

TB21 – Geochemistry

Curraghinalt, Gortin

December 2025

Response to Transboundary Consultation Representations – [REDACTED] (SRK Consulting Ltd)

| Representation Ref | Comment/Issue | Addressed in applicant's submissions to date? | Applicant's Response |
|--|---|---|---|
| TBA0001; 0002; 0003; 0004; 0011; 0013; 0018; 0027; 0028; 0029; 0032; 0035; 0038; 0043; 0045; 0051; 0054; 0058; 0066; 0070; 0073; 0075; 0078; 0080; 0083; 0101; 0106; 0107; 0108; 0119; 0120; 0140; 0142; 0148; 0152; 0154; 0158; 0165; 0184; 0199; 0201; 0206; 0210; 0217; 0223; 0231; 0236; 0239; 0240; 0242; 0248; 0254; 0255; 0257; 0262; 0272; 0276; 0279; 0281; 0289; 0290; 0300; 0304; 0306; 0312; 0326; 0330; 0346; 0351; 0354; 0361; 0364; 0366; 0374; 0379; 0383; 0387; 0389; 0391; 0307; 0313; 0327; 0332; 0343; 0347; 0349; 0357; 0368; 0381; 0392; 0397; 0323; 0405; 0414; 0420; 0435; 0440; 0441; 0445; 0451; 0452; 0457; 0460; 0474; 0478; 0482; 0487; 0490; 0493; 0498; 0469; 0502; 0510; 0515; 0519; 0522; 0525; 0529; 0533; | Acid mine drainage is a permanent problem, which, once started, continues in perpetuity, poisoning land and water. Apparently, there was acid mine drainage found at Dalradian's site at Curraghinalt in 2013. Mines in Spain operating from Roman times are still leaking acid mine drainage (Olias and Nieto, 2015)." | No - reference to Spanish mines is new | The Geochemical Characterisation Report (Appendix B9 to the Second to the ES - 2020) sets out the process for assessing the potential for ARDML in the materials due to be mined at Curraghinalt. The report needs to be read in its entirety to understand assessment process and the generation of numerical water quality predictions which are then used in the Surface Water (Appendix C4 to the Second Addendum to the ES - 2020) and Groundwater Impact Assessment Reports (Appendix C6 to the Second Addendum to the ES – 2020). The Curraghinalt mining method and geology are very different from the Rio Tinto mine in Spain. Rio Tinto is a Volcanic Massive Sulfide (VMS) style deposit; it was and continues to be mined as a large-scale open pit mine; it has been actively mined since Roman times with (historically) no environmental controls, no progressive rehabilitation and no planned closure scheme. In addition the rock types and the style of mineralization is very different such that the comparison is not relevant and reflects no geological understanding on behalf of the representor. |

0539; 0541; 0549; 0553; 0554; 0555;
0559; 0561; 0571; 0572; 0573; 0575;
0579; 0583; 0587; 0597; 0598; 0608;
0613; 0616; 0623; 0626; 0636; 0641;
0648; 0652; 0657; 0663; 0667; 0672;
0677; 0682; 0688; 0696; 0700; 0703;
0707; 0711; 0713; 0716; 0722; 0724;
0744; 0747; 0755; 0759; 0760; 0761;
0763; 0767; 0772; 0779; 0786; 0792;
0802; 0806; 0814; 0815; 0818; 0821;
0824; 0848; 0849; 0851; 0853; 0854;
0855; 0859; 0870; 0871; 0876; 0878;
0882; 0886; 0889; 0892; 0895; 0899;
0904; 0912; 0916; 0918; 0923; 0936;
0949; 0951; 0955; 0959; 0962; 0971;
0977; 0980; 0988; 0989; 0992; 0998;
1003; 1011; 1014; 1022; 1024; 1029;
1030; 1032; 1033; 1043; 1047; 1048;
1055; 1062; 1071; 1074; 1076; 1078;
1083; 1088; 1095; 1097; 1102; 1108;
1111; 1113; 1116; 1125; 1127; 1131;
1134; 1137; 1139; 1146; 1150; 1156;
1159; 1162; 1166; 1174; 1186; 1190;
1196; 1200; 1201; 1208; 1209; 1223;
1231; 1241; 1244; 1250; 1251; 1257;
1260; 1265; 1268; 1274; 1275; 1282;
1286; 1288; 1290; 1294; 1296; 1299;
1301; 1303; 1309; 1311; 1313; 1319;
1323; 1333; 1336; 1339; 1346; 1355;
1357; 1360; 1370; 1377; 1379; 1385;
1387; 1389; 1395; 1398; 1399; 1402;
1408; 1414; 1422; 1423; 1424; 1427;
1428; 1433; 1439; 1453; 1458; 1471;
1476; 1479; 1484; 1486; 1489; 1504;
1506; 1513; 1521; 1522; 1523; 1524;
1542; 1543; 1545; 1547; 1549; 1550;

1552; 1553; 1555; 1562; 1567; 1568;
 1572; 1578; 1579; 1580; 1582; 1586;
 1588; 1593; 1594; 1596; & 1604 - Pg
 2-3

| | | | |
|----------------------------|--|---|---|
| TBA1493 - An Taisce - Pg 2 | <p>Acid Mine Drainage - With the amount of rock that Dalradian proposes to extract and dump, acid mine drainage has the potential to be a forever-problem. Mines in Spain operating from Roman times are still leaching acid mine drainage (AMD) (Olias and Nieto, 2015). As a legacy of the Avoca mines in Co. Wicklow, which closed in 1982, 15 years after closure the Avoca River was still receiving 35 litres of AMD per second, labelled the 'most metal polluted river in Ireland' by the EPA.</p> | <p>No – reference to mines in Spain and Avoca are new</p> | <p>The Geochemical Characterisation Report (Appendix B9 to the ES – 2020) assesses the potential for ARDML in the materials due to be mined at Curraghinalt. The report includes generation of numerical water quality predictions which are used in combination with flow rates to assess potential water quality impacts in the Surface Water and Groundwater Impact Assessments (Appendix C4 and Appendix C6 to the ES – 2020). Curraghinalt mining method and geology are different from the Rio Tinto and Avoca Mines. The explanation of why Rio Tinto is not a relevant comparison is explained above.</p> <p>Similarly, the Avoca Mines, also a volcanic hosted massive sulfide that has a large hydrothermal alteration zone over which pyrite is the dominant mineral. By comparison sulfide values are only within the ore zone at Curraghinalt and there will be negligible amounts of pyrite in the waste rock as opposed to the large spoil heaps in the Avoca valley. Also the Avoca mine generated more than 15 Mt of mine waste as well as 3 Mt of ore. Curraghinalt will be considerably smaller. In addition, Avoca has a long history of mining with no modern environmental controls so separated the weathering of sulfides. Both Rio Tinto and Avoca were mined as open pits over the last 200 years and remain largely exposed with limited remediation. As a result, these mines are not a relevant comparison to Curraghinalt. The Avoca mine is also in a deeply incised valley, has no mineral buffering and has higher tonnage of sulfide bearing rock. Again, the attempted analogy is inapplicable and unreasonable.</p> |
| Pg 22 | <p>We note a study from Hassan et al (2024)¹⁶ which finds that physical treatment of mine tailings i.e dumping, covering and solidifying, experiences reduced efficacy when the soil is highly contaminated. This introduces prohibitive costs for</p> | <p>No</p> | <p>The Hassan paper covers phytoremediation of exposed tailings. This is not relevant to the Curraghinalt Project as the tailings will be compacted, progressively rehabilitated using an engineered cap (see Appendix G3 section 4.8 of Appendix B3 to the ES -</p> |

| | | | |
|--|---|-----|---|
| | the mine operator and may reduce the quality of remediation. The leaching effects into receiving aquatic ecosystems that this entails has transboundary implications due to watercourses flowing into the River Finn SAC and Lough Foyle SPA, both of which are within the ROI jurisdiction. | | 2020). The reference to the Hassan paper has no relevance to the tailings management on this project. |
| TBA1603 - Environmental Justice Network Ireland - Pg 17-18 | Among the heavy metals to be discharged into the Owenkillew River and Owenreagh River include cadmium (known for its accumulation in the food chain, drinking water and soil), arsenic, lead, chromium and mercury, which can remain suspended in air due to its volatile nature. For example, in the Rio Tinto in Spain, pollution from copper mining has lasted over 5,000 years. Given the findings of the independent environmental and ecology assessments in relation to the impact on water quality and ecology, this is highly concerning. A world-renowned mining and groundwater expert, Dr Steven Emerman, has queried the methodology for the mine waste facility and lack of design flood in Dalradian Gold's plans. The parameters and scope of the Dalradian project continue to shapeshift in what can only be interpreted as a means of ensuring planning permission at all costs. | Yes | For bioaccumulation and air quality explanations see TBR9 – Surface Water and TBR12 – Air Quality. It is not appropriate to compare the Rio Tinto mine in Spain with the Curraghinalt Project, as explained above. Flood designs are outside the scope of the Geochemistry work and are dealt with in other sections of this response. Dr Emerman is not qualified to comment on geochemistry and did not do so in his commentary so the comment is irrelevant. |
| TBA0001; 0002; 0003; 0004; 0011; 0013; 0018; 0027; 0028; 0029; 0032; 0035; 0038; 0043; 0045; 0051; 0054; 0058; 0066; 0070; 0073; 0075; 0078; 0080; 0083; 0101; 0106; 0107; 0108; 0119; 0120; 0140; 0142; 0148; 0152; 0154; 0158; 0165; 0184; 0199; 0201; 0206; 0210; 0217; 0223; 0231; 0236; 0239; 0240; 0242; 0248; 0254; 0255; 0257; 0262; 0272; 0276; 0279; 0281; 0289; 0290; 0300; 0304; 0306; 0312; 0326; 0330; 0346; 0351; 0354; 0361; | "In Dalradian's Statement of Case in October 2024, they added in "new information," where they state that for 7 years post closure, there would be a discharge of 4,400 gallons per day from their adit into the Owenkillew River, via the Curraghinalt Burn. After 7 years, this discharge would increase to 176,000 gallons per day, forever! This is hugely worrying as this would most likely be acid mine drainage, which would join the contaminated waste flowing from the Filtered Tailings Stack, and both would pervade the | Yes | Discharge rates are outside of the geochemistry scope, refer to TBR6 – Ecology and TBR9 – Surface Water. The potential for ARDML is assessed in the Geochemistry Characterisation Report (Appendix B9 to the ES - 2020) which includes the generation of numerical water quality predictions which are used as inputs to the Surface Water and Groundwater Impact Assessment Reports (Appendix C4 and Appendix C6 to the ES – 2020). |

0364; 0366; 0374; 0379; 0383; 0387; entire Foyle river system, putting all aquatic life in
0389; 0391; 0307; 0313; 0327; 0332; grave danger."
0343; 0347; 0349; 0357; 0368; 0381;
0392; 0397; 0323; 0405; 0414; 0420;
0435; 0440; 0441; 0445; 0451; 0452;
0457; 0460; 0474; 0478; 0482; 0487;
0490; 0493; 0498; 0469; 0502; 0510;
0515; 0519; 0522; 0525; 0529; 0533;
0539; 0541; 0549; 0553; 0554; 0555;
0559; 0561; 0571; 0572; 0573; 0575;
0579; 0583; 0587; 0597; 0598; 0608;
0613; 0616; 0623; 0626; 0636; 0641;
0648; 0652; 0657; 0663; 0667; 0672;
0677; 0682; 0688; 0696; 0700; 0703;
0707; 0711; 0713; 0716; 0722; 0724;
0744; 0747; 0755; 0759; 0760; 0761;
0763; 0767; 0772; 0779; 0786; 0792;
0802; 0806; 0814; 0815; 0818; 0821;
0824; 0848; 0849; 0851; 0853; 0854;
0855; 0859; 0870; 0871; 0876; 0878;
0882; 0886; 0889; 0892; 0895; 0899;
0904; 0912; 0916; 0918; 0923; 0936;
0949; 0951; 0955; 0959; 0962; 0971;
0977; 0980; 0988; 0989; 0992; 0998;
1003; 1011; 1014; 1022; 1024; 1029;
1030; 1032; 1033; 1043; 1047; 1048;
1055; 1062; 1071; 1074; 1076; 1078;
1083; 1088; 1095; 1097; 1102; 1108;
1111; 1113; 1116; 1125; 1127; 1131;
1134; 1137; 1139; 1146; 1150; 1156;
1159; 1162; 1166; 1174; 1186; 1190;
1196; 1200; 1201; 1208; 1209; 1223;
1231; 1241; 1244; 1250; 1251; 1257;
1260; 1265; 1268; 1274; 1275; 1282;
1286; 1288; 1290; 1294; 1296; 1299;
1301; 1303; 1309; 1311; 1313; 1319;

1323; 1333; 1336; 1339; 1346; 1355;
 1357; 1360; 1370; 1377; 1379; 1385;
 1387; 1389; 1395; 1398; 1399; 1402;
 1408; 1414; 1422; 1423; 1424; 1427;
 1428; 1433; 1439; 1453; 1458; 1471;
 1476; 1479; 1484; 1486; 1489; 1504;
 1506; 1513; 1521; 1522; 1523; 1524;
 1542; 1543; 1545; 1547; 1549; 1550;
 1552; 1553; 1555; 1562; 1567; 1568;
 1572; 1578; 1579; 1580; 1582; 1586;
 1588; 1593; 1594; 1596; & 1604 - Pg
 3

| | | | |
|---|--|-----|---|
| TBA1502 – RABHARTA - Pg 4 | Arsenic contamination | Yes | Arsenic was included as a potential parameter of concern and a source term was generated for arsenic in the Numerical Water Quality Predictions (Section 11 of the Geochemical Characterisation Report, Appendix B9 of the Second Addendum to the ES – 2020). This source term was incorporated into the Surface Water and Groundwater Impact Assessment Reports (Appendix C4 and Appendix C6 of the ES – 2020). The assessment showed only limited Arsenic mobility in the environment. The high level of Iron precipitation leads to efficient Arsenic attenuation. |
| TBA1503 - Zero Waste Alliance Ireland - Pg 17 | The rock extracted from the mine would contain sulphides which, when exposed to air and water, would produce sulphuric acid, another term for it is Acid Mine Drainage which would strip out heavy metals from the rock, such as arsenic, mercury, chromium, cadmium, lead, zinc, copper etc. Acid Mine drainage is a permanent problem, which, once started, continues in perpetuity, poisoning land and water. Mine in Spain operating from Roman times are still leaking. | Yes | The potential for ARDML is assessed in the Geochemical Characterisation Report (Appendix B9 of the Second Addendum to the ES – 2020). The report includes numerical water quality predictions for the parameters listed here. These predictions are used as inputs in the Surface Water and Groundwater Impact Assessment Reports (Appendix C4 and Appendix C6 of the Second Addendum to the ES – 2020). It is not appropriate to make a comparison between the mine in Spain and the Curraghinalt Project for the reasons detailed above. The generation of ARD is not as simple as described and any generated acid is subject to interaction with the volumetrically more dominant gangue (valueless) minerals that consume acid. By so doing, pH is buffered and metal(loid)s attenuate or precipitate from solution. |

| | | | |
|-------------------------------------|---|-----|--|
| TBA0143 - [REDACTED] Pg 1 | - The mine's waste will contain toxic heavy metals like arsenic, mercury, and lead. These could leak into rivers that flow into Donegal and Lough Foyle, threatening fish, wildlife and drinking water. | Yes | The potential for metal leaching is assessed as part of the Geochemical Characterisation Report (Appendix B9 of the Second Addendum to the ES – 2020) which includes generation of numerical water quality predictions. These predictions are used as inputs into the Surface Water (Appendix C4 to the ES - 2020) and Groundwater Impact Assessment Reports (Appendix C6 to the ES – 2020). Any potential ecological impacts are assessed within ES Appendix C8 and C9 to the ES and addenda. The same information is summarised in the Mine Statement of Case - TR6 and the updated sHRA 2025 appended to TBR6 – Ecology of this submission. |
| TBA0412 - Pg 1 | The mines waste includes arsenic lead and mercury all of which will contaminate water bodies killing fish and poisoning drinking water for years to come. | Yes | See above comment. |
| TBA0506 Wild Ireland Defence - Pg 1 | The rock extracted from the mine would contain sulphides which, when exposed to air and water, would produce sulphuric acid, another term for it is Acid Mine Drainage which would strip out heavy metals from the rock, such as arsenic, mercury, chromium, cadmium, lead, zinc, copper etc. Acid Mine drainage is a permanent problem, which, once started, continues in perpetuity, poisoning land and water. Dalradian also state it would have to be kept dry to prevent Acid Mine Drainage from forming and leaching into the groundwater. Such disparity does not elicit confidence. | Yes | The potential for ARDML is assessed in the Geochemical Characterisation Report (Appendix B9 of the Second Addendum to the ES – 2020). The report includes numerical water quality predictions for the parameters listed here. These predictions are used as inputs in the Surface Water and Groundwater Impact Assessment Reports (Appendix C4 and Appendix C6 of the ES – 2020). The design of the mine waste facilities is outside of the Geochemistry scope and described within the Waste Management Plan (Appendix B3 of the Second Addendum to the ES – 2020, specifically Appendix G3 to Appendix B3). |
| TBA0545 - Pg 2 | The rock extracted from the mine would contain sulphides which, when exposed to air and water, would produce sulphuric acid, another term for it is Acid Mine Drainage which would strip out heavy metals from the rock, such as arsenic, mercury, chromium, cadmium, lead, zinc, copper etc. Acid Mine drainage is a permanent problem, which, once started, continues in perpetuity, poisoning land and water. | Yes | See above comment |

| | | | |
|--|---|-----|---|
| Pg 3 | In Dalradians SoC they added that for 7 years post closure, there would a discharge of 4,400 gallons per day from the Adit to the Owenkillew River, via the Curraghinalt Burn. After 7 years the discharge would increase to 176,000 gallons per day forever. This is hugely worrying as this would most likely be acid mine drainage which would join the contaminated waste from the DSF and both would pervade the entire Foyle River System putting all aquatic life in grave danger. | Yes | See above comment for ARDML. Refer to TBR9 – Surface Water for water discharges. |
| TBA0945 - pg 1 -2 TBA1494 - pg 5 -9 TBA1496 - pg 9 -12 | There are multiple pathways by which the proposed goldmine would pose serious risks to the waters of County Donegal , including ... Acid Mine Drainage; ... | Yes | The potential for ARDML is assessed in the Geochemical Characterisation Report (Appendix B9 of the Second Addendum to the ES – 2020). The report includes numerical water quality predictions for the parameters listed here. These predictions are used as inputs in the Surface Water and Groundwater Impact Assessment Reports (Appendix C4 and Appendix C6 of the ES – 2020). Potential contaminant pathways and potential discharge of contaminated waters are reviewed as part of these Surface Water and Groundwater Impact Assessments. Refer to TBR9 – Surface Water and TBR10 – Groundwater of this submission. |

| | | | |
|--|---|------|--|
| TBA0991 - Pg 2 | The rock they're mining contains sulphides. When exposed to air and water, it creates sulphuric acid - what's known as Acid Mine Drainage (AMD). The acid leaches heavy metals like arsenic, mercury and lead into the environment. And here the scary part, once it starts it doesn't stop. It keeps going poisoning the land and water forever. There is already evidence of AMD at the Curraghinalt site from 2013 | | The potential for ARDML is assessed in the Geochemical Characterisation Report (Appendix B9 of the Second Addendum to the ES – 2020). The report includes numerical water quality predictions for the parameters listed here. These predictions are used as inputs in the Surface Water and Groundwater Impact Assessment Reports (Appendix C4 and Appendix C6 of the ES – 2020). Section 10 of the Surface Water Baseline report records the water quality associated with the existing site infrastructure and Section 5 of the Surface Water Impact Assessment (Appendix C4 of the ES – 2020) states that for surface water quality, sources of impact from the existing surface infrastructure site are assessed. A summary of the surface water impact assessment is presented in Section 11 of the same report. . |
| TBA1206 | The rock extracted from the mine would contain sulphides which, when exposed to air and water, would produce sulphuric acid, another term for it is Acid Mine Drainage which would strip out heavy metals from the rock, such as arsenic, mercury, chromium, cadmium, lead, zinc, copper etc. Acid Mine drainage is a permanent problem, which, once started, continues in perpetuity, poisoning land and water | Yes | See response above |
| TBA1581 - Jesuit Centre for Faith & Justice - Pg 4 | | | |
| TBA1564 - Ecojustice Ireland - pg 3 | Waters of Donegal could be affected via ..., acid mine drainage.... | | See above responses |
| Pg 3 | risk of toxic tailings which could ruin the integrity of Lough Foyle | | See above responses |
| Pg 3 | acid mine drainage would arise from rock extracted from the min | | See above responses |
| Pg 3-4 | Already Acid Mine Drainage has been identified as an issue on the site as early as 2013....To knowingly allow the release of dangerous and contaminating heavy metals into the water system of the Foyle makes a mockery of its many designations and poses an unacceptable threat to the well-being of that system and the life it supports, including humans. It | Yes? | Section 5 of the Surface Water Impact Assessment (Appendix C4 of the ES – 2020) states that for surface water quality, sources of impact from the existing surface infrastructure site are assessed. A summary of the surface water impact assessment is presented in Section 11 of the same report. |

in effect be considered a wilful act of ecocide, a crime now being increasingly recognised internationally and potentially retrospectively applied.

TBA1514 - Pg 12

High levels of arsenic in the geology.

Yes

The Geochemistry Characterisation Report (Appendix B9 of the Second Addendum to the ES – 2020) references elevated arsenic and hence this parameter was included in the numerical water quality predictions (Section 11 of the same report). These numerical water quality predictions were subsequently used as inputs to the Surface Water and Groundwater Impact Assessment Reports (Appendix C4 and Appendix C6 of the Second Addendum to the ES – 2020).
