatic conditions, or volume of discharge, it is imperative that limits are set at a precautionary level. Loughs Agency is of

the opinion that the discharge temperature should be not exceed 18°C to reduce the likelihood of impacts on the aquatic ecosystem.

SR351 provides a maximum temperature standard of 20°C (Table 2-1). The baseline stream water temperature in the study is around 10°C, with a 98%ile (exceeded 2% of the time) close to 16°C, lower than the SR351 standard. A review of other UK jurisdictions noted a Scottish Environment Protection Agency (SEPA) standard for discharges (SEPA, 2016) which stated a similar 20°C maximum or an increase in ambient temperature in a highly sensitive watercourse (Owenkilliw River) of 2°C as an annual 98%ile standard. This standard is noted in Table 2-2.

and is taken forward as a more appropriate limit than the 20°C maximum standard (given the observed ambient temperature in the watercourses in the study area). It is noted that the treatment system proposed for the mine site will take water stored in water management ponds and pass it through membranes, without heating the water. Therefore, the water discharged from the treatment plant will be similar to ambient water in the water management ponds and streams). Therefore, although a temperature-based criteria is considered in this application, it may be that during the consultation process that the temperature criteria is removed.

Figure 9a

SR351 provides a maximum temperature standard of 20°C (Table 2-1). The baseline stream water temperature in the study is around 10°C, with a 98%ile (exceeded 2% of the time) close to 16°C, lower than the SR351 standard. A review of other UK jurisdictions noted a Scottish Environment Protection Agency (SEPA) standard for discharges (SEPA, 2016) which stated a similar 20°C maximum or an increase in ambient temperature in a highly sensitive watercourse (Owenreagh River) of 2°C as an annual 98%ile standard. This standard is noted in Table 2-2 and is taken forward as a more appropriate limit than the 20°C maximum standard (given the observed ambient temperature in the watercourses in the study area). It is noted that the treatment system proposed for the mine site will take water stored in water management ponds and pass it through membranes, without heating the water. Therefore, the water discharged from the treatment plant will be similar to ambient water in the water management ponds and streams). Therefore, although a temperature-based criteria is considered in this application, it may be that during the consultation process that the temperature criteria is removed.

Figure 9b

Section 2.2 (Figure 10) in both proposed discharge criteria documents states that dissolved organic carbon (DOC) has not been determined within the parameter suite and is replaced by total organic carbon (TOC). Loughs

Agency requires clarification on the relevance and validity of data produced via M-BAT, given that not only were the data used for these calculations collected between 2015 and 2019, now out of date, but incorrect parameters for organic carbon were used for the calculations. This issue is consistent with Loughs Agency's main concerns raised within our Statement of Case in relation to LA10/2017/1249/F which highlighted the use of out of date and factually incorrect data which calls into questions the validity of subsequent decisions/determinations and calculations.

M-BAT determines metal bioavailability at specific locations using local pH, DOC and calcium water chemistry data. DOC has not been determined within the parameter suite for this project and is replaced by total organic carbon (TOC), which has been measured. Organic carbon reduces metal bioavailability so the TOC measure is less conservative than DOC but is used in the absence of DTOC.

Figure 10

Section 2.2 (Figure 11) in both proposed discharge criteria documents also states "*that M-BAT also calculates a site-specific PNEC dissolved based on the pH, DOC (TOC), and calcium concentrations at the site. PNEC (predicted no-effects concentration) can be considered as a site-specific EQS for the dissolved metal (not the bioavailable component).*" Loughs Agency is concerned that parameters input into M-BAT are subject to seasonal variation, and therefore calculated PNEC values would also be subject to seasonal variation. This further brings into question the validity and relevance of data produced via M-BAT.

M-BAT also calculates a site-specific PNEC_{dissolved} based on the pH, DOC (TOC) and calcium concentrations at the site. PNEC (predicted no-effects concentration) can be considered as a site-specific EQS for the dissolved metal (not the bioavailable component).

Figure 11

Section 2.2 (figure 12a and figure 12b) presents $EQS_{\text{bioavailable}}$ from current standards. The methods for calculating PNEC values show that they are affected by a number of factors that are subject to seasonal variation; using annual averages excludes that seasonal variation.

$EQS_{\text{bioavailable}}$ from current standards are presented in Table 2-4. Site-specific PNEC values for copper, manganese, nickel and zinc are presented in Table 2-5, as derived using the m-BAT tool with background water quality values in the Owenkillew River upstream of the confluence with the Curraghinalt Burn (SW05). Site-specific PNEC values are also derived for the Owenkillew River at its mouth (i.e., at the confluence with the Owenreagh River), using all sampling locations along the watercourse (SW05, SW06, SW07, SW08, SWN03 and SWN04). The minimum calculated PNEC value for each parameter is carried forward as the annual average EQS.

Figure 12a

$EQS_{\text{bioavailable}}$ from current standards are presented in Table 2-4. Site-specific PNEC values for copper, manganese, nickel and zinc are presented in Table 2-5, as derived using the m-BAT tool with background water quality values in both the Pollanroe Burn (sampling location SWN05) and Owenreagh River at the confluence with the Pollanroe Burn (SW11 and SWN06). Site-specific PNEC values are also derived for the Owenreagh River at its mouth (i.e., at the confluence with the Owenkillew River), using all sampling locations along the watercourse (SW05, SW06, SW07, SW08, SWN03 and SWN04). The minimum calculated PNEC value for each parameter is carried forward as the annual average EQS.

Figure 12b

Section 2.3 Limits of Detection, Table 2-6 (figure 13) in both proposed discharge criteria documents shows parameters with a limit of detection at or above Water Quality Guidelines or Standard. The table cites BS EN 16859 2017 (Water Quality). Guidance standard on monitoring freshwater pearl mussel (*Margaritifera margaritifera*) populations and their

environment for detection limits; values from this document are not regulatory values set within legislation.

Table 2-6: Parameters with Limit of Detection at or above Water Quality Guideline or Standard

Parameter	Unit	LOD	Guideline/Standard	Value
Total Ammonia	mg/l as N	0.01 and 0.03	BS EN 16859:2017	0.01
Silver	µg/L	5	SR 351	0.5 (AA EQS)

Figure 13

Section 2.4 Selection of EQS values for assessment (figure 14a and figure 14b) provides discharge criteria with regards to the EQS for pH. Loughs Agency seeks clarification and consultation on what the final discharge criteria value will be set at.

EQS values for pH depend on the organic content in the receiving waters (see footnote in Table 2-1. The range for 'Clear Waters' is pH 6.6 to 9.0 and 5.1 to 9.0 for 'Humic Waters'. The baseline pH for the Owenkillew River at Curraghinalt Burn has a mean of 6.87 with a standard deviation of 0.6, indicating baseline pH can be lower than the EQS range for 'Clear Waters'. Table 2-2 indicates the range for FPM is 6.2 to 7.3, with the lower end between the EQS values for 'Clear' and 'Humic' waters. For this assessment, given the baseline conditions in the Owenreagh River and the FPM value, both pH ranges are considered as EQS, but the final discharge criteria are based on a review of the baseline data, with consideration of the FPM value.

Figure 14a

EQS values for pH depend on the organic content in the receiving waters (see footnote in Table 2-1. The range for 'Clear Waters' is pH 6.6 to 9.0 and 5.1 to 9.0 for 'Humic Waters'. The baseline pH for the Owenreagh River at Pollanroe Burn has a mean of 6.74 with a standard deviation of 0.49, indicating baseline pH can be lower than the EQS range for 'Clear Waters'. Table 2-2 indicates the range for FPM is 6.2 to 7.3, with the lower end between the EQS values for 'Clear' and 'Humic' waters. For this assessment, given the baseline conditions in the Owenreagh River and the FPM value, both pH ranges are considered as EQS, but the final discharge criteria are based on a review of the baseline data, with consideration of the FPM value.

Figure 14b

Section 2.4 (figure 15) in both proposed discharge criteria documents states “*extractable petroleum Hydrocarbons (EPH) and mineral oil were measured during baseline studies, but there are no standards for these parameters.* Extractable petroleum hydrocarbons (EPHs) such as anthracene, benzene, and their related compounds are listed as priority hazardous substances and priority substances. Polycyclic aromatic hydrocarbons (PAHs), which include EPHs, and mineral oils need to be considered. EQS values are listed for these substances at a higher resolution than the qualitative standard put forth by the application for these parameters as ‘Visible oil and grease’, which were recoded as either present or absent. Loughs Agency requires that EQS are adhered to in lieu of a qualitative standard for ‘Visible oil and grease’ to ensure aquatic species are protected.

Extractable Petroleum Hydrocarbons (EPH) and mineral oil were measured during baseline studies, but there are no standards for these parameters. To allow the development of a practical discharge criteria, a general parameter encompassing all hydrocarbons was considered as 'Visible oil and grease', with a qualitative standard of 'no trace' proposed. This was considered an appropriate way to monitor against any hydrocarbon releases from the mine site and is the approach taken for the discharge consent at the existing exploration works at the site. No discharge calculations for hydrocarbons were undertaken.

Figure 15

Section 2.4 (figure 16) in both proposed discharge criteria documents states that for mercury, the EQS is a maximum concentration, but for this assessment, this is considered as the 95%ile concentration. Loughs Agency sees no reason for the EQS for mercury to be changed from a maximum concentration to a 95%ile concentration. The toxicity and longevity of mercury in ecosystems mean that short periods of high concentrations can have lasting affects on the ecosystem.

Where parameters have EQS for mean and max values (e.g., cadmium in Table 2-1) the assessment is based on the mean concentration. For BOD and Total Ammonia, the EQS is related to the 90%ile concentration. For mercury the EQS is a maximum concentration, but for this assessment this is considered as the 95%ile concentration.

Figure 16

Section 2.4 (figure 17a) also states that calculated discharge criteria are compared to the drinking water standards to assess the impact of discharges on water quality in the Curraghinalt Burn and Owenkillew River. Due to the presence of salmonids, Curraghinalt Burn is entitled the same protection as the Owenkillew River SAC to support aquatic life rather than drinking water standards.

Calculated discharge criteria are then compared to the drinking water standards and forwards calculations are undertaken using the discharge criteria to assess the impact of discharges on water quality in the Curraghinalt Burn and Owenkilleg River. The results of these calculations are then compared to the guideline values presented in Table 2-2.

Figure 17a

Section 2.4 (figure 17b) also states that calculated discharge criteria are compared to the drinking water standards to assess the impact of discharges on water quality in the Pollanroe Burn and Owenreagh River. Due to the presence of salmonids, Pollanroe Burn is entitled the same protection as the Owenreagh River ASSI to support aquatic life rather than drinking water standards.

Calculated discharge criteria are then compared to the drinking water standards and forwards calculations are undertaken using the discharge criteria to assess the impact of discharges on water quality in the Pollanroe Burn and Owenreagh River. The results of these calculations are then compared to the guideline values presented in Table 2-2..

Figure 17b

Section 3 (figure 18a and figure 18b) discusses methods used in this application to calculate discharge criteria. Regarding points 1 and 2, Loughs Agency is of the opinion that the presence of salmonids in the Curraghinalt Burn and the Pollanroe elevates their status, and EQSs for the protection of aquatic life is required.

The method used in this application to calculate discharge criteria is based on:

1. Calculation of criteria based on EQS for the Owenkillev River. Although the Curraghinalt Burn will provide some dilution of the effluent, this is not taken into account in these calculations, which assume that the discharge from the Site is direct to the Owenkillev River. This is a more conservative assessment (no dilution in Curraghinalt Burn) and provides a transparent and robust assessment, without the introduction of another step in the calculations.
2. Resulting maximum allowable discharge values (end of pipe) that are protective of the Owenkillev River will be compared to drinking water standards and reduced if they would not provide compliance of these standards at the point of discharge and in the Curraghinalt Burn. Consistent with the approach in the ES, if the mean baseline concentrations in the Curraghinalt Burn are above the drinking water standards, the discharge criteria are set at the baseline mean concentration.
3. Predicted concentrations in the Owenkillev River are compared to guidelines for Fresh Water Pearl Mussels.

Figure 18a

The method used in this application to calculate discharge criteria is based on:

1. Calculation of criteria based on EQS for the Owenreagh River. Although the Pollanroe Burn will provide some dilution of the effluent, this is not taken into account in these calculations, which assume that the discharge from the Site is direct to the Owenreagh River. This is a more conservative assessment (no dilution in Pollanroe Burn) and provides a transparent and robust assessment, without the introduction of another step in the calculations.
2. Resulting maximum allowable discharge values for the Owenreagh River will be compared to drinking water standards and reduced if they would not provide compliance of these standards at the point of discharge and in the Pollanroe Burn. Consistent with the approach in the ES, if the mean baseline concentrations in the Pollanroe Burn are above the drinking water standards, the discharge criteria are set at the baseline mean concentration.
3. Predicted concentrations in the Owenreagh River are compared to guidelines for Freshwater Pearl Mussels.

Figure 18b

Section 3.2 Monte Carlo Modelling Assessment, Table 3-1 (figure 19a) and **3-2** of the Proposed Discharge Criteria for Owenkillev River and

Curraghinalt Burn state dissolved metals are presented in terms of bioavailability, this measurement is best calculated using dissolved organic carbon (DOC); however, the application has stated in **Section 2.2 that DOC was not measured**. Furthermore, the reliance on DOC for this measurement makes it susceptible to seasonal variation, which is not reflected when presenting values as annual averages. Loughs Agency has significant concerns in relation to how these calculations were determined given the discrepancy identified in how the calculations were made using incorrect parameters.

Table 3-1: Calculation of Mean Target Downstream Water Quality for “Backwards” Modelling of Parameters with Environmental Standards (EQS)

Parameter	Unit	EQS (Annual Average unless stated)	Baseline quality (Average unless stated)	Baseline Std Dev	% change of EQS allowed	Downstream target ¹
<i>Physical</i>						
TSS	mg/L	25	6.31	4.05	10	8.81
BOD	mg/L	3 (90%ile)	2 (90%ile)	0.81	10	2.3 (90%ile)
<i>Nutrients/Salts</i>						
Total Ammonia N	mg/L N	0.2 (90%ile)	0.062 (90%ile)	0.043	10	0.082 (90%ile)
<i>Dissolved metals</i>						

Figure 19a

Section 3.2 Monte Carlo Modelling Assessment, Table 3-1 (figure 19b) and **3-2** of the Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn state dissolved metals are presented in terms of bioavailability, this measurement is best calculated using dissolved organic carbon (DOC); however, the application has stated in **Section 2.2 that DOC was not measured**. Furthermore, the reliance on DOC for this measurement makes it susceptible to seasonal variation, which is not

reflected when presenting values as annual averages. Loughs Agency has significant concerns in relation to how these calculations were determined given the discrepancy identified in how the calculations were made using incorrect parameters.

Table 3-1: Calculation of Mean Target Downstream Water Quality for “Backwards” Modelling of Parameters with Environmental Standards (EQS)

Parameter	Unit	EQS (Annual Average unless stated)	Baseline quality (Average unless stated)	Baseline Std Dev	% change of EQS allowed	Downstream target ¹
<i>Physical</i>						
TSS	mg/L	25	5.8	2.2	10	8.3
BOD	mg/L	3 (90%ile)	2 (90%ile)	0.94	10	2.3 (90%ile)
<i>Nutrients/Salts</i>						
Total Ammonia	mg/L N	0.2 (90%ile)	0.11 (90%ile)	0.056	10	0.13 (90%ile)
<i>Dissolved metals</i>						

Figure 19b

Section 3.2.1.1 (figure 20a) of the Proposed Discharge Criteria for Owenkillew River and Curraghinalt Burn and **Section 3.2.1.1** (figure 20b) of the Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn states the predicted concentrations in the Owenkillew River and Owenreagh River are compared to the non-statutory water quality guideline values outlined in Table 2-2. Predicted ammonia concentrations deteriorate already failing EQSs by >3%, exceeding the criteria set by the ¹Environment Agency 2014 as discussed in Section 3. Loughs Agency seeks clarification on how exceedances of parameters to a degree outside of the acceptable range (EA 2014) can be justified in the Owenkillew and Owenreagh under the WFD mandate to protect and, where necessary, restore water bodies in order to reach good status and to prevent deterioration.

¹ [LIT 10419 Modelling: surface water pollution risk assessment \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298419/LIT_10419_Modelling_surface_water_pollution_risk_assessment.pdf)

- TSS – the calculated mean TSS concentration in the Owenkillew River is predicted to be <10mg/L, identified as a guideline for the protection of Fresh Water Pearl Mussels. Therefore, the proposed discharge is considered protective of this guideline value.
- BOD – the calculated 90%ile BOD concentration is increased by the 10% allowed in the EA methodology applied in this assessment. Although the 90%ile concentration increased the mean concentration is predicted to be 1.01 mg/L post-development, compared to the 1.01 mg/L pre-development, i.e., no change. The mean concentration is within the range of 1 – 1.4 mg/L identified in BS EN 16859:2017 as a guideline for Freshwater Peal Mussels.
- Total Ammonia – the calculated 90%ile Total Ammonia concentration is increased by the 10% allowed in the EA methodology applied in this assessment. In terms of the mean concentration, it is predicted to be 0.055 mg/L, compared to the baseline mean of 0.050 mg/L. Both these values lie outside of the range for total ammonia in BS EN 16859:2017 of 0.01 to 0.05 mg/L (for mean concentrations).
- Nitrate – the calculated mean nitrate concentration is predicted to be 0.19 mg/L which is within the range of 0.125 – 0.5 mg/L identified in BS EN 16859:2017 as a guideline for Fresh Water Pearl Mussels. The discharge is set to the Northern Ireland drinking water standard.

Figure 20a

- TSS – the calculated mean TSS concentration in the Owenreagh River is predicted to be <10 mg/L, identified as a guideline for the protection of Freshwater Pearl Mussels. Therefore, the proposed discharge is considered protective of this guideline value.
- BOD – the calculated 90%ile BOD concentration is increased by the 10% allowed in the EA methodology applied in this assessment. In terms of the mean concentration, it is predicted to be 1.35 mg/L post-development, compared to 1.23 mg/L pre-development. The change in baseline is within the allowed 13% increase in baseline used by NIEA to assess sewage discharges. It is also within the range of 1 – 1.4 mg/L identified in BS EN 16859:2017 as a guideline for Freshwater Pearl Mussels.
- Total Ammonia – the calculated 90%ile Total Ammonia concentration is increased by the 10% allowed in the EA methodology applied in this assessment. In terms of the mean concentration it is predicted to be 0.071 mg/L, compared to the baseline mean of 0.062 mg/L. Both these values lie outside of the range for total ammonia in BS EN 16859:2017 of 0.01 to 0.05 mg/L (for mean concentrations). However, the current and proposed mean concentrations are below the NIEA guidance for sewage discharges (0.1 mg/L) and the change in baseline is within the allowed increase of 28% used by NIEA to assess sewage discharges.
- Nitrate – the calculated mean nitrate concentration is predicted to be 0.53 mg/L, compared with a baseline mean value of 0.24 mg/L, which takes the mean just outside of the range of 0.125 – 0.5 mg/L identified in BS EN 16859:2017 as a guideline for Freshwater Pearl Mussels. The discharge is set to the Northern Ireland drinking water standard.

Figure 20b

Table 3-6 (figure 21a and figure 20b) presents mercury threshold in terms of a 95th percentile in lieu of an absolute EQS value. Loughs Agency seek clarification on whether the 10% acceptable increase would be exceeded in the instance where the EQS value is used.

Table 3-6: Results of "Forwards" Monte Carlo Modelling for the Owenkillew River at Curraghinalt Burn

Parameter	Unit	EQS (Annual Average unless stated)	Observed Quality Upstream of Discharge (Average unless stated)	Calculated Quality Downstream of Discharge (Average unless stated)	Increase in Concentration in Receiving River as Percent of EQS (Average unless stated)
<i>Physical</i>					
TSS	mg/L	25	6.31	6.80	2%
BOD	mg/L	3 (90%ile)	2 (90%ile)	2.3 (90%ile)	10%
<i>Nutrients/Salts</i>					
Total Ammonia	mg/L N	0.2 (90%ile)	0.062 (90%ile)	0.072 (90%ile)	5%
Nitrate	mg/L N		0.12	0.19	
Nitrite	mg/L N		0.003	0.0038	
Chloride	mg/L		9.78	11.2	
Fluoride	mg/L		0.15	0.17	
Sulphate	mg/L		1.35	2.82	
<i>Metals (Dissolved)</i>					
Aluminium	µg/L		68.8	70.0	
Antimony	µg/L		1.20	1.26	
Arsenic	µg/L	50	0.81	0.94	3%
Barium	µg/L		8.77	16.2	
Boron	µg/L	1500	5.30	11.0	<1%
Cadmium	µg/L	0.08	0.027	0.035	10%
Chromium (III)	µg/L	4.7	2.64	2.84	4%
Chromium (VI)	µg/L	3.4	2.64	2.67	<1%
Chromium (CrIII + CrVI)	µg/L	8.1	5.28	5.51	3%
Cobalt	µg/L	3	0.16	0.46	10%
Copper	µg/L	1.5	1.16	1.20	3%
Iron	mg/L	1	0.92	0.93	1%
Lead	µg/L	1.2	0.26	0.35	8%
Manganese	µg/L	123	92.3	92.1	<1%
Mercury	µg/L	0.07 (95%ile)	0.005 (95%ile)	0.012 (95%ile)	10%
Molybdenum	µg/L	73	0.16	0.57	6%
Nickel	µg/L	4.0	0.58	0.709	3%
Selenium	µg/L		0.60	0.65	
Silver	µg/L	0.5	2.5	2.51	2%
Sodium	mg/L		6.13	7.27	
Uranium	µg/L	15	2.5	2.6	<1%
Zinc	µg/L	10.9	3.92	5.01	10%

Figure 21a

Table 3-6: Results of “Forwards” Monte Carlo Modelling for the Owenreagh River at Pollanroe Burn

Parameter	Unit	EQS (Annual Average unless stated)	Observed Quality Upstream of Discharge (Average unless stated)	Calculated Quality Downstream of Discharge (Average unless stated)	Increase in Concentration in Receiving River as Percent of EQS (Average unless stated)
<i>Physical</i>					
TSS	mg/L	25	5.76	7.04	5%
BOD	mg/L	3 (90%ile)	2 (90%ile)	2.29 (90%ile)	10%
<i>Nutrients/Salts</i>					
Total Ammonia	mg/L N	0.2 (90%ile)	0.11 (90%ile)	0.13 (90%ile)	10%
Nitrate	mg/L N		0.24	0.53	-
Nitrite	mg/L N		0.0032	0.0071	-
Chloride	mg/L		13.52	19.8	-
Fluoride	mg/L		0.15	0.24	-
Sulphate	mg/L		1.62	8.14	-
<i>Metals (Dissolved)</i>					
Aluminium	µg/L		53.6	57.8	-
Antimony	µg/L		1.22	1.35	-
Arsenic	µg/L		0.56	0.83	-
Barium	µg/L		8.15	42.3	-
Boron	µg/L	1500	4.60	30.9	2%
Cadmium	µg/L	0.08	0.029	0.037	10%
Chromium (III)	µg/L	4.7	2.27	2.74	10%
Chromium (VI)	µg/L	3.4	2.22	2.43	6%
Chromium (CrIII + CrVI)	µg/L	8.1	4.49	5.19	9%
Cobalt	µg/L	3	0.085	0.39	10%
Copper	µg/L	8.89	1.24	2.13	10%
Iron	mg/L	1	0.62	0.62	0%
Lead	µg/L	7.2	0.33	0.61	4%
Manganese	µg/L	162	79.1	82.3	3%
Mercury	µg/L	0.07 (95%ile)	0.005 (95%ile)	0.012 (95%ile)	10%
Molybdenum	µg/L	73	0.15	2.01	3%
Nickel	µg/L	10.2	0.23	0.76	8%
Selenium	µg/L		0.60	0.85	-
Silver	µg/L	0.5	2.5	2.52	2%
Sodium	mg/L		8.63	13.7	-
Uranium	µg/L	15	2.5	3.23	5%
Zinc	µg/L	20.3	4.75	6.77	10%

Figure 21b

3.2.1.2 of the Proposed Discharge Criteria for Owenkillew River and Curraghinalt Burn states that baseline water quality and flow data for the Curraghinalt Burn used the same modelling as taken for the Owenkillew River, but with predictions compared to drinking water standards (figure 22a). Throughout this section, drinking water standards have been applied to Curraghinalt Burn. Due to the presence of salmonids in the Curraghinalt Burn these standards are not applicable. Due to the presence of salmonids creating a functional linkage between the Owenkillew River SAC and the Curraghinalt Burn, the Curraghinalt Burn is entitled to the same level of protection of aquatic life through EQS rather than standards for drinking water.

Monte Carlo "forwards" modelling was also undertaken to assess the impact of the calculated maximum discharges on the Curraghinalt Burn. Baseline water quality for the Curraghinalt Burn is summarised in Table A2 4 of Appendix 2, and flow data for the burn is summarised in Appendix 1. A summary of the inputs for the Curraghinalt Burn forwards modelling are outlined in Table 3-8.

The same approach is taken as for the Owenkillew River, but with predictions compared to drinking water standards.

Figure 22a

3.2.1.2 of the Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn states that baseline water quality and flow data for the Pollanroe Burn used the same modelling as taken for the Owenreagh River, but with predictions compared to drinking water standards (figure 22b). Throughout this section, drinking water standards have been applied to Pollanroe Burn. Due to the presence of salmonids in the Pollanroe Burn these standards are not applicable. Due to the presence of salmonids creating a functional linkage between the Owenreagh River ASSI and the

Pollanroe Burn, the Pollanroe Burn is entitled to the same level of protection of aquatic life determined based on EQS rather than standards for drinking water.

Monte Carlo "forwards" modelling was also undertaken to assess the impact of the calculated maximum discharges on the Pollanroe Burn. Baseline water quality for the Pollanroe Burn is summarised in Table A2-4 of Appendix 2, and flow data for the burn is summarised in Appendix 1. A summary of the inputs for the Pollanroe Burn forwards modelling are outlined in Table 3-8.

The same approach is taken as for the Owenreagh River, but with predictions compared to drinking water standards.

Figure 22b

Section 3.2.2 (figure 23a and figure 23b) assesses "*Risk to EQS*" (i.e., could the proposed load cause a failure of the receiving water EQS) caused by observed discharge concentrations. As stated throughout, Loughs Agency are of the opinion that EQSs for the protection of aquatic life are required for the Curraghinalt Burn and Pollanroe Burn. With EQSs applied, it is likely that more parameters would exceed EQS values. Parameters already in exceedance of EQSs would need to be addressed regardless. The application has also stated in **Section 2.4** that the 95%ile was used for mercury EQSs rather than the defined maximum EQS, bringing the levels of non-compliance for mercury into question.

Results from the compliance test for dissolved metals and other parameters are summarised in Table 3-10, based on an assumed monthly sampling programme (i.e., 12 samples every year). The majority of parameters comply with the criteria outlined above, namely a less than 5% change of exceedance of the EQS in the receiving waters. However, exceedances are predicted for two parameters which either have their mean values above the standard (iron) or detection limits which approach or exceed the standard (silver). The impact of the mine discharge is minor for all parameters, with a 3% increase in non-compliance for iron, a 2.2% increase of cadmium, a 1% increase for copper, and a 0.1% increase for chromium VI, with zero for all other parameters.

Figure 23a

Results from the compliance test for dissolved metals and other parameters are summarised in Table 3-10, based on an assumed monthly sampling programme (i.e., 12 samples every year). The majority of parameters comply with the criteria outlined above, namely a less than 5% change of exceedance of the EQS in the receiving waters. However, exceedances are predicted for three parameters which either have high standard deviations that result in some samples exceeding the standard (Total Ammonia and BOD) or detection limits which approach or exceed the standard (silver). The impact of the mine discharge is minor for all parameters, with a 1.7% increase in non-compliance for mercury and less than or equal to 1% for all other parameters.

Figure 23b

Section 4 (figure 24a) of the Proposed Discharge Criteria for Owenkillew River and Curraghinalt Burn states, "*The discharge criteria were set based on EQS values for the Owenkillew River. They were then adjusted with comparison to drinking water standards, so that the discharge quality at the outfall into the Curraghinalt Burn met (at a minimum) Northern Ireland and other international drinking water standards.*" Loughs Agency attended electrofishing survey undertaken in 2022 with consultants working on behalf of the applicant which identified salmonid populations present in the Curraghinalt Burn. The details of this electrofishing assessment are included in Appendix 1 of the Gold Mine SOC (LA10_2017_1249_F). In

light of this finding, the ecological value of the Curraghinalt Burn **must be elevated, and discharge criteria should be set to EQS values for the protection of aquatic life to reflect this.**

The discharge criteria were set based on EQS values for the Owenkillev River. They were then adjusted with comparison to drinking water standards, so that the discharge quality at the outfall into the Curraghinalt Burn met (at a minimum) Northern Ireland and other international drinking water standards. Finally, the impact of the discharge on mean water quality in the Owenkillev River was compared to non-statutory guidelines, including the British Standard relevant to monitoring Freshwater Pearl Mussel populations and their environment.

Figure 24a

Section 4 (figure 24b) of the Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn states, "*The discharge criteria were set based on EQS values for the Owenreagh River. They were then adjusted with comparison to drinking water standards, so that the discharge quality at the outfall into the Pollanroe Burn met (at a minimum) Northern Ireland and other international drinking water standards.*" Loughs Agency attended electrofishing survey undertaken in 2022 with consultants working on behalf of the applicant which identified salmonid populations present in the Pollanroe Burn. The details of this electrofishing assessment are included in Appendix 1 of the Gold Mine SOC (LA10_2017_1249_F). In light of this finding, the ecological value of the Pollanroe Burn **must be elevated, and discharge criteria should be set to EQS values for the protection of aquatic life to reflect this.**

The discharge criteria were set based on EQS values for the Owenreagh River. They were then adjusted with comparison to drinking water standards, so that the discharge quality at the outfall into the Pollanroe Burn met (at a minimum) Northern Ireland and other international drinking water standards. Finally, the impact of the discharge on mean water quality in the Owenreagh River was compared to non-statutory guidelines, including the British Standard relevant to monitoring Freshwater Pearl Mussel populations and their environment.

Figure 24b

Section **3.3 (figure 25)** states baseline concentrations of one of the fourteen parameters exceed baseline concentrations in the Pollanroe Burn. Given the presence of salmonids in the Pollanroe Burn consideration must be given to the burn to elevate its status from the assumed “*low ecological sensitivity*” status it has been granted in the Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn. Loughs Agency requires that the Pollanroe Burn be reassessed to ascertain how many of the 14 parameters reviewed in the quoted “*Tables 3-11*” would exceed the discharge criteria when using appropriate standards for the protection of aquatic life.

Predictions of the potential quality of seepage water have been undertaken by geochemists in support of the Environmental Statement for the mine. Review of the predictions indicated that concentrations of fourteen parameters in the seepage water exceeded baseline concentrations in the Pollanroe Burn (i.e., nitrate, ammonia, sulphate, antimony, arsenic, barium, chromium VI, copper, molybdenum, lead, nickel, selenium, uranium and zinc). The predicted concentrations of these parameters are shown in Table 3-11.

Of the fourteen parameters in Table 3-11 the concentrations of molybdenum only are shown to exceed the proposed discharge criteria. A check is made on whether the additional loadings from seepage would result in changes to the water quality in the receiving waters that would require an adjustment to the discharge criteria. The calculations, presented in Table 3-11, show that the loadings of all parameters except molybdenum would have no impact on downstream quality. For this parameter the impact is very small, with the seepage increasing the combined treatment plant and seepage concentration to 70.1 ug/L for molybdenum (0.1 ug/L above the Drinking Water standard). These calculations are conservative with the treatment plant discharge at the discharge limit, the seepage rate at the end of operations and no dilution from any non-contact water in the river.

Figure 25

Appendix 2 Table A2.1 (figure 26a) of the Proposed Discharge Criteria for Owenkillew River and Curraghinalt Burn and **Appendix 2 Table A2.1** (figure 26b) of the Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn provides an overview of QAQC analyses for water quality data. The poor correlation between field and laboratory measurements post-2017 raises questions about whether data collected in the laboratory or field is more accurate and the accuracy of prediction models (M-BAT) based off these data.

QAQC Check	Result
Blank samples	1 instance of BOD >5x LOD (SW05, 2017-2019 data); 1 instance of Cr_D >5x LOD (SW05, 2017-2019 data); Low levels of As, Cr, Cu, Fe, Ni and Zn in several samples (all data) – however low level 'trace concentrations' would not affect the results for other samples
Blind duplicates	All duplicates (2017-2019) show good correlation (<±20% relative percent difference); Pre-2017, 90.2% of duplicates (all samples) show good correlation.
Dissolved vs Total Metals	For 2017-2019 data, 86% of sample (all samples) dissolved results are within 1.1x the total concentration; Pre-2017, 99.1% of the results (all samples) have a dissolved concentration less than the total metal concentration.
Field vs Lab Measurements	For 2017-2019 data, generally poor correlation – could result from differences in instrument calibration or minor changes in sample composition between sampling and laboratory analysis; Pre-2017, generally good correlation between field and lab pH and EC.
Parameters below detection	All values recorded below detection set to ½ analytical detection limit All F values for SW05 set to ½ analytical detection limit (>95% of values below LOD)
Outliers	2 x Zn outliers for SW02

Figure 26a

QAQC Check	Result
Blank samples	Relevant parameters reported as > 5x the limit of detection include total ammonia, total dissolved solids, aluminium and biological oxygen demand. Relevant parameters reported as < 5x the limit of detection include aluminium, arsenic, copper, zinc, chromium, molybdenum, nickel, antimony, total dissolved solids, fluoride, mercury, iron, total ammonia and biological oxygen demand. Results with very low (i.e., trace) concentrations would not affect the results for the other samples on these batches so are not considered significant.
Blind duplicates	Most duplicates show good correlation (< ±20% relative percent difference); only three parameters show duplicate differences > ±20%: aluminum, iron and zinc (all on 2018-09-10)
Dissolved vs Total Metals	For 2017-2019 data, 86% of sample (all samples) dissolved results are within 1.1x the total concentration. Pre-2017, 99.1% of the results (all samples) have a dissolved concentration less than the total metal concentration.
Field vs Lab Measurements	For 2017-2019 data, generally poor correlation – could result from differences in instrument calibration or minor changes in sample composition between sampling and laboratory analysis. Pre-2017, generally good correlation between field and lab pH and EC.
Parameters below detection	All values recorded below detection set to ½ analytical detection limit
Outliers	None.

Figure 26b

Conclusion

Loughs Agency have presented a number of areas throughout the ‘Proposed Discharge Criteria for Owenkillew River and Curraghinalt Burn’ and the ‘Proposed Discharge Criteria for Owenreagh River and Pollanroe Burn’ which calls into question the validity of the data presented within the discharge consent application. The use of incorrect or non-

applicable standards presents a potential threat to aquatic life within the Curraghinalt Burn and the Pollanroe Burn, which are habitat for Atlantic salmon and trout.