

Application for a project to be referred to an expert consenting panel

(Pursuant to Section 20 of the COVID-19 Recovery (Fast-track Consenting) Act 2020)

For office use only:

Project name: Reimagining Aquaculture – Trials of novel aquaculture structures
Application number: PJ-0000874
Date received: 28/02/2023

This form must be used by applicants making a request to the responsible Minister(s) for a project to be referred to an expert consenting panel under the COVID-19 Recovery (Fast-track Consenting) Act 2020.

All legislative references relate to the COVID-19 Recovery (Fast-track Consenting) Act 2020 (the Act), unless stated otherwise.

The information requirements for making an application are described in Section 20(3) of the Act. Your application must be made in this approved form and contain all of the required information. If these requirements are not met, the Minister(s) may decline your application due to insufficient information.

Section 20(2)(b) of the Act specifies that the application needs only to provide a general level of detail, sufficient to inform the Minister's decision on the application, as opposed to the level of detail provided to an expert consenting panel deciding applications for resource consents or notices of requirement for designations.

We recommend you discuss your application and the information requirements with the Ministry for the Environment (the Ministry) before the request is lodged. Please contact the Ministry via email: fasttrackconsenting@mfe.govt.nz

The Ministry has also prepared [Fast-track guidance](#) to help applicants prepare applications for projects to be referred.

Part I: Applicant

Applicant details

Person or entity making the request: The New Zealand Institute for Plant and Food Research Limited

Contact person: s 9(2)(a)

Job title: General Manager of Science, Seafood Technologies

s 9(2)(f)(ii), s 9(2)(g)(i)

s 9(2)(f)(ii), s 9(2)(g)(i)

Postal address:

Plant & Food Research

Box 5114

Port Nelson

Nelson 7043

New Zealand

Address for service (if different from above)

Organisation: Stantec New Zealand

Contact person: s 9(2)(a)

Job title: Senior Principal Planner

s 9(2)(f)(ii), s 9(2)(g)(i)

s 9(2)(f)(ii), s 9(2)(g)(i)

s 9(2)(f)(ii), s 9(2)(g)(i)

Postal address:

PO Box 13-052

Christchurch

Part II: Project location

The application: relates wholly to the coastal marine area

If the application relates to the coastal marine area wholly or in part, references to the Minister in this form should be read as the Minister for the Environment and Minister of Conservation.

Site address / location:

A cadastral map and/or aerial imagery to clearly show the project location will help.

The proposed site is located in Tasman Bay approximately 6 km to the west of Sauvage Point, D'Urville Island (see Figure 1, Attachment A). This is an existing marine farm site for which the resource consent (U000361) and marine farming permit (MPE933) are held by Wakatū Incorporation (Wakatū). The proposed trials will be entirely located within the Wakatū marine farm site, with the exact location within the farm to be confirmed in consultation with Wakatū and the Harbour Master prior to full application to EPA. The area required for trials is approximately 3.6 ha (including the swing radius of the structures), less than 1% of Wakatū's consented site (450 ha).

Legal description(s):

A current copy of the relevant Record(s) of Title will help.

Crown land - coastal marine area

Registered legal land owner(s):

Not applicable

Detail the nature of the applicant's legal interest (if any) in the land on which the project will occur, including a statement of how that affects the applicant's ability to undertake the work that is required for the project:

The applicant has no legal interest in the land on which the project will occur. However, as the land is Crown land, this has no effect on the applicant's ability to undertake the work. Wakatū Incorporation holds an existing mussel farm resource consent for the area proposed for the trials. We are in the process of finalizing a legal agreement with Wakatū to use a small part of their site. An email from Wakatū is included as an attachment to this application.

Part III: Project details

Description

Project name: Reimagining Aquaculture – Trials of novel aquaculture structures

Project summary:

Please provide a brief summary (no more than 2-3 lines) of the proposed project.

The proposed project involves phased trials of novel open-ocean aquaculture structures. The trials are a proof-of-concept demonstration, not a commercial operation, and seek to determine whether the structures can:

- Withstand the open ocean environment
- Provide an internal environment that is better aligned to the needs of fish than existing technologies

Project details:

Please provide details of the proposed project, its purpose, objectives and the activities it involves, noting that Section 20(2)(b) of the Act specifies that the application needs only to provide a general level of detail.

The New Zealand Institute for Plant and Food Research Limited (PFR) is currently engaged in a **multi-year research project trialing new technologies for open-ocean finfish aquaculture**. The research is seeking to develop a mobile, open ocean aquaculture system that is **designed for New Zealand conditions**, supports the biological needs of fish, providing optimal conditions year-round and alleviates some of the environmental, climate change resilience and social license challenges that are associated with existing, fixed aquaculture systems.

This research project is funded through MBIE's Endeavour fund. Originally a 5-year project starting in October 2019, it has recently been extended by 1-year (now ending September 2025) to take into account impacts of COVID but also due to the timelines required for gaining aquaculture consent for trialing prototypes with fish.

PFR has also committed a substantial proportion of SSIF funding into Open Ocean Aquaculture research via Growing Futures®. This research direction will invest ^{s 9(2)(b)(ii)} over its lifespan and will also require and utilise the aquaculture resource consent for science delivery.

Currently **NZ does not have a separate consenting process for research** and consequently PFR has no choice but to apply for an aquaculture consent even though it is research that is being supported rather than commercial aquaculture. Due to the time constraints, cost and uncertainty associated with aquaculture resource consent applications, this represents a significant delivery risk to PFR, its collaborators and to MBIE, the funder.

Phase 1 of trials is currently under way (see Table 1, Attachment A). Phase 1 involves physical trials of 100–150m³ fish enclosures at three, progressively more exposed sites within Nelson City Council's coastal waters. As no fish are involved in phase 1 only a mooring resource consent was required, and this was a relatively straight forward consent process. To deliver the programme, we wish to run, **at least, three further trial phases** (phases 2-4) in deeper, more exposed water off D'Urville Island **with two exemplar finfish species**: Chinook salmon (*Oncorhynchus tshawytscha*) and New Zealand snapper (*Chrysophrys auratus*). The general parameters for phases 2–4 are set out in Table 1, Appendix A. While the phases will not follow an entirely linear progression, at no point do we propose to have more

than one structure or fish enclosure being trialed at the same time. **The trials will test the physical suitability of the enclosures for the exposed environment, and for the fish.**

The specific design of the structures for phases 2–4 and their associated moorings are yet to be confirmed. However, general configuration of the fish enclosure and mooring will be like that used for phase 1, which is shown in Figure 2, Attachment A. Points of difference between Figure 2 and the future trial phases covered by this application are:

- The dimensions of the fish enclosure for phases 3 and 4 will be larger — up to 40 m long and up to 6.9 m diameter. To allow flexibility regarding the mooring configuration and vessel operation around the mooring and enclosure, the swing radius required is 300 m. In combination with the mooring system. With a bounding box around the swing radius, this equates to an area of 600 m x 600 m = 36,000 m² (3.6 ha).
- Given ocean conditions and the larger size of the trial structures, the mooring used to anchor the structure will be a multi-point mooring system (potentially utilizing screw anchors in a triangle configuration) with a footprint of approximately 500 m². Exact configuration and layout of mooring system to be confirmed with appropriate professionals and in consultation with the Harbour Master prior to full application to EPA.
- A feeder buoy will sit on the water's surface and serve as the marker buoy for the mooring system. The buoy will be up to 8 m high (with approximately 4.5 m of this below the water line) and up to 2 m diameter. The buoy will be connected to the fish enclosure by a semi-flexible tube (up to 300 mm diameter and up to 25 m long) that will deliver feed, and also house cabling associated with monitoring.
- The buoy will also have appropriate navigation markers as depicted below in Figure 3, Appendix A, with examples of 'special marks' in Figure 4, Appendix A. The exact details of navigation markers (frequency of light flashes, dimensions of radar reflectors etc) will be agreed in writing with the council and Harbour Master in advance of any deployment.

For the two biological phases of the (phases 2 and 4) the **level of production**, both in terms of fish biomass and food, would be **only a small proportion of a commercial operation** (see Table 2, Appendix A).

We are **seeking a 7-year resource consent** to enable these trials. This duration extends beyond the current MBIE Endeavour Fund window. However, we are seeking this extended period to enable further trial phases to be undertaken (i.e., beyond phase 4) with snapper, salmon, or other novel, candidate aquaculture finfish species within the scope of this consent. We consider that this is a more efficient approach than having to re-seek resource consent for further trials in the future if we obtain the necessary funding. Any and provided that such additional phases do not exceed the physical size and production envelopes set out for 'Beyond Phase 4' in Table 2. In our resource consent application, we will propose conditions (including certification processes) to facilitate such additional phases.

Our proposed 7-year consent duration will extend past the duration of the existing Wakatū consent, which expires on 26 March 2028. However as our application will be for a stand-alone consent this is not considered to raise any issues. Should Wakatū seek to replace their existing consent they would not seek to use the area occupied by our trials until the trials have concluded. We have been discussing this proposal with Wakatū for some time and are finalizing the necessary legal agreements. An email from Wakatū is included as an attachment to this application.

The **main discharge** associated with biological trials will be faeces and any uneaten feed pellets (see Table 2 'Waste' column, Appendix A). Any fish mortalities will be removed from the fish enclosure by divers on a regular basis. Fish will be sub-sampled up to once a month for the longer (Phase 4) trials for growth and health. In order to undertake this fish will be anaesthetised with the food-grade aquatic anaesthetic, AQUI-S®, *in situ*, as per PFR's standard husbandry operations conducted at the Beatrix Bay sea pen site. Once anaesthetised fish will either be measured and returned to the fish enclosure or killed by *iki jime* (brain ablation) and invasively sampled.

Vessel traffic to site will vary with different phases of the trials as follows:

- Moorings: installation of moorings will be carried out by a commercial provider and would require a large vessel (12m+) over 2-3 days.
- Feeder buoy deployment: a commercial provider will be required for deployment and retrieval (large vessel 12m+ for a day) along with 8m alloy boat.
- Fish enclosure deployment (physical and biological): a commercial provider will be required for deployment and retrieval (large vessel 12m+ for a day for each task).

- Fish enclosure trial: Regular visits (up to 3 times per week) to site in an 8m alloy boat will be conducted to check the enclosure and connections, and to top-up feed. On-site time for each visit up to 4 hours but usually 1-2 hours.
- Delivery/sampling/harvest of fish: a commercial provider will be required (large vessel 12m+ for a day for each task) along with 8m alloy boat.

Where applicable, describe the staging of the project, including the nature and timing of the staging:

Table 1, Attachment A, describes the 3 phases that PFR will undertake within the 7-year consent duration. As noted, if time allows, we are seeking that the consent would enable us to undertake further phases provided that such additional phases stay within the physical size and production envelopes set out in Table 2, Appendix A.

Figure 5, Attachment A shows the anticipated timeline for the trials, subject to the timing of resource consent approval and unexpected issues arising during the trials. As yet this timeline does not include the monitoring we may need to undertake to ensure our potential environmental effects are appropriately managed. We are working with our expert advisors to confirm what, if any, and when such monitoring should be undertaken. We would detail that proposed monitoring, if determined to be required, in our full application to the EPA.

Consents / approvals required

Relevant local authorities: Marlborough District Council

Resource consent(s) / designation required:

Coastal permit

Relevant zoning, overlays and other features:

Please provide details of the zoning, overlays and other features identified in the relevant plan(s) that relate to the project location.

Legal description(s)	Relevant plan	Zone	Overlays	Other features
Not applicable	Marlborough Sounds Resource Management Plan	Coastal Marine Zone 2	Tasman Bay / Admiralty Bay Marine Ecosystem	Not applicable
Not applicable	Proposed Marlborough Environmental Plan (PMEP)	Coastal Marine	Coastal Management Unit 8 – Open Water Marlborough Sounds High Amenity Landscape	Not applicable

Rule(s) consent is required under and activity status:

Please provide details of all rules consent is required under. Please note that Section 18(3)(a) of the Act details that the project **must not include** an activity that is described as a prohibited activity in the Resource Management Act 1991, regulations made under that Act (including a national environmental standard), or a plan or proposed plan.

Relevant plan / standard	Relevant rule / regulation	Reason for consent	Activity status	Location of proposed activity
Marlborough Sounds Resource Management Plan (MSRMP)	Rule 35.5	Except where provided for as a controlled, restricted discretionary or discretionary	Non-complying activity	Coastal marine area off D'Urville Island

		activity, marine farms within the CMZ2 constitute a non-complying activity under rule 35.5 where they are located beyond a line drawn 200 meters from mean low water, at right angles to a line normal to the nearest part of mean high-water mark. The proposed trials involving fish fall under the definition of marine farms in the MSRMP. It will be a new marine farm and therefore does not benefit from any of the controlled or restricted discretionary rules that apply to existing marine farms in Chapter 35. The trials will be located further than 200 metres from the mean low water mark. The proposal is therefore classed as a non-complying activity under Rule 35.5 of the MSRMP.		
Marlborough Sounds Resource Management Plan (MSRMP)	Rule 35.4 (any activity listed as permitted which does not meet the specified standards) Rule 35.4.2.5 (disturbance of the seabed) Rule 35.4.2.7 (occupation)	Trial phases not involving fish do not technically meet the definition of 'marine farm' or 'marine farming' in the MSRMP. Therefore, the structure and moorings associated with the non-marine farming phases may require consent under the general structure, disturbance and occupation rules of Chapter 35. Rule 35.1 permits temporary structures provided these meet the standards in 35.1.2.3. It is considered that the proposed mooring and fish enclosures (when not containing fish) would be a temporary	Discretionary	Coastal marine area off D'Urville Island

		structure but would not meet the standard 35.1.2.3 (b) as the structure would be in place for more than 31 days. The structure is therefore considered to be a discretionary activity under the default rule 35.4.		
Proposed Marlborough Environment Plan (PMEP)	Rule 16.6.13	Rule 16.6.13 provides for marine farming including the associated occupation of space in the coastal marine area, the erection, placement, use of structures, disturbance of the seabed and ancillary discharges to water. The proposed trials involving fish, including the ancillary activities, meet the PMEP definition of marine farming which is linked to the definition of aquaculture activities in the Resource Management Act.	Discretionary Activity	Coastal marine area off D'Urville Island
Proposed Marlborough Environment Plan	Rule 16.6.15	The discharge of feed or medicinal or therapeutic compounds associated with any type of marine farming or the discharge of feed associated with marine farming using conventional long line structures. The proposed trials include the discharge of feed, waste and medicinal products (food-grade aquatic anaesthetic).	Discretionary Activity	Coastal marine area off D'Urville Island
Proposed Marlborough Environment Plan	Rule 16.6.7 (occupation, other than marine farm)) Rule 16.6.10 (use of the CMA, other than marine farm)	Trial phases not involving fish do not technically meet the definition of 'marine farm' or 'marine farming' in the MEP. Therefore, the structure and moorings associated with the non-marine farming phases may require consent under the	Discretionary Activity	Coastal marine area off D'Urville Island

		general coastal marine area rules of Chapter 16.		
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Resource consent applications already made, or notices of requirement already lodged, on the same or a similar project:

Please provide details of the applications and notices, and any decisions made on them. Schedule 6 clause 28(3) of the COVID-19 Recovery (Fast-track Consenting) Act 2020 details that a person who has lodged an application for a resource consent or a notice of requirement under the Resource Management Act 1991, in relation to a listed project or a referred project, must withdraw that application or notice of requirement before lodging a consent application or notice of requirement with an expert consenting panel under this Act for the same, or substantially the same, activity.

A resource consent application was lodged and granted for phase 1 of the trials that are currently underway within the coastal waters of Nelson City (RM205275, RM205276, RM205277).

PFR has not yet made any resource consent applications for the next phases of the trials that are covered by this referral application. However, we are preparing the full consent application for the next phases and will be ready for lodgment in late April / early May 2023.

Resource consent(s) / Designation required for the project by someone other than the applicant, including details on whether these have been obtained:

No other person or organisation requires resource consent for this project.

Other legal authorisations (other than contractual) required to begin the project (eg, authorities under the Heritage New Zealand Pouhere Taonga Act 2014 or concessions under the Conservation Act 1987), including details on whether these have been obtained:

Animal Ethics: Under the Animal Welfare Act PFR will need to seek and acquire approval from the Nelson Marlborough Institute of Technology (NMIT) Animal Ethics Committee (whom we have an agreement with) for some of the research that will be undertaken at the site. This is a routine activity for PFR and given the low grade of interventions and the nature of the research activity itself is considered low risk. This application is currently in preparation.

Harbour Master: Exact location of trials within the existing marine farm site will be confirmed in consultation with the Harbour Master prior to lodgment of our full resource consent application. Exact details of navigation markers (frequency of light flashes, dimensions of radar reflectors, etc.) will be agreed in writing with the council and Harbour Master before deployment.

Fisheries Act: While aquaculture activities generally are subject to an 'aquaculture decision' under the Fisheries Act, MPI has confirmed that in this case, as the activities are proposed within an existing consented site, an aquaculture decision is not required.

Construction readiness

If the resource consent(s) are granted, and/or notice of requirement is confirmed, detail when you anticipate construction activities will begin, and be completed:

Please provide a high-level timeline outlining key milestones, e.g. detailed design, procurement, funding, site works commencement and completion.

The construction component associated with activity on site is relatively small and simple. The project is shovel ready and installation of moorings appropriate for the fish enclosure size will commence as soon as possible after the granting of consent. The time frame for construction is short and anticipated to only take 1-2 months. The mooring system details are not yet finalised.

Please see Figure 5, Attachment A. The timeline starts in August 2023 which assumes the Consent would be granted in July. If this is not the case then the trials with fish would be modified to fit the shortened timeframe, we would have to suit the end date of funding (30 Sep 2025).

Part IV: Consultation

Government ministries and departments

Detail all consultation undertaken with relevant government ministries and departments:

Ministry for Business, Innovation and Employment

The research programme within which we are undertaking the trials is funded through MBIE's Endeavour Fund. A representative of MBIE's Science Investment Management team is an observer at all of the programme's Governance Group meetings.

Ministry for Primary Industries, Fisheries NZ

Two personnel from MPI are members of the research programmes' Governance Group that meets three times a year. We have also been involved with numerous workshops and meetings with MPI regarding the development of Open Ocean Aquaculture frameworks where the technology being developed in this research programme and the trials we would like to undertake have been discussed in detail.

Department of Conservation

Representatives from DOC Nelson have been briefed on the research programme and the plan to undertake trials requiring aquaculture consent. Feedback was positive.

Ministry for the Environment (MFE) / Department of Conservation (DOC)

We met with representatives of the Fast Track Team from MFE and representatives from DOC on January 24, 2023. The MFE staff outlined the Fast Track process and the requirements under the Act, including the information needed for this referral application. These information requirements are addressed elsewhere in this application except in relation to s104D of the Resource Management Act. In this regard, MFE staff advised that, because the proposal is a non-complying activity, the referral application should outline the reasons why it could meet the test under s104D. We consider that the application would meet both the effects and policy limb of the s104D test (even though it only needs to meet one of these limbs to pass s104D). With respect to the effects limb, this conclusion is based on the summary of effects outlined in Part VII of this application, which identifies that the proposal's adverse effects will be no more than minor. This summary relies on detailed expert reports that are currently being prepared with respect to seabirds, marine mammals, water column and benthic effects and landscape and natural character. With respect to the policy limb, it is noted that the site is not located in an area of outstanding natural character or landscape and therefore stringent 'avoid' policies do not apply with respect to these values. Adverse effects of the proposal on the high amenity landscape values of the area are being appropriately addressed through the landscape assessment, although it is worth noting that the requested consent is within an area already consented for mussel farming. Other key plan policies (such as those relating to the King Shag (Policy 8.3.5 of the PMEP) or the location of marine farms within CMU 8 (PMEP Policy 13.21.6) are also being addressed through the adoptions of recommendations from the expert reports. While rule 35.4 of the MSRMP makes marine farming more than 200m from mean low water a non-complying activity, it does not include absolute objectives or policies which direct that such activities should be avoided (and a significant number of marine farms have been consented beyond the 200m mark already). Like the PMEP, the objectives and policies of the MSRMP are focused on managing adverse effects on various values. We consider that, subject to adopting appropriate expert recommendations, the proposed trials will be consistent with these objectives and policies.

Finally, we note that the King Salmon 'Blue Endeavour' application was for a non-complying activity under the same rules that apply to our proposal. The King Salmon application was for a significantly larger marine farming activity and was granted consent by the Marlborough District Council, with the hearing panel concluding that the proposal met both limbs of s104D.

Local authorities

Detail all consultation undertaken with relevant local authorities:

We have held two meetings with staff from the Marlborough District Council (MDC). The first meeting on April 5, 2022, was used to provide MDC staff with an initial briefing on the proposal. The second meeting was held on

December 16, 2022. This meeting was used to provide MDC staff with an update on the proposal, to discuss the expert reports that were being commissioned at the time, to confirm if MDC was willing to undertake pre-application reviews of the expert reports, to identify relevant mana whenua and stakeholder groups and to discuss whether the application would be processed with or without notification. In relation to this final point, MDC staff identified that they currently publicly notify marine farm applications.

We are continuing to communicate with MDC staff to provide draft expert reports for their review, and to ask specific questions about the application. They are currently reviewing the draft Seabird report and we expect to provide them with all other expert reports through February and March. We also plan to meet the MDC Harbour Master to discuss any potential navigational issues. However, we expect these to be minimal given the proposed location of our trials within an existing consented marine farm site.

We also met with Nelson City Council staff on August 8, 2022. The purpose of this meeting was to assist us to determine the most appropriate location for the next phases of the trials. Nelson City staff identified that they do not have significant experience with marine farm applications, that they would need to engage external assistance and that their base position is that, notwithstanding the potential adverse effects, the application would need to be publicly notified unless strong arguments could be provided to the contrary.

Other persons/parties

Detail all other persons or parties you consider are likely to be affected by the project:

We consider that the parties potentially affected by our proposed trials are:

1. The relevant iwi authorities
2. Wakatū Incorporation as holder of a current resource consent for the site.

Detail all consultation undertaken with the above persons or parties:

Our engagement with the iwi authorities is set out in Part V below.

As noted, we have had on-going conversations with Wakatū Incorporation and are finalizing an agreement with them for use of the farm site. PFR also entered into a Relationship Memorandum of Understanding (MoU) with Wakatū in 2019 to record intentions about how they work together and identify opportunities for research and innovation. We have also engaged with organisations that have an interest in aquaculture, but who we do not consider to be affected parties. These organisations are:

Te Tau Ihu Fisheries Forum is mandated to represent the customary fisheries interest of all eight iwi within Te Tau Ihu. The forum is annually updated on the progress of the research programme and the plan to undertake trials requiring aquaculture consent. Feedback has been consistently positive.

Environmental Defence Society

Key personnel from EDS have been briefed on the research programme and the plan to undertake trials requiring aquaculture consent. Feedback was positive and they have requested that they are kept informed of progress.

Friends of Nelson Haven (FoNH)

Key personnel from FoNH have been briefed on the research programme, its progress, and the plan to undertake trials requiring aquaculture consent. FoNH's fundamental principle is that *'citizens need to take an active role in assessing proposals to exploit the environment for commercial and personal gain'*. PFR respect this position and have taken onboard FoNH's concerns around fed aquaculture, particularly with regard to seabird and marine mammal activity. They requested that no 'fed aquaculture' take place near the Horoirangi Marine Reserve (between Glenduan and Cable Bay, north of Nelson), and that feeding only be conducted in already designated Tasman Bay Aquaculture Management Area (AMA). We have acknowledged their concerns and have avoided the marine reserve. While not proposing the trial within the existing AMA, we are within an existing marine farm site and an area that is known to have relatively low benthic values. We have also recognised their concerns through commissioning seabird, marine mammal, benthic and water column reports.

Part V: Iwi authorities and Treaty settlements

For help with identifying relevant iwi authorities, you may wish to refer to [Te Kāhui Māngai – Directory of Iwi and Māori Organisations](#).

Iwi authorities and Treaty settlement entities

Detail all consultation undertaken with Iwi authorities whose area of interest includes the area in which the project will occur:

Iwi authority	Consultation undertaken
Ngāti Koata Trust	Participated in a number of hui detailing the progress of the research programme and the plan to undertake trials requiring aquaculture consent. They are supportive of the project. Consultation also occurred prior to resource consent application for our test site moorings in Tasman Bay (RM205275 RM205276 RM205277) and received email of support. Before the full consent application is lodged, formal consultation with iwi representatives will occur.
Te Rūnanga o Ngāti Kuia; Te Rūnanga a Rangitāne o Wairau; Ngāti Apā ki te Rā Tō Trust	Participated in a number of hui detailing the progress of the research programme and the plan to undertake trials requiring aquaculture consent. Consultation also occurred prior to resource consent application for our test site moorings in Tasman Bay (RM205275 RM205276 RM205277). They expressed concerns over the original mooring design and PFR replaced this with a more environmentally friendly mooring design (specifically an elasticated block anchor). Before the full consent application is lodged, formal consultation with iwi representatives will occur.
Ngāti Tama ki Te Waipounamu Trust	Participated in a number of hui detailing the progress of the research programme and the plan to undertake trials requiring aquaculture consent. Consultation also occurred prior to resource consent application for our test site moorings in Tasman Bay (RM205275 RM205276 RM205277). Have requested continued engagement and updates on research activities. A representative s 9(2)(a) is also a member of the research programme's Governance Group. Before the full consent application is lodged, formal consultation with iwi representatives will occur.
Ngāti Toa Rangatira ki Wairau Trust	Participated in a number of hui detailing the progress of the research programme and the plan to undertake trials requiring aquaculture consent. Consultation also occurred prior to resource consent application for our test site moorings in Tasman Bay (RM205275 RM205276 RM205277) but received no response. Before the full consent application is lodged, formal consultation with iwi representatives will occur.
Ngāti Rārua Settlement Trust	Participated in a number of hui detailing the progress of the research programme and the plan to undertake trials requiring aquaculture consent. Consultation also occurred prior to resource consent application for our test site moorings in Tasman Bay (RM205275 RM205276 RM205277) and received email of support. Before the full consent application is lodged, formal consultation with iwi representatives will occur.
Te Ātiawa o Te Waka-a-Māui Trust	Participated in a number of hui detailing the progress of the research programme and the plan to undertake trials requiring aquaculture consent. Consultation also occurred prior to resource consent application for our test site moorings in Tasman Bay (RM205275 RM205276 RM205277). They expressed concerns over the original mooring design and PFR replaced this with a more environmentally friendly mooring design (specifically an elasticated block anchor). A detailed Marine mammal and wildlife interaction plan was also requested. PFR commissioned this and incorporated recommendations into the consent application. Before the full consent application is lodged, formal consultation with iwi representatives will occur.

Te Rūnanga o Ngāi Tahu	Participated in a number of hui detailing the progress of the research programme and the plan to undertake trials requiring aquaculture consent. A representative S 9(2)(a) is also a member of the research programme's Māori Co-innovation Group, charged with evaluating the cultural dimensions of the research programme. This includes implications with regard to existing settlement obligations, legal requirements, and regional perspectives in the aquaculture/fisheries space. Before the full consent application is lodged, formal consultation with iwi representatives will occur.
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Detail all consultation undertaken with Treaty settlement entities whose area of interest includes the area in which the project will occur:

Treaty settlement entity	Consultation undertaken
Te Ohu Kaimoana	Key personnel from TOKM have been briefed on the research programme and the plan to undertake trials requiring aquaculture consent. Feedback has been positive and personnel have been involved with workstreams underway in the research programme's Māori Co-innovation Group, specifically with regard to legal and regulatory frameworks that would facilitate open ocean aquaculture.

Treaty settlements

Treaty settlements that apply to the geographical location of the project, and a summary of the relevant principles and provisions in those settlements, including any statutory acknowledgement areas:

Section 18(3)(b) of the Act details that the project **must not include an activity that will occur on land returned under a Treaty settlement where that activity has not been agreed to in writing by the relevant land owner.**

Tangata whenua iwi of the Marlborough Sounds have all signed Deeds of Settlement with the Crown to address breaches of the Treaty of Waitangi/Te Tiriti o Waitangi. The historic claims of each of the area's tangata whenua iwi have been settled as follows:

- The settlements for Ngāti Apa, Ngāti Kuia, and Rangitāne are set out in the Ngāti Apa ki te Rā Tō, Ngāti Kuia, and Rangitāne o Wairau Claims Settlement Act 2014.
- The settlements for Ngāti Kōata, Ngāti Rārua, Ngāti Tama and Te Ātiawa o Te Waka-a-Māui are set out in the Ngāti Kōata, Ngāti Rārua, Ngāti Tama ki Te Tau Ihu, and Te Ātiawa o Te Waka-a-Māui Claims Settlement Act 2014.
- The settlement for Ngāti Toa is set out in the Ngāti Toa Rangatira Claims Settlement Act 2014.

In the Deeds of Settlement and associated legislation, the Crown acknowledges that it acted in repeated breach of the principles of Te Tiriti in its dealings with the respective iwi and it apologises for the hardship and suffering that this has caused. These documents also set out the means of redress for each iwi, including cultural redress. The Crown's acknowledgments and apologies are based on historical accounts as described in the applicable legislation/deed. Statutory acknowledgements were included in these settlements, and all include Te Tau Ihu coastal marine area, including the waters in the area of this application, as a coastal statutory area. These acknowledgements are located in:

- Schedule 1 of the Ngāti Apa ki te Rā Tō, Ngāti Kuia, and Rangitāne o Wairau Claims Settlement Act 2014 and located as shown on OTS-099-51
- Schedule 1 of the Ngāti Kōata, Ngāti Rārua, Ngāti Tama ki Te Tau Ihu, and Te Ātiawa o Te Waka-a-Māui Claims Settlement Act 2014 and located as shown on OTS-202-63
- Schedule 1 of the Ngāti Toa Rangatira Claims Settlement Act 2014 and located as shown on OTS-068-70.

Part VI: Marine and Coastal Area (Takutai Moana) Act 2011

Customary marine title areas

Customary marine title areas under the Marine and Coastal Area (Takutai Moana) Act 2011 that apply to the location of the project:

Section 18(3)(c) of the Act details that the project **must not include** an activity that will occur in a customary marine title area where that activity has not been agreed to in writing by the holder of the relevant customary marine title order.

While applications have been made under the Marine and Coastal Area (Takutai Moana) Act 2011 for customary marine title in the area of the proposal no decisions have been made to date, so there are no customary marine title areas that apply to the location of the project. We intend to notify applicant parties of our application, in accordance with the Marine and Coastal Area (Takutai Moana) Act 2011 once our expert reports are available.

Protected customary rights areas

Protected customary rights areas under the Marine and Coastal Area (Takutai Moana) Act 2011 that apply to the location of the project:

Section 18(3)(d) of the Act details that the project **must not include** an activity that will occur in a protected customary rights area and have a more than minor adverse effect on the exercise of the protected customary right, where that activity has not been agreed to in writing by the holder of the relevant protected customary rights recognition order.

We have reviewed the Marine and Coastal Area register on the Land Information NZ website. This indicates that no protected customary rights have been confirmed in the area of our proposal.

Part VII: Adverse effects

Description of the anticipated and known adverse effects of the project on the environment, including greenhouse gas emissions:

In considering whether a project will help to achieve the purpose of the Act, the Minister may have regard to, under Section 19(e) of the Act, whether there is potential for the project to have significant adverse environmental effects. Please provide details on both the nature and scale of the anticipated and known adverse effects, noting that Section 20(2)(b) of the Act specifies that the application need only provide a general level of detail.

We consider that the proposal has the potential to cause adverse effects with respect to mana whenua values, landscape and natural character, seabirds, marine mammals, the water column and seabed, navigation, recreational use and biosecurity. However, these effects will be minimal given the temporary nature and small scale of the proposal and are significantly outweighed by the long-term environmental benefits that the research aims to generate.

We are continuing to engage with the relevant mana whenua groups to understand the significance of the potential adverse effects on their values and how these might be mitigated. We have held a number of hui with the relevant mana whenua groups about the overall research programme, these have included the provision of information about the proposed trial phases near D'Urville Island. Overall, the feedback has been very positive, particularly with regard to the design principles around looking after the biological needs of fish and low-environmental footprint.

We have commissioned a report on the potential landscape, visual and natural character effects from Isthmus. This report is still being finalised, however the authors have confirmed that given the limited time period and physical scale of the trials it is their initial conclusion that the effects on these values will be very low to low.

Turoa Consulting Limited has prepared a draft report on the potential effects on seabirds. This assesses the proposal in relation to the Fisheries New Zealand *'Best practices and mitigation technologies available to minimise and mitigate the interactions between finfish open ocean aquaculture and seabirds'*. This draft report identifies that the proposal is generally consistent with this best practice guidance and recommends further measures are investigated. The draft report is currently being reviewed by MDC.

The Cawthron Institute has prepared a draft report on the potential effects on marine mammals. This also assesses the proposal with respect to Fisheries New Zealand best practice guidance and takes into account direction from the New Zealand Coastal Policy Statement. The draft report concludes that the potential adverse effects from the

proposed trials, after mitigation measures are considered, will be less than minor or negligible. The draft report provides recommendations with respect to the trial layout, gear and monitoring.

The Cawthron Institute has also prepared a draft report on the potential effects on the water column and seabed in the vicinity of the proposed trials. The draft report concludes the potential effects will be relatively small although there may be some measurable effects in close proximity to the fish enclosure. Overall, the draft report concludes that the potential risks to the wider region are likely to be very small provided the proposed limits on the volume of the structure, density of fish and feed inputs are maintained.

As described the proposal will include surface marker buoys to ensure navigational safety. We will meet with the local harbour master prior to lodging the resource consent application to confirm that these measures meet their expectations. With respect to recreational effects, we note that the area was not identified as significant for recreational use as part of the existing Wakatū consent process. Our trials will be located within their site and therefore we anticipate that any adverse effects on recreational use will be no more than minor.

Finally, we propose to include a Biosecurity and Fish Health Management Plan in the application. This will follow standard best practice and aims to minimise biosecurity risks associated with operations. This plan will fall under PFR's umbrella plan and sit alongside a similar plan that PFR operates under for its sea-pen at Beatrix Bay. It will set standards and the operational framework for the following: Stock source and pre-transfer health assessments, transport of livestock to site, health monitoring, investigation and response into potential biosecurity events, site security, site biosecurity, fish husbandry practices, feed, marine pests, wildlife management, harvesting, lines of reporting and contingency planning. The small scale and temporary nature of operation will also limit the biosecurity risks associated with operation.

Once all expert reports have been reviewed by MDC we will work with the authors and reviewers to integrate recommended additional mitigation measures into our proposed trials. We note that the scale of these recommendations are not such that they would materially change our proposal, or the resource consents required.

With respect to greenhouse gas emissions, we note that aquaculture has low emissions in comparison to other primary production activities. The key source of greenhouse gas emissions from our proposal relates to the boat journeys to and from the site. We propose to minimise the need for these trips by, as far as practicable, using remote sensors for our monitoring. We do not consider that any greenhouse gas related adverse effects will be generated by our proposed trials.

Part VIII: National policy statements and national environmental standards

General assessment of the project in relation to any relevant national policy statement (including the New Zealand Coastal Policy Statement) and national environmental standard:

The relevant national policy statement is the New Zealand Coastal Policy Statement 2010 (NZCPS). There are no relevant national environmental standards (the National Environmental Standard: Marine Aquaculture relates only to replacement of consents for existing marine farms, so will not be relevant to the proposed trials. Policies in the NZCPS address use of the coastal environment and the management of adverse effects on ecological values, natural character and landscape, biosecurity, and public access. In summary:

- The NZCPS recognises the contribution of aquaculture to the social, economic, and cultural wellbeing of people and communities, and sets out an intent that appropriate locations for aquaculture will be identified. Our proposed trials are intended to assist with the development of more resilient aquaculture systems and therefore at their core is the recognition of the importance of aquaculture to the country. With respect to the location of the trials these will be located within Coastal Management Unit 8 – Open Ocean. Within CMU8, aquaculture activities may be provided for where they are located and designed appropriately. These include being away from recognised navigation routes, areas of outstanding natural character and landscape and areas of ecological significance. The proposed location of our trials aligns with this direction. We therefore consider it to be an appropriate location in accordance with the NZCPS;
- Potential effects on the seabed and water column are relevant to the provisions of the NZCPS that seek the maintenance of the integrity, form, functioning and resilience of the coastal environment. Significant adverse

effects on the seabed and in the water column are not anticipated as a result of our trials, and therefore the integrity, form, functioning, and resilience of the seabed and water column is expected to remain.

Recognising the requirements of a precautionary approach within the NZCPS we will continue to work with our expert advisors to ensure appropriate mitigation measures are integrated into our proposal;

- Policies in the NZCPS require that the principles of the Treaty of Waitangi and the principle of kaitiakitanga be taken into account in managing the coastal environment. We continue to engage with the various mana whenua groups that have any interest in the area of our application. We will undertake the activities associated with the project consistent with mana whenua values for the coastal marine area;
- In relation to Policy 11 of the NZCPS a number of marine mammals and seabirds that are listed as threatened or at risk are found in the area of the proposed site. Assessments carried out by marine mammal and seabird experts have concluded potential adverse effects are minor or negligible and that the proposal aligns with good practice guidance. The draft seabed assessment identifies that any benthic effects of our trials will meet policy 11 as it is unlikely that any threatened or at-risk taxa reside within the range of benthic impact;
- In relation to Policies 13 and 15 of the NZCPS, a landscape, visual and natural character assessment has been carried out, which has concluded that the site is not within areas of outstanding natural character or within outstanding natural features or landscapes and will not have adverse effects on any outstanding values. The proposal will not have significant adverse effects on the natural character or landscape values of the coastal environment and any adverse effects will be very low to low;
- Consistent with Policy 12 of the NZCPS, we are preparing a draft biosecurity management plan to manage the risks of adverse effects on the coastal environment from a biosecurity perspective;
- Access to and along the coastline will not be affected by the proposal, and on the sea surface, we note that our proposal will be located within an existing consented marine farm site and that the area is not subject to high recreational use. We therefore consider that our proposal is consistent with Objective 4 of the NZCPS as recreational values will be maintained.

Overall, the proposed trials are an appropriate use of the coastal marine area that recognise and seek to provide for the benefits of aquaculture to the country and manage adverse effects in a manner that is consistent with the relevant provisions of the NZCPS.

Part IX: Purpose of the Act

Your application must be supported by an explanation how the project will help achieve the purpose of the Act, that is to “urgently promote employment to support New Zealand’s recovery from the economic and social impacts of COVID-19 and to support the certainty of ongoing investment across New Zealand, while continuing to promote the sustainable management of natural and physical resources”.

In considering whether the project will help to achieve the purpose of the Act, the Minister may have regard to the specific matters referred to below, and any other matter that the Minister considers relevant.

Project’s economic benefits and costs for people or industries affected by COVID-19:

This consent is part of a wider investment programme that will enable PFR and collaborators to generate the science and technological innovations needed to promote sustainable employment and economic benefit, and to help deliver MPI’s Aquaculture strategy (Ministry for Primary Industries 2019, 2021). This strategy is focused on sustainable growth, aiming to transform the industry from sales of \$600M+ today to \$3B by 2035. Such growth would generate in the region of 6,000 additional regional jobs (Ministry for Primary Industries 2021). For every additional job created in the aquaculture industry, two additional jobs will be created elsewhere in the economy (Williams et al. 2017). As production increases, ancillary sectors supporting aquaculture will increase by \$1M for every \$1M of additional aquaculture output (Williams et al. 2017). But to achieve this goal, a step-change is required such as a significant increase in space utilised. However, like many other countries, NZ has limited sheltered coastal space for aquaculture (arguably all premium NZ aquaculture locations are already allocated; Wyatt et al. 2010), and there are vocal opponents to near-shore expansion. NZ has the 4th largest EEZ globally (4.4M km²) and is amply resourced with offshore production space.

This project is an early step toward achieving this step change — demonstrating the technical feasibility of a finfish aquaculture system with the potential to be operated in the open ocean and with a vision to be mobile and unmanned in the future. This will open up a substantial area of NZ's EEZ for production as well as provide resilience to climate change through the ability to move fish to waters where they grow best, as well as provide opportunity for species diversification.

This resource consent is foundational to the delivery of science from both the § 9(2)(b)(ii) Re-imagining Aquaculture programme and the § 9(2)(b)(ii) Growing Futures®, Open Ocean Aquaculture Growing Futures direction (funded by MBIE via SSIF) over a 5-year timespan. Consequently, the economic and social impacts of this application cannot be assessed in isolation and must be considered within the context of the surrounding and supporting science and facility investments that it will underpin and complement the delivery of transformative outputs and outcomes. Without a full complement of appropriate facilities that enable the ideation, development, lab scale testing, field testing and pilot scale testing of aquaculture innovations PFR's seafood science strategy and workforce plan would be endangered, risking future recruits and creating risk to current employment levels.

PFR has supported complementary capital investments in a chain of related facilities that form a progressively higher energy testing environment, from the virtual (on land in an office) through to the open ocean where 6m+ waves, strong currents and storm force winds can be the norm. These facility investments total § 9(2)(b)(ii) which, based on data from Bevins (2019) would support in the region of 60 jobs in the construction industry and broader community. The biggest contribution to the economy will be generated by the anticipated outcomes of the research. With technology that allows safe, cost-efficient offshore finfish aquaculture, in 20-years' time NZ could rival the Norwegian salmon aquaculture industry, becoming a multibillion-dollar exporter of high-quality seafood to a global population with a growing appetite for nutritious, low-footprint proteins and omega-3 fats, while still being true to kaitiakitanga principles.

The project also aligns well with the Living Standards Framework (New Zealand Treasury, 2021); It will allow researchers to generate innovations that improve NZ's natural capital, enabling aquaculture to move further offshore; reducing visual, environmental and wildlife impacts and improving animal welfare. These outputs will generate intellectual capital that will enable the aquaculture industry to grow; which will contribute to NZ's financial and physical capital and provide significant benefits to human capital. As well as the impacts on NZ's aquaculture production, disruptive technology development can provide global opportunities for NZ's marine engineering industry, with development of new manufacturing and export opportunities and generating large numbers of highly skilled jobs in the marine engineering space. It will ultimately generate diverse employment, study and skill development opportunities throughout NZ. These benefits will strengthen NZ's social capital, providing livelihoods in rural, coastal regions.

Project's effects on the social and cultural wellbeing of current and future generations:

This project will enable science activity contributing to 9 of the UNESCO sustainable development goals: poverty, hunger, good health and wellbeing, gender equality, decent work and economic growth, Industry, innovation and infrastructure, responsible consumption and production, climate action, life below water and life on land.

The research programme is also designed to support Indigenous Innovation through:

- Collectively exploring mātauranga associated with the health of Tangaroa and Hinemoana encapsulating different kaitiakitanga practices around Aotearoa, supporting new seafood production pathways and identifying new commercial marine economies and societal opportunity
- Supporting Māori kaimoana businesses actively co-innovating with us, providing operational and economic know-how to empower and enable offshore aquaculture and Māori development
- Creating an environment enabling understanding, identifying and mapping of cultural, regulatory and ownership implications of novel offshore farming strategies: e.g., mobile production; farming in areas not currently consented for aquaculture (including existing Whakataunga Tiriti obligations, legal requirements, and regional perspectives for Māori in aquaculture/fisheries)

Whether the project would be likely to progress faster by using the processes provided by the Act than would otherwise be the case:

We have consulted with the Nelson City Council and Marlborough District Council during our resource consent application. Both councils have indicated that despite the expected low adverse environmental effects, it is highly likely that they would publicly notify our application if made under the RMA. We have also engaged with interest groups that have previously opposed aquaculture applications. They indicated that they would oppose the application on principle. More generally we are aware that there has been a high level of public interest and controversy over recent years in relation to fish farming applications in the Marlborough region. There is a significant risk that this controversy will spillover to this application, despite it being completely different in nature. We therefore expect that going through the RMA consent process will require public notification and a hearing, with a risk of Environment Court appeals if the application is granted. This would create significant risks with respect to our current Endeavour Fund funding window which ends in September 2025. We also consider that such delays are out of proportion to the potential environmental effects of our proposal and do not recognize the significant national interest benefits (both short and long term) that this research generates.

Whether the project may result in a 'public benefit':

Examples of a public benefit as included in Section 19(d) of the Act are included below as prompts only.

Employment/job creation:

PFR's investments in science activity (described in Economic Benefit) has already led to the creation of 6 new science FTEs over the past 24 months. The Seafood Technologies portfolio has prepared a work force plan that proposes the creation of a further 42 direct science (and support) FTEs over the coming 5-year period. Acquiring this resource consent as part of the required facilities matrix necessary for the delivery of Open Ocean Aquaculture research would help to enable and safeguard these and the c60FTE's that already exist within the portfolio. Table 3 in Attachment A identifies the direct FTEs planned and secured as well as the numbers of indirect FTEs secured within the community due to the above-mentioned investment in science. FTEs generated within the Knowledge economy contribute significantly to the economic diversity of smaller communities such as Nelson, helping generate greater economic stability and contributing significantly to jobs in the community. According to Bivans (2019) around 48 indirect jobs are supported in the community by scientific jobs, equating to approximately 451 additional jobs being supported indirectly. When the jobs associated with capital investment are included the total positions contingent on this application increases to c619 jobs. This project provides exceptional value in its contribution to both local and national employment over the immediate, mid, and long term.

Housing supply:

The project will not contribute directly to housing supply. Indirectly it may lead to an increase in housing supply through the need to satisfy demand for a stable or increasing population.

Contributing to well-functioning urban environments:

The project will not contribute directly to a well-functioning urban environment but will strengthen the Nelson / Marlborough economy and contribute towards economic diversity as described above. In the long term this will improve the functioning of existing urban environments.

Providing infrastructure to improve economic, employment, and environmental outcomes, and increase productivity:

Acquiring this resource consent will create an essential additional testing 'facility' for New Zealand that is one of a chain of similar facilities and capabilities required for the ideation, development, lab scale testing, field testing and pilot scale testing of novel aquaculture devices and innovations. These Investments form a chain of related facilities that form the steps required for innovations to be tested and further developed in progressively higher energy environments from the virtual through, to the Open Ocean. This chain of facilities includes the following which PFR has already invested in:

- CFD modelling software and capability to enable the virtual ideation and iterative development, modelling, and testing of concepts pre-prototype.
- Workshops, model labs and associated facilities for the design and ideation of models.

- Flume tank for hydrodynamic and lab scale testing of novel structures/devices (under construction).
- A set of moorings in progressively increasing energy sites in Tasman Bay for the early-stage testing and development of devices at scale and without fish.
- A fin fish facility on land for growing and holding fish for physiology, behavior, breeding trials and for growing fish for testing stocked structures at sea.
- A Marine hatchery on land for rearing marine species to support the above.
- A Seapen in Beatrix Bay (Marlborough Sounds) for development of monitoring technology and testing of components in lower energy environments

The D'Urville Island site will complement this series of facilities to enable the testing of larger-scale devices in a higher-energy environment stocked with fish and enable the pilot-scale assessment of innovations.

Improving environmental outcomes for coastal or freshwater quality, air quality, or indigenous biodiversity:

As noted, the project is seeking to develop a mobile, open ocean aquaculture system that, among other things, alleviates some of the environmental, resilience and social license challenges that are associated with existing, fixed aquaculture systems. It is expected that a mobile open ocean aquaculture system would help reduce impacts on marine wildlife, benthic ecology and amenity, landscape and natural character effects that arise from fixed aquaculture systems and will enable aquaculture to move away from more sensitive in-shore environments.

Minimising waste:

PFR will actively manage and minimize waste generated through the trials through its Biosecurity and Fish Health Management plan. Feed control systems will ensure that feeding is targeted to fish appetite and as little waste feed is discharged as possible. One of the envisaged improvements that mobile technology will deliver is improved feed consumption and conversion which in the long term could actively reduce waste generated by the aquaculture industry, thus generating waste improvement outcomes far beyond the lifetime of the resource consent.

Contributing to New Zealand's efforts to mitigate climate change and transition more quickly to a low-emissions economy (in terms of reducing New Zealand's net emissions of greenhouse gases):

New Zealand has a goal to become a zero-carbon society, and to reduce biogenic methane by 24 – 47% below 2017 levels by 2050, while also adding \$44B in export earnings from the primary sector over the next decade (Ministry for Primary Industries, 2020). Achieving these goals is likely to lead to a re-focusing within the primary sector, and as a low emission activity aquaculture will play a key role in this and is an integral part of NZ's Aquaculture Strategy which this programme will help to deliver.

Promoting the protection of historic heritage:

No historic heritage will be affected by the project.

Strengthening environmental, economic, and social resilience, in terms of managing the risks from natural hazards and the effects of climate change:

The world needs innovative technologies for low-footprint protein production. Done properly, marine fish aquaculture has one of the lowest greenhouse gas and nutrient emission profiles of all animal production industries (Global Aquaculture Alliance 2019). Currently, NZ has 11,000 tonnes of salmon in 15 ha of ocean (Ministry for Primary Industries 2022), so to achieve a production target of 1M Tonnes, only 1,363 ha / 13.6 sq km or 0.000003% of our EEZ would be required, much of which is characterized as having low-medium productivity. By shifting fish production to a fraction of the vast, nutrient-limited open oceans surrounding us, we will be ensuring NZ has a primary production industry able to sustain ever-increasing scrutiny/demands over environmental impact. Solving the space-to-grow issue will help focus research resources on improving fish diets, which are the main source of sustainability concerns associated with aquaculture (FAO 2018; Ytrestoyl et al. 2015). Adverse environmental impacts associated with conventional aquaculture will be minimized by mobile production systems (e.g., benthic deposition). New mechanisms to address biosecurity, including spatially separated quarantine activities and advantages of a membrane-based structure for closed treatment methodologies, will be possible with this technology.

The development of highly size-scalable, mobile production systems gives NZ the flexibility and **resilience to cope with, and even capitalize on, changing weather and climatic conditions**, e.g., following optimal environmental conditions and species diversification and development opportunities in evolving markets (Cochrane et al. 2009).

Other public benefit:

Numerous **spill-over benefits** may arise from the science and technology outputs of the research programme:

- Innovative technology could lead to a multimillion-dollar manufacturing and technology export industry. The technology development strategy leverages NZ marine engineering strengths and unique market positions (submerged soft-structure engineering and niche small-to-medium vessel construction for dynamic sea conditions).
- Large-scale growth in aquaculture production will be associated with increased **medium-high skilled jobs in the regions**. For every additional job created in the aquaculture industry, two additional jobs will be created elsewhere in the economy³. As production increases, ancillary sectors supporting aquaculture will increase by \$1M for every \$1M of additional aquaculture output (Williams et al 2017).
- Mobile aquaculture technology will spur R&D into novel fabrics designed for long-term submergence; autonomous vessels; aquatic disease management strategies; aquafeed development; and land-sea data communication. It also brings an aligned, integrated legal, policy and management framework for developing offshore aquaculture **premised on environmental respect and indigenous values**.
- Increased activities in our EEZ will stimulate further innovation in hyper-local sea state forecasting and monitoring networks for oceanographic conditions, vessels, infrastructure, and difficult-to-track marine fauna.

Whether there is potential for the project to have significant adverse environmental effects:

The expert reports that we have commissioned have not identified any potentially significant adverse environmental effects. These reports include the following:

- Seabird assessment
- Marine Mammal assessment
- Benthic and water column assessment
- Landscape report

Part X: Climate change and natural hazards

Description of whether and how the project would be affected by climate change and natural hazards:

The Mobile Aquaculture Production System concept was partly developed in response to the impacts of climate change that are already being experienced by salmon farmers in the Marlborough Sounds, such as increasing water temperatures and marine heatwaves. The concept allows operators to move farms to locations where conditions (e.g., water temperature) exist that are optimal for fish performance. The concept also focuses on scalable approaches suitable for moving production out of coastal areas into the Open Ocean marine environment where high energy is the norm. Acute climate change events, such as tropical cyclones moving further south are therefore within the design criteria of the structures being tested. Prototypes are designed to be moved vertically within the water column and can therefore be sunk to a depth where there is less wave energy (wave energy dissipates rapidly with depth) should it be required during disruptive weather events. Prototypes can also be towed to other locations (being mobile and towable) so that if an exceptionally large storm were predicted (given sufficient warning) devices could be towed to another location. It is also worth noting that trials are occurring over a brief period of time and are therefore not expected to be impacted by the longer term effects of climate change.

Part XI: Track record

A summary of all compliance and/or enforcement actions taken against the applicant by a local authority under the Resource Management Act 1991, and the outcome of those actions:

Local authority	Compliance/Enforcement Action and Outcome
Marlborough District Council	No compliance/enforcement actions

Part XII: Declaration

I acknowledge that a summary of this application will be made publicly available on the Ministry for the Environment website and that the full application will be released if requested.

By typing your name in the field below you are electronically signing this application form and certifying the information given in this application is true and correct.

s 9(2)(a)

28/02/2023

Signature of person or entity making the request

Date

Important notes:

- Please note that this application form, including your name and contact details and all supporting documents, submitted to the Minister for the Environment and/or Minister of Conservation and the Ministry for the Environment, will be publicly released. Please clearly highlight any content on this application form and in supporting documents that is commercially or otherwise sensitive in nature, and to which you specifically object to the release.
- Please ensure all sections, where relevant, of the application form are completed as failure to provide the required details may result in your application being declined.
- Further information may be requested at any time before a decision is made on the application.
- Please note that if the Minister for the Environment and/or Minister of Conservation accepts your application for referral to an expert consenting panel, you will then need to lodge a consent application and/or notice of requirement for a designation (or to alter a designation) in the approved form with the Environmental Protection Authority. The application will need to contain the information set out in Schedule 6, clauses 9-13 of the Act.
- Information presented to the Minister for the Environment and/or Minister of Conservation and shared with other Ministers, local authorities and the Environmental Protection Authority under the Act (including officials at government departments and agencies) is subject to disclosure under the Official Information Act 1982 (OIA) or the Local Government Official Information and Meetings Act 1987 (LGOIMA). Certain information may be withheld in accordance with the grounds for withholding information under the OIA and LGOIMA although the grounds for withholding must always be balanced against considerations of public interest that may justify release. Although the Ministry for the Environment does not give any guarantees as to whether information can be withheld under the OIA, it may be helpful to discuss OIA issues with the Ministry for the Environment in advance if information provided with an application is commercially sensitive or release would, for instance, disclose a trade secret or other confidential information. Further information on the OIA and LGOIMA is available at www.ombudsman.parliament.nz.

Checklist

Where relevant to your application, please provide a copy of the following information.

No	Correspondence from the registered legal land owner(s)
No	Correspondence from persons or parties you consider are likely to be affected by the project
No	Written agreement from the relevant landowner where the project includes an activity that will occur on land returned under a Treaty settlement.
No	Written agreement from the holder of the relevant customary marine title order where the project includes an activity that will occur in a customary marine title area.
No	Written agreement from the holder of the relevant protected customary marine rights recognition order where the project includes an activity that will occur in a protected customary rights area.