

Blairbeg House
Lamlash, Isle of Arran KA27 8JT

2 December 2021

Letter attached to email: planning@lochlomond-trossachs.org

Ms Alison Williamson – Case Officer
Loch Lomond and Trossachs Park Authority
Planning Department
Carrochan
Balloch
G83 8EG

Dear Ms Williamson

**PLANNING APPLICATION 2021/0357/DET
BEINN REITHE SEMI ENCLOSED SALMON FARM**

I wish to register my objection to this application as I firmly believe the design of this aquaculture development is fundamentally flawed in one of its objectives, namely to contain the animal wastes arising and therefore protect the surrounding marine environment.

The subject of this planning application, the construction and operation of what would be one of the largest salmon aquaculture units in Scottish waters utilising a new technological approach raises fundamental questions regarding its suitability for the location proposed. The applicant has selected a design marketed by FiiZK which allows for caged fish to be raised in inshore sheltered waters whilst minimizing the risk of infestation by sea lice, the plague of marine open cage fish farming. This is achieved by simply pumping seawater from depth where sea lice and their larvae are not normally found into the net cage surrounded by an impervious plastic outer skirt or curtain to prevent fish exposure to surface waters. The excess head of water results in an outward flow from ports situated towards the base of the skirt. These waters at depth are dissolved oxygen deficient so the pumped water is intentionally oxygenated, a vital factor in preserving life in the cages.

An additional design feature is aimed at containing the faecal solid wastes from the stocked fish and this is said to be achieved through natural settlement through the water column to the base of each cage where the outer skirt is then enclosed in the shape of a funnel. The settled solids are then pumped ashore as a sludge, dewatered and exported from site by tanker. It is claimed that 85% of the faecal wastes arising and 100% of any excess feed is collected by this method. The remainder is carried out of the system into the surrounding waters and settles out on the seabed. It is this residual loss to the environment that is subject to what is essentially a licence to pollute, a CAR licence issued by SEPA granted on the basis that the agency's requirements are met. It is evident from the outset that any decrease in the proportion of waste collected would not meet SEPA criteria for granting a licence. It is also the case that in the low velocity flow conditions in the loch waters at this location discharge of increased quantities of waste would be catastrophic for the biodiversity of the seabed.

My contention is centrally that I disagree with the assumptions that have been used in attempting to model the conditions of settlement of solids through the water column inside the outer skirt and into the funnel for pumping ashore. To the contrary, I believe that there is a good chance that much larger quantities of solids will escape to the surrounding environment and I will try and explain the reasoning for my concern. There seem to be two key criteria governing the settlement characteristics that lead to the 85% capture projection. The first is the mean size of the particle and the second is the condition of the waters through which the particle settles. On size of particle this information is derived from a number of studies and in particular focuses on work conducted some 20 or more years ago at SAMS – Dunstaffnage. This research work was conducted to develop a standard computer based mathematical model capable of predicting the deposition characteristics of wastes from open cage fish aquaculture and its latest manifestation “newDEPOMOD” is used today by SEPA. It assumes certain conditions experienced in open cage farming and in my view the conditions in this proposed semi-enclosed facility will be sufficiently different to the extent that the 85% collection estimate is grossly overestimated. My reason for saying this is that the applicants and their scientific consultants do not appear to have taken any account of the physical condition inside the cages once stocked with fish.

A very large volume of seawater from depth is proposed to be pumped into the surface waters of each cage at a rate of 36,000 m³/hr resulting in complete exchange of cage volume every hour discharging through ports as described earlier. Although it remains unclear which of the two rearing options for production is to be adopted one fact stands out, the very high maximum stocking density of up to 50kg /m³. This is double or even more the limit currently adopted and permitted for open cage salmon farming in Scotland and elsewhere. Both these factors will inevitably lead to markedly increased turbulence in the cage waters in addition to the normal feeding frenzy. The stocked fish will be swimming through their own faeces with the turbulence adding to the breakup of the faeces strings to far finer particulate than experienced in open cage conditions. This in turn will reduce the settlement velocity with the smaller particles remaining in suspension thus increasing the risk they will be carried out into the surroundings in the large water flows through the ports with consequent environmental damage.

One further unknown which seems to have escaped attention is that the depths of the discharge ports at 30m and 42m are similar in depth to the water intakes at 20 – 45m. This means there is a distinct possibility that solids in suspension passing out of the ports will be entrained to some extent in the inflow and transferred back to enclosed salmon pens.

I believe I am right in saying that the supplier of the technology has little or no practical experience of collection of wastes although the design has been adopted by a number of customers interested in its means of protecting against sea lice parasitic predation. The applicant offers no evidence of operation at scale which would back up the assumptions other than a theoretical basis. I can therefore only conclude that a huge risk would be incurred by sanctioning this development at this particular location without first obtaining confidence from a comparable demonstration project. My claim is that the technology and design is still at its infancy unsuited at the scale proposed for the very constrained and sensitive location of the Loch Long headwaters.

It is impossible to judge from what has been presented what SEPA thinks about the technology and more specifically the project proposed. The implication is that at 85% capture with the 15% of waste arisings discharged the standard modelling of dispersion and

deposition suggests that the criterion for acceptance dictates a maximum biomass stocked of 3452 tonnes but it is not clear how this relates to the 4000 tonnes design figure.

By extension there is a further issue that has apparently only been examined superficially. The faecal slurry collected from the base of the cages after pumping ashore is dewatered it is said by screening, coagulation and air flotation to yield a product containing 5% moisture which is then pumped into road tankers for export. In my opinion any sludge of this sort containing most likely colloidal material would be a solid cake at 5% moisture. The fact that is pumped as a slurry into a road tanker just confirms that a 5% moisture level is unachievable without a further expensive stage of filtration. It further demonstrates that waste product handling of a slurry at the onshore site will require much more sophisticated equipment than specified to contain odour nuisance throughout the handling process.

The applicant claims that chemical treatments are unlikely to be required although the use of hydrogen peroxide dosing is mentioned as a possibility. Evidence from Norway in investigative study of rate of decay of this highly reactive chemical suggests toxicity is maintained for much longer in saltwater than previously appreciated and thus much more damaging to seabed biodiversity. The applicant's claim of absence of chemical treatment is somewhat compromised by practical experience with this technology on Vancouver Island in Canada where a major outbreak of viral disease has been reported. I think this just indicates that the technology in no way offers protection from the more virulent viral diseases reported ubiquitously in salmon aquaculture especially at the very high stocking density proposed.

Salmon like all animals require nitrogen and phosphorus nutrients in their food intake to maintain life functions and excrete these elements mainly as water soluble compounds including ammonia and urea. No attempt is made to retain these elements and along with respired carbon are discharged to the surrounding marine waters. I do not accept that the headwaters of Loch Long are of excellent quality regarding nutrients and that there is a large assimilation capacity without harm. Algal blooms are as I understand it are common in summer months in these waters and the heightened risk of dangerous levels of these vectors of eutrophication promoting conditions toxic to marine life is present regardless of the standard dispersion calculations.

Finally, it is my belief that this project should be categorised as major and not be considered under the "Scheme of Delegation"; in other words handled only by the Planning Department. It is an industrial intensive farming development with potentially serious environmental impact in a locality known for its prized visual and amenity value.

In conclusion there is no doubt in my mind that this development is totally unsuitable both by virtue of its size and its sensitive location, and also by the unproven nature of the new technology and that the application should be refused on these grounds.

Your truly

Dr John M Campbell C.Env, C.Chem, FRSC

Relevant references to information supplied in support of application :

- Arcus Technical Appendix A11.3
- Arcus Technical Appendix A11.4