



**SOLVING THE COASTAL EROSION AND SUSTAIN THE COASTAL ECOSYSTEM THROUGH THE  
ECO FRIENDLY DEFENDER AT PANTAI IRAMA, BACHOK, KELANTAN**

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**Highlights:** Breakwaters are designed to limit wave energy reaching the shoreline by dispersing, reflecting, or diffracting oncoming waves, allowing for better deposition and the implementation of low-wave energy uses. On the Pantai Irama Waterfront have several breakwaters that have been provided to prevent erosion from occurring which this structure is made up of a big pile of rocks that runs parallel to the shore. The structure is works well but to create a sustainable coastal ecosystem I have created a more creative breakwater design and give a diverse impact on the environment on the Pantai Irama Waterfront.

**Key words:** *Breakwater, Eco-friendly, Coastal ecosystem, Sustainable landscape, Aesthetic*

## **Introduction**

The new breakwater design name as Eco-Friendly Defender. This structure is created by mixed of creative idea and unique technology which this structure can be locate along the sea. Eco-Friendly Defender is a structure constructed for the purpose to protect the shore area from the effect of sea waves. This structure is using 3 type of material which is large rock, eco armor block, and tide pool armor. Eco armor block is an eco-friendly technology designed with tiny hole for the small fish live around it, seaweed grow on top of it, coral and oysters appear around it, and marine life thrives. Tide pool armor add beautiful water retaining features to breakwaters, riprap, and revetments. It bring life by retaining water at low tide and create "hot spot" for biology. This structure also using the Headland Breakwater type which is an attached fashion to the shoreline and the shoreline behind the structures will evolves into a natural form. For the form design, from the typical form of breakwater turn into a new form of breakwater which can protect marine life for example create reef movement for the fish. Eco-Friendly Defender is suitable install at the long beach shoreline where more than one breakwater unit can be install. Eco-Friendly Defender not just protect shore area from the wave disturbance and collect sand but it also give a lot of advantages to the environment for example it is a sustainable solutions for coastal and marine life by providing habitat for ecosystem. It also transform a new form which provide aesthetic value to the coastline look. Then, this structure also help increase awareness of risk, empower citizens, and engage local schools in waterfront education. Through the nowadays technology this Eco Friendly Defender can be promote by scanning the QR code that provided at the shoreline area. It is also an easiest platform for student to learning.

## **Acknowledgement**

Big thanks I address to my lecturers, Dr Ramly Bin Hasan, and other lecturer Dr Wan Azlina Binti Wan Ismail and Dr Nur Hafizah Binti Ramle who give me opportunity to participate and do this project for this competition. Without their guide my project cannot be done properly like this. They always give me supports and guide to me how to done this creative and innovation project in purpose to produce a good outcome. Finally thanks to my beloved family that always support me when I having problems and continue to inspire so that my project can be completed. Million thanks also I wish to all my classmate because they also help me in doing this project and keep comment on my design and give idea.

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