



# Brunel

University  
of London

## Deliverable 2 – Project Management Plan

**Group:** B14

**Startup:** Startup2

**Tutor:** Mr. Phil Glass

**Assigned UN SDG:** SDG14 - Life Below Water

**Problem Statement:** Deep-sea mining and unsustainable exploitation threaten little understood ecosystems, risking irreversible damage before their benefits are fully known

## Section 1 – Startup Information

Startup Contributors:

Name / Student ID	Roles	Key Responsibilities / Contributions
Aiyana Patel - 2429885	Full-Stack Developer	Completed section 2, 3, and 4. Map page
Joshua Mensah - 2322246	Full-Stack Developer	Completed sections 6 and 3. Learn page
Moustafa Osman -	Full-Stack Developer	Completed section 5 and 3. Home page and login/register pages
Renat Sapon - 2433370	Full-Stack Developer	Completed sections 1 and 7 (remade sections 4, 5 and 6). Research and impact pages

## Section 2 – Project Idea and Vision

### 2.1. Overview of Topic Area

This Project is based on the UN Sustainable Development Goal 14 - Life Below Water, which aims to sustainably use the ocean and marine resources whilst conserving biodiversity and deep-sea life. This goal is supported by the **United Nations Convention on the Law of the Sea treaty** (UNCLOS) and the **1944 agreement** which mandates the **International Seabed Authority** (ISA) to oversee all activities conducted in 'The Area' (international seabed outside national borders) to ensure a balance between environmental protection and economical benefits.

Several initiatives have been put in place in order to improve the understanding and regulating of the deep-sea, including **ISAs Mining Code**, **Regional Environmental Management Plans (REMPs)**, **AREA2030s mapping project** and the **Sustainable Seabed Knowledge Initiative (SSKI)**. Although these initiatives help to generate vast amounts of data, it is mostly complex to understand and not easily accessible to the general public.

### 2.2. Summary of the Problem Research:

After conducting research into ISA reports, UN initiatives and multiple problem areas relating to deep-sea mining and SDG14, 3 overarching problem areas have been identified:

#### 1. Limited awareness / accessibility of environmental and ecosystemic data

Deep-sea ecosystems, mining impacts and conservation zones are poorly understood by the public despite playing a crucial role in climate regulation and biodiversity, mainly due to the lack of accessible, engaging tools available. ISA Contractors (e.g. AREA2030, EIAs, SSKI) also produce extensive datasets that can be complex to understand for non-specialists.

#### 2. Balancing resource exploitation and environmental protection

Mining has high economic value but poses environmental risks such as habitat destruction and pollution. Monitoring and enforcing regulations are still a challenge and although EIAs / REMPs help, there's no standard method to track compliance and compare impacts globally

### **3. Inconsistent collaboration and knowledge sharing**

Exchanging data between countries and contractors is inconsistent due to the lack of standardisation of data formats and method of sharing which slow down collaboration

## **2.3. User-Centred Problem Definition:**

During the project's research and the identification of the 3 problem areas, this application aims make deep-sea environmental and exploration data accessible and useful to various types of users, including:

- **Local communities and fisheries** - Stay informed about mining operating near their region, and report evidence of pollution or habitat damage to protect local ecosystems
- **Scientific / Research community** - analyse and upload datasets marine species and mining impact zones, and validate observations that local communities have reported
- **Government and policy makers** - Oversee how marine resources are managed and if regulations are being complied with
- **Mining companies and contractors** - Respond to reports and incidences regarding their mining operations and demonstrate how to mine sustainably
- **Admin** - responsible for reviewing uploads, discussions and ensuring data integrity

## **2.4. Project Vision:**

The aim of this project is to implement a non-trivial full stack web application that makes marine data accessible and educational for all stakeholders. This will be done by centralising environmental and biological data collected (by scientists, researchers, contractors or other) and modifying them into simpler interactive tools for educational and collaboration purposes. The overall purpose of the application will be to help many different types of stakeholders to explore, and understand deep-sea life, environment and its sustainable management (through features such as toggle layered interactive maps, environmental impact trackers and educational portals) which align to the goals of SDG14.

## **2.4. Project Vision:**

The success of our application will be defined by:

- An increase of accessibility and awareness of the deep-sea including habitats, environments and marine life for specialist and non-specialist stakeholders
- Making decision-making and enforcing regulations on deep-sea activities and environmental conservation easier

- An increase of collaboration between scientists, contractors, and policymakers through sharing data and standardising data formats
- Support SDG14 by encouraging understanding, sustainable management, and responsible use of ocean resources

The ultimate vision is to create a platform that encourages stakeholders to engage with and contribute to ocean sustainability and strengthen global knowledge for protecting life below water

### **Resources used:**

#### **ISA's mining code (explorational and exploitational) / ISAs contributions:**

- *The mining code - international seabed authority* (no date) *The Mining Code*. Available at: <https://isa.org.jm/the-mining-code/> (Accessed: 18 October 2025).
- *The mining code: Exploration regulations - international seabed authority* (no date) *The Mining Code: Exploration Regulations*. Available at: <https://www.isa.org.jm/the-mining-code/exploration-regulations/> (Accessed: 18 October 2025).
- *The mining code: Draft exploitation regulations - international seabed authority* (no date) *The mining code: Draft exploitation regulations*. Available at: <https://isa.org.jm/the-mining-code/draft-exploitation-regulations-2/> (Accessed: 18 October 2025).
- *The mining code: Standards and guidelines - international seabed authority* (no date) *The Mining Code: Standards and Guidelines*. Available at: <https://isa.org.jm/the-mining-code/standards-and-guidelines/> (Accessed: 18 October 2025).
- *Strategic plan - international seabed authority* (no date) *Strategic Plan*. Available at: <https://www.isa.org.jm/strategic-plan/> (Accessed: 18 October 2025).
- *Strategic plan 2024-2028 - international seabed authority* (no date) *Strategic Plan 2024-2028*. Available at: <https://www.isa.org.jm/strategic-plan-2024-2028/> (Accessed: 19 October 2025).
- *Contributions Dashboard - International Seabed Authority* (no date) *Contributions Dashboard*. Available at: <https://isa.org.jm/contributions-dashboard/> (Accessed: 19 October 2025).

### **Exploration Contracts:**

- *Exploration contracts - international seabed authority* (2025) *International Seabed Authority - International Seabed Authority*. Available at: <https://isa.org.jm/exploration-contracts/> (Accessed: 20 October 2025).
- *Polymetallic nodules - international seabed authority* (2025) *International Seabed Authority - International Seabed Authority*. Available at: <https://isa.org.jm/exploration-contracts/polymetallic-nodules/> (Accessed: 20 October 2025).

- *Polymetallic sulphides - international seabed authority* (no date) *Minerals: Polymetallic Sulphides*. Available at: <https://isa.org.jm/exploration-contracts/polymetallic-sulphides/> (Accessed: 20 October 2025).
- *Cobalt-rich ferromanganese crusts - international seabed authority* (no date) *Minerals: Cobalt-rich Ferromanganese Crusts*. Available at: <https://isa.org.jm/exploration-contracts/cobalt-rich-ferromanganese-crusts/> (Accessed: 20 October 2025).
- *Exploration Areas - International Seabed Authority* (no date) *Exploration areas*. Available at: <https://isa.org.jm/exploration-contracts/exploration-areas/> (Accessed: 20 October 2025).

**Protection of the marine environment (EIAs and REMPs):**

- *Environmental impact assessments - international seabed authority* (no date) *Environmental Impact Assessments*. Available at: <https://isa.org.jm/protection-of-the-marine-environment/environmental-impact-assessments/> (Accessed: 20 October 2025).
- *Regional Environmental Management Plans - International Seabed Authority* (no date) *Regional environmental management plans*. Available at: <https://www.isa.org.jm/protection-of-the-marine-environment/regional-environmental-management-plans/> (Accessed: 20 October 2025).
- *Standardized approach to the development, approval and review of a Remp - International Seabed Authority* (no date) *Standardized approach to REMPs*. Available at: <https://www.isa.org.jm/protection-of-the-marine-environment/regional-environmental-management-plans/standardized-approach/> (Accessed: 20 October 2025).
- *Regional Environmental Management Plans - International Seabed Authority* (no date) *Environmental management plan for the Clarion-Clipperton Zone*. Available at: <https://isa.org.jm/protection-of-the-marine-environment/regional-environmental-management-plans/ccz/> (Accessed: 22 October 2025).
- *Draft REMP for the Northern Mid-Atlantic Ridge - International Seabed Authority* (no date) *Draft REMP for the northern Mid-Atlantic Ridge*. Available at: <https://www.isa.org.jm/protection-of-the-marine-environment/regional-environmental-management-plans/northern-mar/> (Accessed: 22 October 2025).
- *Progress in other priority regions - International Seabed Authority* (no date) *Progress in other priority regions*. Available at: <https://www.isa.org.jm/protection-of-the-marine-environment/regional-environmental-management-plans/other-regions/> (Accessed: 22 October 2025).

**Marine scientific research / initiatives (AREA2030, SSKI and Call to Action):**

- *Isa and the 2030 agenda - international seabed authority* (no date) *ISA's contributions to the achievement of the 2030 Agenda*. Available at: <https://www.isa.org.jm/isa-and-the-2030-agenda/> (Accessed: 18 October 2025).
- *Sustainable seabed knowledge initiative - international seabed authority* (no date) *Sustainable Seabed Knowledge Initiative*. Available at: <https://isa.org.jm/sski/> (Accessed: 23 October 2025).
- *Call for action - international seabed authority* (no date) *Call for action for ensuring the stewardship of the Area and its resources for the benefit of all humanity through deep-sea science, technology and innovation*. Available at: <https://www.isa.org.jm/call-for-action/> (Accessed: 22 October 2025).

#### **Report 1 - Seas At Risk (2024), The changing seascape of deep-sea mining in Europe**

- (No date) *The changing seascape of deep-sea mining in Europe*. Available at: [https://seas-at-risk.org/wp-content/uploads/2024/05/EU-DSM-Report\\_final-digital-with-appendix.pdf](https://seas-at-risk.org/wp-content/uploads/2024/05/EU-DSM-Report_final-digital-with-appendix.pdf) (Accessed: 21 October 2025).

#### **Report 2 - ISA (2024), The contribution of ISA to the scientific objectives of the UN Decade of Ocean Science for Sustainable Development**

- (No date) *The contribution of ISA to the scientific objectives of the UN ...* Available at: [https://www.isa.org.jm/wp-content/uploads/2024/12/Report\\_Contribution-of-ISA-to-the-scientific-objectives-of-the-UN-Decade.pdf](https://www.isa.org.jm/wp-content/uploads/2024/12/Report_Contribution-of-ISA-to-the-scientific-objectives-of-the-UN-Decade.pdf) (Accessed: 23 October 2025).

### **Section 3 – Lean Canvas Model**

(See the appendix for completed deliverable)

### **Section 4 – Project Backlog**

#### **Epic 1- User Management**

Sub-epic	US ID	As a ..	I want ..	So that ..	F/NF/UI	Priority
<b>User Authentication System</b>	01	General User	I want to create an account and log into the system with clear validation and error messages	I can securely access the system	F	High
	02	General User	To recover my password securely via email verification	I can still access my account in the event I forgot it	F	High
	03	General User	I want my profile to display my name, role and contribution	I can personalise my user experience	F	Low

	04	Admin	All passwords to be hashed and salted and all user data to be encrypted in storage	So credentials remain secure and accessible only to authorised processes	NF	High
	05	General User	A clean login / register interface with clear input fields and icons (e.g. a lock icon for password)	I can easily and confidently sign in or register	UI	High

## Epic 2 Interactive map

Sub -epic	US ID	As a ..	I want ..	So that ..	F/NF/UI	Priority
Interactive Map	06	General public	To view an interactive global map presenting seabed regions, mining / risk zones and protected areas, with clickable regions that display key information	I can explore the ocean's ecosystems and mining zones visually and easily access information of relevance in one place	F	High
	07	General User	To be able to toggle the maps layer to view biodiversity, mining / risk zones, APEIs and EIA sites	So I can view and compare specific datasets to each other	F	High
	08	General User	To view nearby mining activities or protected areas near my region	I can learn about activities being conducted in my area and identify potential local impacts	F	High
	09	General User	I want the map to load quickly and provide zoom, search, and reset tools	I can navigate regions smoothly without delay	NF/UI	High

## Epic 3 educational portal

Educational Portal	10	General User	I want to explore an interactive timeline with draggable, scrollable events and pop-up details	So that I can understand deep-sea milestones	F/UI	High
	11	General User	I want to view infographics and content about sustainable mining practices	So that I can learn and share key insights	F	High
	12	General User	I want to answer quizzes with feedback on correct/incorrect answers	So that I can test my understanding	F	Low
	13	General User	I want the portal to load quickly and work on desktops, tablets, and mobiles	So that I can learn from any device	NF	Low

	14	General User	I want educational content to be fetched dynamically from the database	So that updates can be made without editing code	NF	High
--	----	--------------	--	--	----	------

### Epic 4 Environmental & Research trackers

US ID	As a ..	I want ..	So that ..	F/NF/UI	Priority
15	General User	I want to upload EIA/APEI/REMP summaries through a clear form	So that environmental assessments are recorded	F	High
16	Admin	I want to approve or reject uploaded reports	So that only verified information is shown	F	High
17	General User	I want to search, filter, and download environmental reports	So that I can easily access relevant data	F	High
18	General User	I want each report to show compliance status labels	So that I can quickly evaluate regulatory alignment	F	High
19	General User	I want reports to have colour-coded impact levels (green/yellow/red)	So that I can understand severity at a glance	UI	High

### Epic 5 Collaborative Research Hub

US ID	As a ..	I want ..	So that ..	F/NF/UI	Priority
20	General User	I want to comment on datasets or participate in discussions	So that I can exchange insights with others	F	High
21	Admin	I want to remove inappropriate comments or posts	So that the platform remains respectful and reliable	F	High

## Section 5 – Sprint Plan

**Sprint 1 Duration:** 2 weeks (13/11 – 27/11)

**Sprint Goal:** Deliver core high-priority features and map foundation.

**Sprint Leads:**

- **Scrum Master:** Aiyana Patel
- **Product Owner:** Joshua Mensah

**Sprint 2 Duration:** 1 week (27/11 – 03/12)

**Sprint Goal:** Complete remaining medium/low priority features.

**Sprint Leads:**

- **Scrum Master:** Renat Sapon
- **Product Owner:** Joshua Mensah

## **Section 6 – Sprint Backlog**

### **Sprint Backlog 1 (13/11 – 27/11)**

1. HOME PAGE + LOGIN/REGISTER (Assigned to Moustafa)

Task ID	Description	Story Point	Status
01.1	Build full registration form UI		
02.1	Create “Forgot Password” UI page		
03.1	Build a static profile page UI		
04.1	Add password rules + input validation		
05.1	Create navigation + clean login/register UI		

2. MAP PAGE (Assigned to Aiyana)

Task ID	Description	Story Point	Status
06.1	Render map and interactive map		
07.1	UI panel to toggle map layers		
08.1	“Zoom to region” + highlight activity		
09.1	Add zoom, pan, reset buttons		
10.1	Click region and show popup		

3. LEARN PAGE (Assigned to Joshua)

Task ID	Description	Story Point	Status
11.1	Build timeline cards + scroll		
12.1	Infographic grid + modal		
13.1	Make learn page responsive		

20.1	Add visual legend of impact colours		
------	-------------------------------------	--	--

#### 4. RESEARCH & IMPACT (Assigned to Renat)

Task ID	Description	Story Point	Status
15.1	Create upload page UI		Done
17.1	Add frontend filters + search bar		Done
18.1	Add compliance badges visually		Done
21.1	Build discussion page frontend2		Done

### Sprint Backlog 2 (27/11 – 03/12)

#### 1. HOME PAGE + LOGIN/REGISTER (Assigned to Moustafa)

Task ID	Description	Story Point	Status
02.2	Add confirmation UI after sending reset link	4	
03.2	Add editable profile UI (client-side only)	3	
04.2	Add advanced password rules checker	3	

#### 2. MAP PAGE (Assigned to Aiyana)

Task ID	Description	Story Point	Status
07.2	Improve layer colours and legend		
08.2	Add sidebar listing region details		
09.2	Optimise render performance		

#### 3. LEARN PAGE (Assigned to Joshua)

Task ID	Description	Story Point	Status
12.2	Add simple filter for infographics		
13.2	Add subtle animation to timeline events		

#### 4. RESEARCH & IMPACT (Assigned to Renat)

Task ID	Description	Story Point	Status
16.1	Build list and approve/reject UI		
17.2	Add frontend export buttons for CSV/PDF		
22.1	Add delete comment UI		

## Section 7 – Peer Review from the other startup

### Feedback from Startup 1:

The Word document is clear and looks good at focusing on users from different backgrounds. User stories in project backlog were well defined, and all tasks were detailed. But all the tasks defined seems will take longer time than the project plan. It doesn't look feasible to finish all of them. Some of the tasks can be updated with lower priorities so that they may be removed in the future if needed

### Appendix

		Designed for:	Designed by:	Date:	Version:
Lean Canvas		Ocean sustainability stakeholders	SDG14 project team	28/10/25	1
Problem	Solution	Unique Value Proposition	Unfair Advantage	Customer Segments	
<ul style="list-style-type: none"> <li>Lack of awareness and understanding of deep-sea environments and ecosystems</li> <li>Finding middle ground between resource exploitation and environmental protection</li> <li>Inconsistent collaboration and knowledge sharing of bathymetric, biodiversity and genomic data</li> </ul>	<ul style="list-style-type: none"> <li><b>Learning &amp; Awareness Portal</b> - interactive map (with toggleable layers for mining zones, biodiversity, APEIs and EIA sites) and an educational hub featuring interactive timelines and infographics of key oceanic milestones</li> <li><b>Environmental &amp; Research Trackers</b> - manage / store data from EIAs, APEIs and REMPs for comparisons across contractor regions</li> <li><b>Collaborative Research Hub</b> - upload and share marine datasets with forums for peer collaboration and users - specialist Q&amp;As</li> </ul>	<ul style="list-style-type: none"> <li>A unified digital platform that aims to connect science, policy and public awareness to bridge the gap between reaping economic benefits and action for oceanic and deep-sea mining sustainability</li> <li>To discover the unknown by interacting, conserving and applying scientific insights to inspire global ocean stewardship</li> </ul>	<ul style="list-style-type: none"> <li>Integrates science, regulations and public data in one unified platform, which competitors treat separately</li> <li>Community - driven collaboration creates an efficient networking environment</li> <li>Visual and interactive tool makes complex marine science accessible to both experts and the public</li> </ul>	<ul style="list-style-type: none"> <li><b>Students / General public</b> – build awareness on marine sustainability</li> <li><b>Communities / Fisheries</b> – stay informed about local marine activities, report incidents</li> <li><b>Scientists / researchers</b> – share / collaborate on global marine datasets</li> <li><b>Environmentalists / Activists</b> - advocate for sea conservation using reliable data</li> <li><b>Government</b> - access reliable insights to track compliance</li> <li><b>Contractors</b> – submit EIAs, track impacts of their activities</li> </ul>	
Existing Alternatives	<h3>Key Metrics</h3> <ul style="list-style-type: none"> <li>Number of active users</li> <li>Number of active interactive map views and timeline interactions</li> <li>Quiz completion / average scores</li> <li>Number of datasets uploaded</li> <li>Number of peer reviews / comments in the forums</li> <li>Number of EIA / REMP / APEI entries tracked</li> <li>Volume of incident reports submitted</li> </ul>	<h3>High-Level Concept</h3> <ul style="list-style-type: none"> <li>Google Earth = Atlas for the deep-sea</li> <li>National Geographic = Interactive deep-sea classroom</li> <li>Duolingo = Learning portal for ocean awareness</li> <li>GitHub = Data sharing for deep sea researchers</li> <li>OECD Observatory = Global tracker for oceanic policy</li> <li>Reddit = Forum for ocean enthusiasts and researcher</li> </ul>	<h3>Channels</h3> <ul style="list-style-type: none"> <li>Partnerships with universities, schools and marine research institutes</li> <li>Workshops, seminars or webinars introducing the platform to students and educators</li> <li>Collaboration with ISA, marine science organisations / research groups</li> </ul>	<h3>Early Adopters</h3> <ul style="list-style-type: none"> <li>Students and researchers interested in SDG14, deep-sea ecosystems or resource sustainability</li> <li>Marine policy advisors or ISA staff to track EIA / APEI / REMP data</li> <li>Mining contractors and marine engineering companies involved in</li> </ul>	

provides free access to marine datasets across Europe	<ul style="list-style-type: none"> <li>Number of campaigns supported by app insights</li> <li>Average page load / response time</li> </ul>	<ul style="list-style-type: none"> <li>Use of platform in government official policy meeting</li> </ul>	responsible resource extraction
---	--	---	---------------------------------

## Cost Structure

**Fixed costs** – web hosting & cloud storage, software licenses & API subscriptions (map APIs, data visualisation libraries), database management system

**Variable costs** – customer marketing (social media ads, university outreach), email and notification services, data storage expansion (higher cloud usage fees for increased uploads / user activity)

**Customer acquisition costs** – educational partnerships, social media advertising, search engine optimisation

**Distribution costs** – app distribution (app store, google play fees), content distribution (newsletters, social media / digital outreach)

**Hosting** – file storage for datasets / reports / assessments, database hosting and backups, server uptime management tools

**People** – support and management staff, developers / engineers, data scientists, marketing team

Lean Canvas is adapted from The Business Model Canvas ([www.businessmodelgeneration.com/canvas](http://www.businessmodelgeneration.com/canvas)). Word implementation by: Neos Chronos Limited (<https://neoschronos.com>). License: CC BY-SA 3.0

## Revenue Structure

**Revenue Model** - Institutional subscriptions (unlimited access for universities, research institutes), Contractor data submission fees (mining companies pay for unlimited data uploads, EIA tracking, and compliance tools), donations / funding from environmental foundations / UN programs

**Life Time Value** – Assuming partners stay for approx. 3 years, contributing around £1,500/year, Each institutional or contractor partnership is expected to generate approximately **£4,500** over its lifetime

**Revenue** – Projected revenue growth from **£10,000** in the pilot year to **£100,000** by year 3, supported by educational partnerships, contractor data access and grant funding

**Gross Margin** - estimated gross margin of **75-85%**, as primary costs are hosting and periodic updates