

From: Bonnie Hartfield <Bonnie.Hartfield@mfe.govt.nz>
Sent: Monday, 4 May 2026 8:33 am
To: Matt.Adams@mfe.govt.nz; Aaron.Napier@mfe.govt.nz
Subject: RE: Gigablue - Materials shared via DocSend

Morena korua,

As mentioned below, notes for each of the documents can be found here: [Gigablue document notes.docx](#).

Note: The link is incorrect. It should be linked to the document "GB document thoughts".

I did think the innovation and data document may be new, but thankfully it was here beforehand.

Ngā mihi,

Bonnie

Bonnie Hartfield ([she/her](#))

Advisor | Kaitohutohu
Marine Policy | Kaupapahere Moana
Natural Environment Policy | Te Rōpū Te Whakahaere Taiao me te Urutau

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Ministry staff work flexibly by default. This means I work in the office/at home from 8:30 – 4:30.



From: Matt Adams <Matt.Adams@mfe.govt.nz>
Sent: Friday, 1 May 2026 2:14 pm
To: Aaron Napier <Aaron.Napier@mfe.govt.nz>; Bonnie Hartfield <Bonnie.Hartfield@mfe.govt.nz>
Subject: RE: Gigablue - Materials shared via DocSend

Hi Aaron,

Thanks for this. Always useful, although Bonnie has already conscientiously reviewed and summarised. Might be some new documents in there.

At some point, when you roll into your new role, we will need to consider how we communicate with GB. I know we will inevitably have questions for them, so would be good to have that ability to just reach out.

Have a good weekend,
Cheers,

Matt

From: Aaron Napier <Aaron.Napier@mfe.govt.nz>
Sent: Friday, 1 May 2026 2:02 pm
To: Matt Adams <Matt.Adams@mfe.govt.nz>; Bonnie Hartfield <Bonnie.Hartfield@mfe.govt.nz>
Subject: FW: Gigablue - Materials shared via DocSend

Hey Team,

I got this overview of the docs in DocSend a week or so back is this useful? I figure you already have access to them so not sure how helpful it is.

Regards,

Aaron Napier

General Manager, Digital

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From: Sharon Naveh Ovedya 9(2)(a)
Sent: Monday, 20 April 2026 12:45 am
To: Aaron Napier <Aaron.Napier@mfe.govt.nz>
Cc: Guy Shafran 9(2)(a)
Subject: Gigablue - Materials shared via DocSend

MFE CYBER SECURITY WARNING

This email originated from outside our organisation. Please take extra care when clicking on any links or opening any attachments.

Hi Aaron,

Following our recent discussions, I wanted to provide a brief overview of the materials shared via DocSend, to help guide you through the documents and how they fit together.

Below is a brief description of each document and its role in the overall package.

Technical and research plan

Technical Report – provides the detailed scientific and technical foundation of the MCFS activity, including carbon removal efficacy, life cycle analysis, capsule behavior, and environmental effects across the water column and seabed. The report is structured to address key research priorities previously identified by MfE in July 2025, including quantification of carbon removal efficacy, modeling approaches, and potential chemical, biological, and environmental impacts.

Research Plan (2026–2030) – outlines a structured, phased research program to validate and scale the MCFS approach, including environmental baseline studies, monitoring and verification (MRV), carbon uptake performance, and ongoing technology development. The plan is designed to address key scientific questions and support responsible scale-up through defined validation milestones. An independent peer review of the Research Plan is currently being undertaken by Earth Sciences New Zealand (ESNZ), and the results will be shared once available.

MCFS Methodology

MCFS Methodology (Puro.earth standard) – sets out the formal, third-party methodological framework for the MCFS approach, including system boundaries, eligibility criteria, and requirements for quantifying and verifying durable carbon removal. It defines how carbon fixation, transport, and long-term storage are accounted for under an established certification standard.

In situ MRV Design and Protocol – provides a detailed description of the monitoring, reporting, and verification (MRV) framework to be applied during field activities. This includes sampling design, spatial and temporal monitoring approaches, and key physical, chemical, and biological parameters measured to quantify carbon removal and assess environmental effects.

MCFS Differentiation from Ocean Iron Fertilization (OIF) – this document, prepared by Tonkin & Taylor and ESNZ, provides a scientific and regulatory comparison between MCFS and Ocean Iron Fertilization (OIF). The document clarifies differences in mechanism, environmental behavior, and risk profile. It explains that, unlike OIF, MCFS uses engineered capsules with low, insoluble micronutrient content to support localized phytoplankton growth within the capsules, followed by controlled, monitored sinking to the deep ocean for carbon sequestration.

Environmental reports

Environmental Impact Assessment (Tonkin & Taylor) – the primary, independent assessment of environmental effects for the planned 1000 tons MCFS trial in New Zealand's EEZ. It evaluates the physical, chemical, and biological environment, identifies potential impacts (e.g. water quality, marine species, habitats), and defines mitigation measures and operational controls. The assessment concludes that residual environmental effects are expected to be low to negligible under the proposed trial design.

DO Consumption Modeling – a focused modeling study assessing potential dissolved oxygen depletion resulting from organic matter degradation at the seabed. Using conservative scenarios, it shows that any oxygen reduction is small, localized, and temporary, indicating negligible ecological impact.

ESNZ Benthic Data Assessment – compiles and analyses benthic habitat and species data within the area of interest. It identifies the distribution of sensitive habitats and supports site-selection and deployment strategies designed to avoid ecologically sensitive areas.

ESNZ Threshold Study – defines environmental thresholds and exposure limits for key parameters (e.g. capsule concentration, organic matter loading, and ecological response). It provides a scientific basis for assessing acceptable impact levels and supports the conclusion that predicted exposures remain within safe bounds.

Durability Assessment – evaluates the ability of the sunken biomass and capsules to remain in the deep ocean for hundreds to thousands of years, thus supporting MCFS as an efficient carbon removal technology.

Social and Economic Reports

Innovation and Data for Climate Change Solution – assesses the potential effects of the proposed trial on relevant stakeholders, including Ngāi Tahu, other marine users, and the wider public.

Economic benefits – The report by Insight Economics identifies meaningful potential benefits, including contributing to New Zealand's position at the forefront of marine climate innovation, supporting high-value research activity, and enabling early participation in the development of scalable carbon removal solutions aligned with national and global climate goals. An independent peer review of the Economic Benefits, conducted by NZIER, will be shared once available.

EPA Form 1 Submissions

GIGPA04 – Pre-Activity Notification Form 1 – describes an open-ocean particle release trial, including deployment, monitoring, and modeling of capsule transport and environmental effects.

GIGPA05 – Pre-Activity Notification (Updated Form 1) – describes a contained research trial using floating pens, where capsules are retained and fully recovered at the end of the experiment.

We note that the GIGPA04 Form 1 was subsequently withdrawn by Gigablue, and is included here for context on the evolution of the research design.

Please let me know if it would be helpful to walk through any of these materials in more detail. We would be very happy to discuss any of the areas you highlighted previously or to provide further information where useful.

Kind regards,

Sharon

Sharon Naveh

VP Regulatory Compliance // Gigablue