PA 02175/18

PROPOSAL TO CONSOLIDATE TEMPORARY TUNA FARMING AREA AT A PARCEL OF SEA APPROXIMATELY 5 KILOMETERS FROM THE SHORE (IN GENERAL AREA APPROVED FOR PA/03072/17 AND PA/05858/17) FOR A TOTAL BIOMASS OF 3,300 TONNES OF FISH

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

NON TECHNICAL SUMMARY

Version 1: July 2018

Report Reference:

Adi Associates Environmental Consultants Ltd, 2018. PA 02175/18 - Proposal to consolidate temporary tuna farming area at a parcel of sea approximately 5 kilometers from the shore (in general area approved for PA/03072/17 and PA/05858/17) for a total biomass of 3,300 tonnes of fish – Non-technical Summary. San Gwann, July 2018; ii + 21 pp.

THIS IS A DIGITAL COPY OF THE REPORT.

RESPECT THE ENVIRONMENT – KEEP IT DIGITAL

Quality Assurance

PA 02175/18
Proposal to consolidate temporary tuna farming area at a parcel of sea approximately 5 kilometers from the shore (in general area approved for PA/03072/17 and PA/05858/17) for a total biomass of 3,300 tonnes of fish Non-Technical Summary to EIA Report

Report for: **AJD Tuna Ltd**

Revision Schedule

Rev	Date	Details	Written by:	Checked by:	Approved by:
00	Jul 2018	Submission to ERA	**Adrian Mallia** Managing Director	**Rachel Xuereb** Director	**Rachel Xuereb** Director

File ref: G:_Active Projects\EIA\AJD010 - AJD Tuna extended farm EIA\EIA Report\FINAL CHAPTERS\NTS English_Final.docx

Kappara Business Centre
113 Triq Birkirkara
San Gwann SGN 4197
MALTA

Tel. / Fax: 21378172 - 77

Email: info@adi-associates.com
Web: www.adi-associates.com

INTRODUCTION

1. This Environmental Impact Assessment (EIA) Report was commissioned by Mr Charles Azzopardi of AJD Tuna Ltd to support his proposal to increase the number of cages at the temporary farming site occupied by AJD Tuna Ltd and Malta Mariculture Limited off is-Sikka l-Bajda in the north of Malta.

2. A Project Description Statement (PDS) for the proposed development was submitted to the Environment and Resources Authority (ERA) in January 2018. ERA subsequently determined that the development required an Environmental Impact Assessment (EIA) in accordance with Schedule 1, Category 1 Section 8.2.1.1 of the *Environmental Impact Assessment Regulations, 2017* (S.L. 549.46) as amended.

3. Hereafter in this EIA Report, the proposed development is referred to as 'the Scheme'. A detailed description of the Scheme is provided in **Chapter 3** of the EIA Report.

Purpose of the EIA Report

4. The purpose of this EIA Report is to present the findings of the EIA. EIA is the process of systematically assessing the likely significant environmental impacts of development proposals. EIA also ensures that the significance of these impacts, and the scope for reducing them, is clearly understood by the public, and by ERA and the Planning Authority (PA) before a decision is made on whether or not the development should be approved.

Background to the Scheme

5. In 2017, AJD Tuna Ltd applied to relocate its existing tuna penning farm from its former location approximately 2 km off Qawra Point, St Paul's Bay to a site further offshore (PA/03072/17) - see **Figure 1**. This was in response to a decision of the Planning Authority (PA) that all fish farms must relocate further offshore by May 2017 in order to mitigate the impacts that had been reported over the previous years, and in particular in summer 2016, on the marine environment, including social impacts related to amenity and nuisance from odour and water quality at affected areas of the coast. Previously, and since 1999, the farm had been operating under permit PA 07377/98; however, in September 2016 the PA revoked this permit.

6. Furthermore, permit PA 01741/01, to substitute part of the breeding of sea bream with tuna in cages located in the South Comino channel (see **Figure 1**) was also revoked. This permit was operated by Malta Mariculture Limited (MML), a sister company to AJD Tuna Ltd. MML too applied to relocate the farming operations further offshore and adjacent to the site identified by AJD Tuna Ltd (PA/05858/17). The two farms were hence set up in close proximity to each other and can virtually be considered as one operation that incorporates the total capacity of tuna farming permitted at the two farms.

7. Both applications PA/03072/17 and PA/05858/17 were

approved by the Planning Authority in 2017. These two permits cater for a maximum of 12 cages (six each). In 2017, the farms stocked approximately 2,220 tonnes of biomass, which over 12 cages meant a stocking density of approximately 225 tonnes at input, almost double the optimal stocking density based on the ICCAT recommendation. This resulted in sub-optimal conditions within the cages and affected the growth of the tuna and did not provide the necessary flexibility for the farming operation to observe ICCAT conditions on caging of fish.

8. As a result, including lessons learned during the 2017 season, the Applicant is applying to increase the number of cages within the same general farm area in order to support the biomass that he is permitted to farm (see **Figure 2**). In line with ICCAT concessions, this is a maximum of 3,300 tonnes of biomass in total. A Full Development Permit (FDP) application was submitted to the Planning Authority (PA) in December 2017.

Terms of Reference

9. The Terms of Reference (ToR) for the EIA were prepared by ERA, in consultation with the relevant Government Departments. A scoping meeting for stakeholders was also held in February 2018. The final version of the ToR is available in **Technical Appendix 1: *Terms of Reference and Method Statements***.

10. The ToR were formulated following a scoping exercise, undertaken by ERA, to identify the issues to be considered in the EIA. The ToR focused on those impacts ERA considered likely to be significant and, therefore, requiring further assessment. The ToR also described the various components of the EIA.

Method Statements

11. Method Statements were prepared to assess the impacts of the Scheme in respect of the topic areas: marine environment (including including bathymetry, sonar and video surveys, and marine ecology), and cultural heritage / marine archaeology

12. The Method Statements outlined the baseline survey work to be carried out, the methodology to be used to assess the predicted impacts, and the means by which the significance of the impacts would be determined. The Method Statements are reproduced in **Technical Appendix 1: *Terms of Reference and Method Statements***.

EIA Approach

13. Baseline surveys were undertaken within the marine area subject of the application. These included: remote sensing surveys (bathymetry, side scan sonar, benthic video survey), sediment and water quality sampling, benthic diversity and habitats mapping, avifauna, and cultural heritage, having regard to an 'Area of Influence' (A of I) for each topic area, agreed in consultation with ERA.

14. A detailed assessment of the Scheme's impact on the

features present on / within the Scheme site and the A of I was undertaken, and any potential environmental benefits of the Scheme were identified.

Significance of Impacts

15. Assessment of the significance of impacts arising from the Scheme is a key stage in the EIA process. This judgement is critical in informing the decision-making process. However, defining significance can be difficult. In general terms, environmental significance involves assessing the amount of change to the environment perceived to be acceptable to the community (Sippe, 1999).

16. The following criteria were used in the EIA to assess the significance of an impact:

- type of impact (adverse / beneficial);
- extent and magnitude of impact;
- direct or indirect impact;
- duration of impact (short term / long term; permanent / temporary);
- comparison with legal requirements, policies and standards;
- sensitivity of receptor (residential dwellings, hotel, recreational areas, etc.);
- probability of impact occurring (certain, likely, uncertain, unlikely, remote);
- reversibility of impact;
- scope for mitigation / enhancement (very good, good, none); and
- residual impacts.

17. Using these criteria, the significance of the negative impacts arising from the Scheme was categorised, as follows:

- **not significant**, where the impact is environmentally acceptable;
- **minor significance**, where the impact is manageable; and
- **major significance**, where the impact is environmentally damaging and requires redesign or mitigation measures to minimise it.

18. The EIA Report includes an assessment of the significance of predicted impacts and, following the implementation of any proposed mitigation measures, the significance of any residual impacts. A summary of the identified significant impacts is included in **Chapter 9** of the EIA Report. The recommended mitigation measures, and residual impacts, are described in respect of each topic area, at the end of the relevant chapter (see **Chapters 5** to **8** of the EIA Report) as well as in **Chapter 9**.

19. An Environmental Risk Assessment was also conducted, and is presented as **Volume 2** of the EIA Report.

Uncertainty

20. The EIA process is designed to enable good decision-making based on the best possible information about the environmental implications of a proposed development. However, there will always be some uncertainty as to the exact scale and nature of the environmental impacts. This arises through shortcomings in information, doubts, or lack of certainty on the likelihood that an incidence will occur, and/or due to the limitations of the prediction process itself. Where uncertainties have arisen, and where they remain, this is clearly stated in the EIA Report.

Consultation

21. During the process of the EIA, consultation meetings were organised with several stakeholders. These included: Transport Malta, Environmental Health Directorate, Malta Tourism Authority, the Armed Forces of Malta, Mellieha Local Council, St Paul's Bay Local Council, Nature Trust – FEE Malta, Birdlife (Malta), the Amateur Fishermen Association, the Professional Diving Schools Association, and the environmental group 'Stop the Slime'. Notes from these meetings are reproduced in **Appendix 1** to the EIA Report; the issues raised are also discussed in **Chapter 8**. .

Figure 1: Location of former farms off St Paul's Bay and South Comino Channel in relation to the new temporary location 5 km offshore

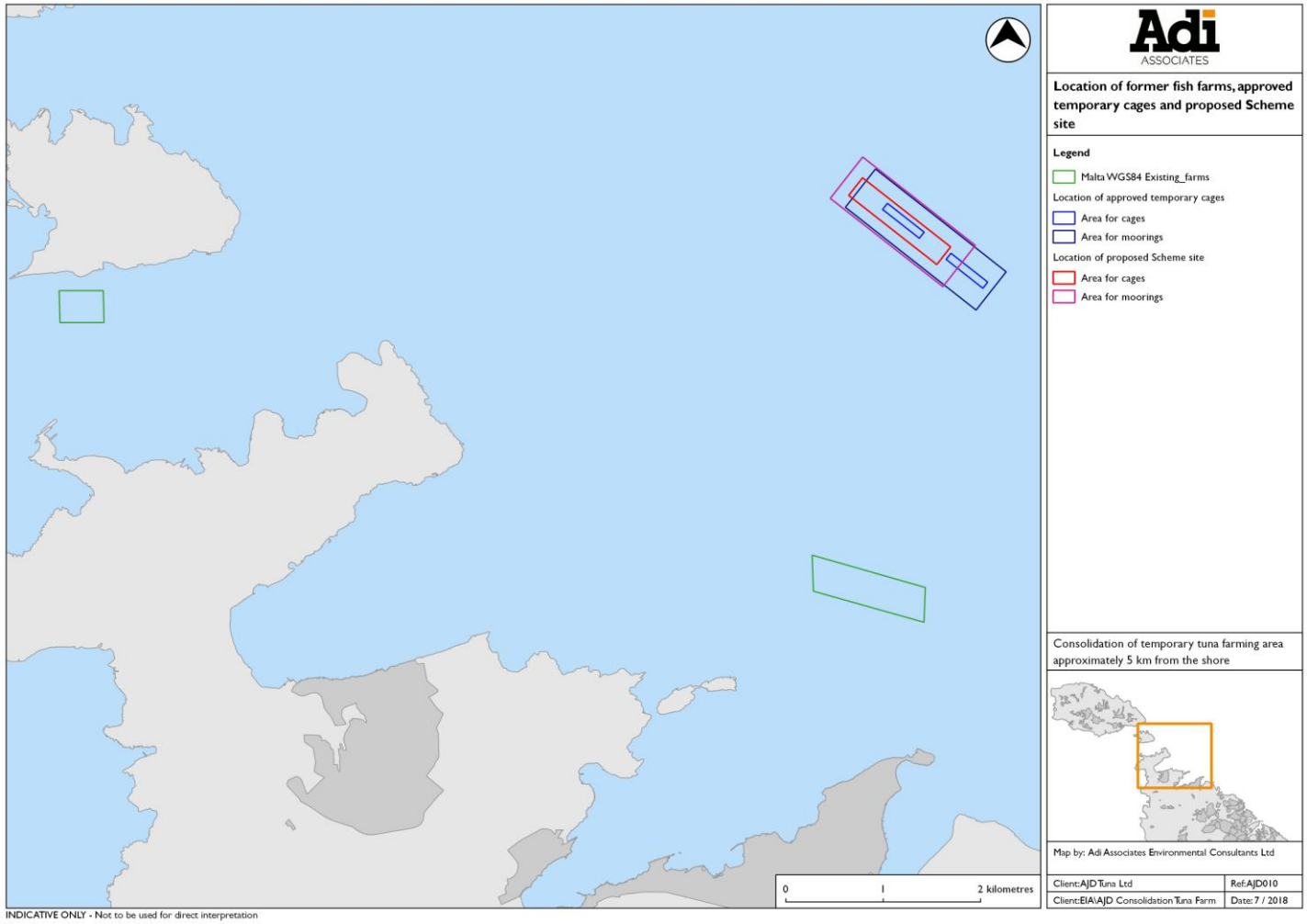
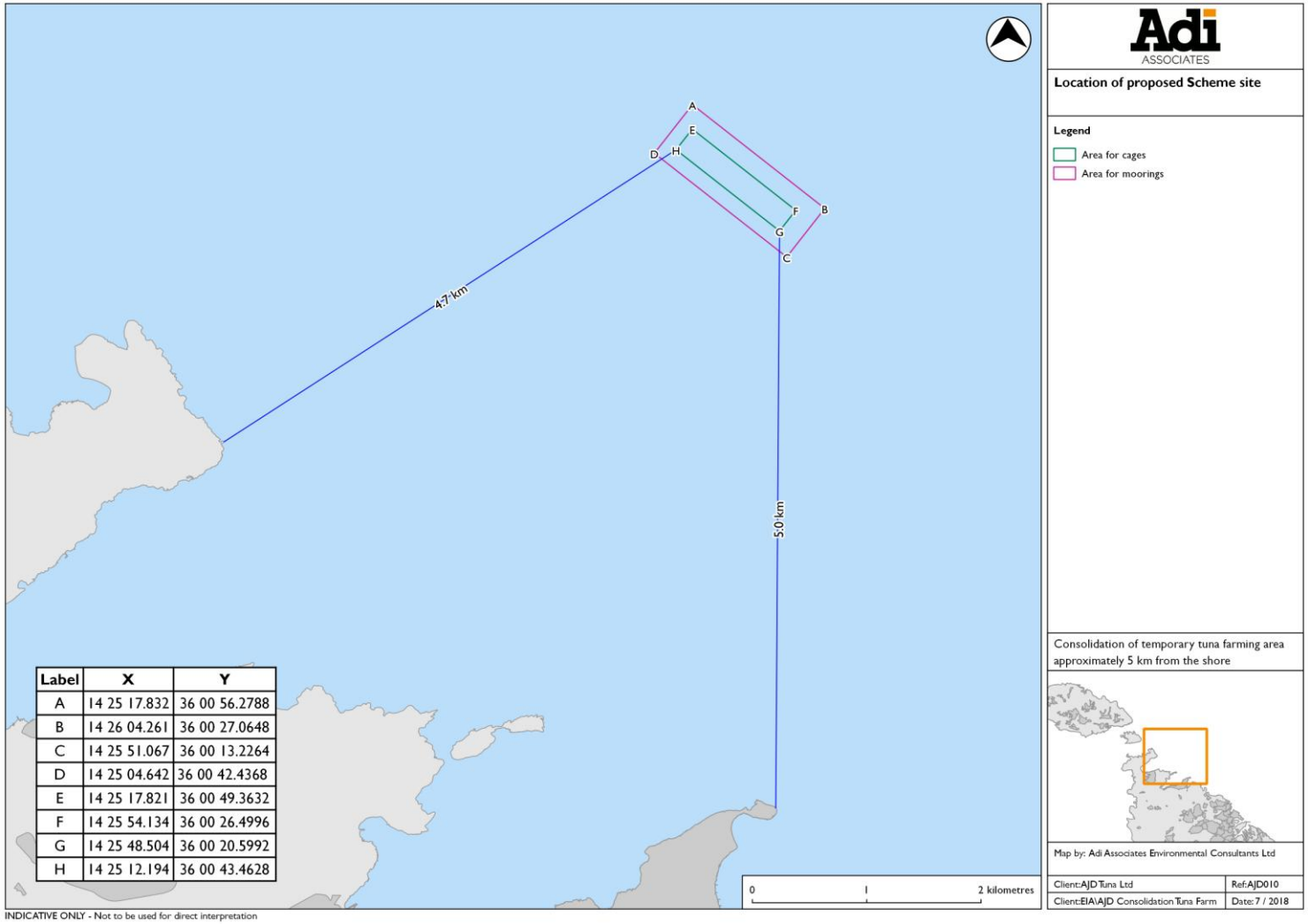


Figure 2: Scheme location and distance from shore



Label	X	Y
A	14 25 17.832	36 00 56.2788
B	14 26 04.261	36 00 27.0648
C	14 25 51.067	36 00 13.2264
D	14 25 04.642	36 00 42.4368
E	14 25 17.821	36 00 49.3632
F	14 25 54.134	36 00 26.4996
G	14 25 48.504	36 00 20.5992
H	14 25 12.194	36 00 43.4628

Assessment of Alternatives

Alternative Sites

22. The current operational site at sea was identified following a selection exercise, as described hereunder. To begin with, the site previously identified for the north aquaculture zone (for which planning approval had not been concluded) was reviewed. This site was, however, no longer considered to be suitable for consideration as a search area for the fish farm. This was mainly due to the fact that the proposed site also lies relatively close to the coast thereby potentially not fulfilling the spirit of the permit revocation and the PA conditions. Discussions with the ERA and the Department of Fisheries and Aquaculture indicated that a minimum distance of 4.5 – 5 km from the shore was expected for all relocated farms.

23. To this end, it was considered that an appropriate approach would be to identify a suitable search area within which to study parameters in order to identify a final relocation site for the cages. **Figure 3** identifies the search area that was studied. This is located north of Qawra Point, St Paul's Bay. This search area was chosen based on (i) technical requirements for operation set by the applicant, e.g. the cages should not be deployed in water that is significantly deeper than 50 m and not deeper than 100 m because it will be difficult for divers to work under such conditions; (ii) a desk-top analysis using GIS overlays to identify the various marine uses off the north and east coast of the islands; and (iii) any constraints associated with the relocation as specifically directed by relevant Authorities or entities. Notably, with respect to the latter, Transport Malta's Harbour Master directed that the search area should be located no closer than 300 m from the bunkering zone.

24. Following identification of the search area, the following studies were carried out under licence from the Continental Shelf Department of the Ministry for Transport and Infrastructure:

- Multibeam echo sounder and back scatter survey within the search area; and
- Initial video surveys of the benthic environment to identify benthic habitats in the area.

25. The benthic habitat survey revealed that the search area included maerl/rhodolith beds and coarse sand with rhodoliths. The proposed site was then located as far as possible over the area with predominantly coarse sand and muddy heterogeneous sediment, as shown in **Figure 4**.

Zero Option (Do-nothing Scenario)

26. Since the Scheme already exists (though on a temporary basis) at the same site, the zero option at this stage would signify retaining the existing 12 cages and also retaining the high stocking density per cage that created difficulties (and possibly animal welfare issues) in 2017.

Figure 3: Search area for relocation

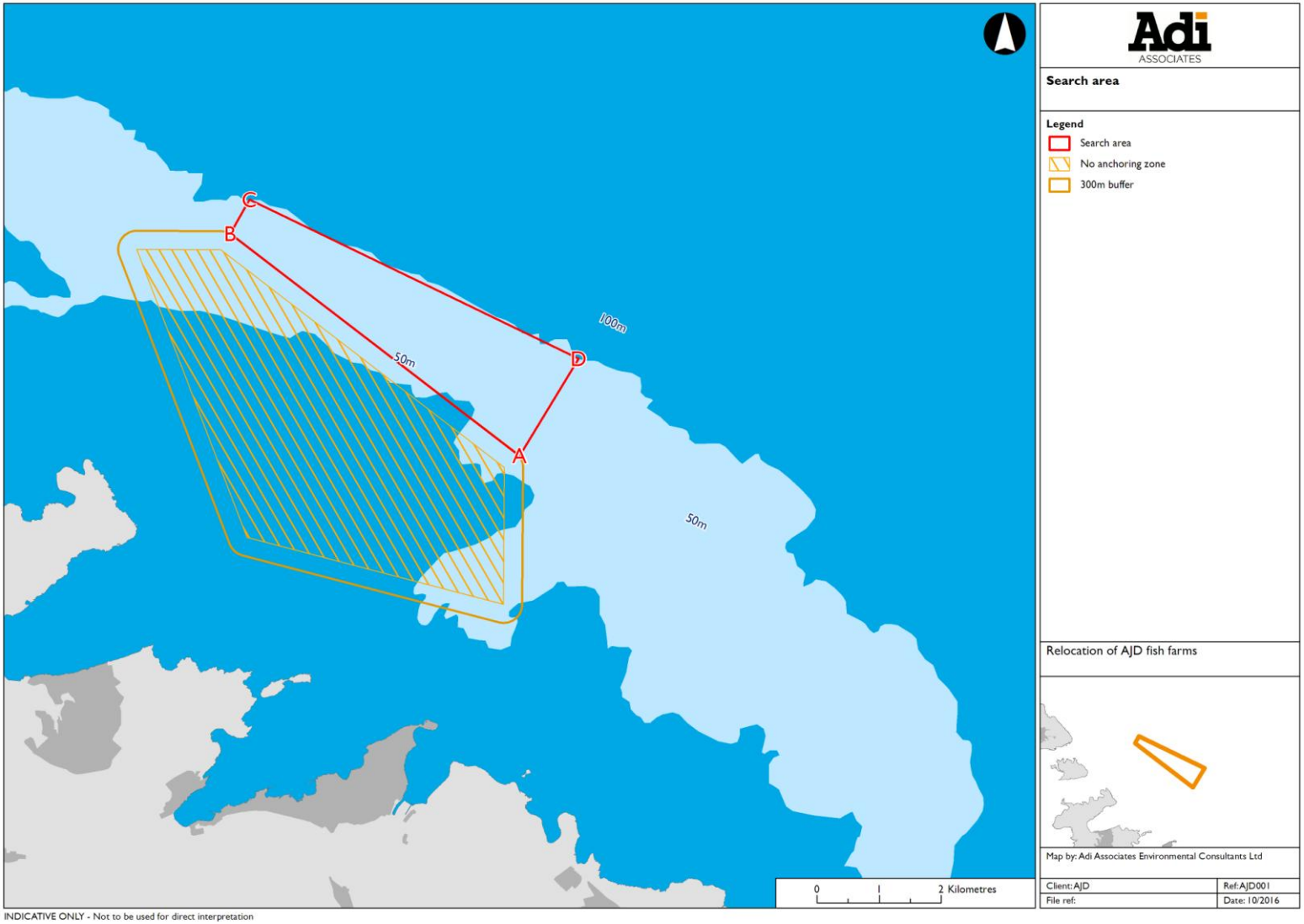
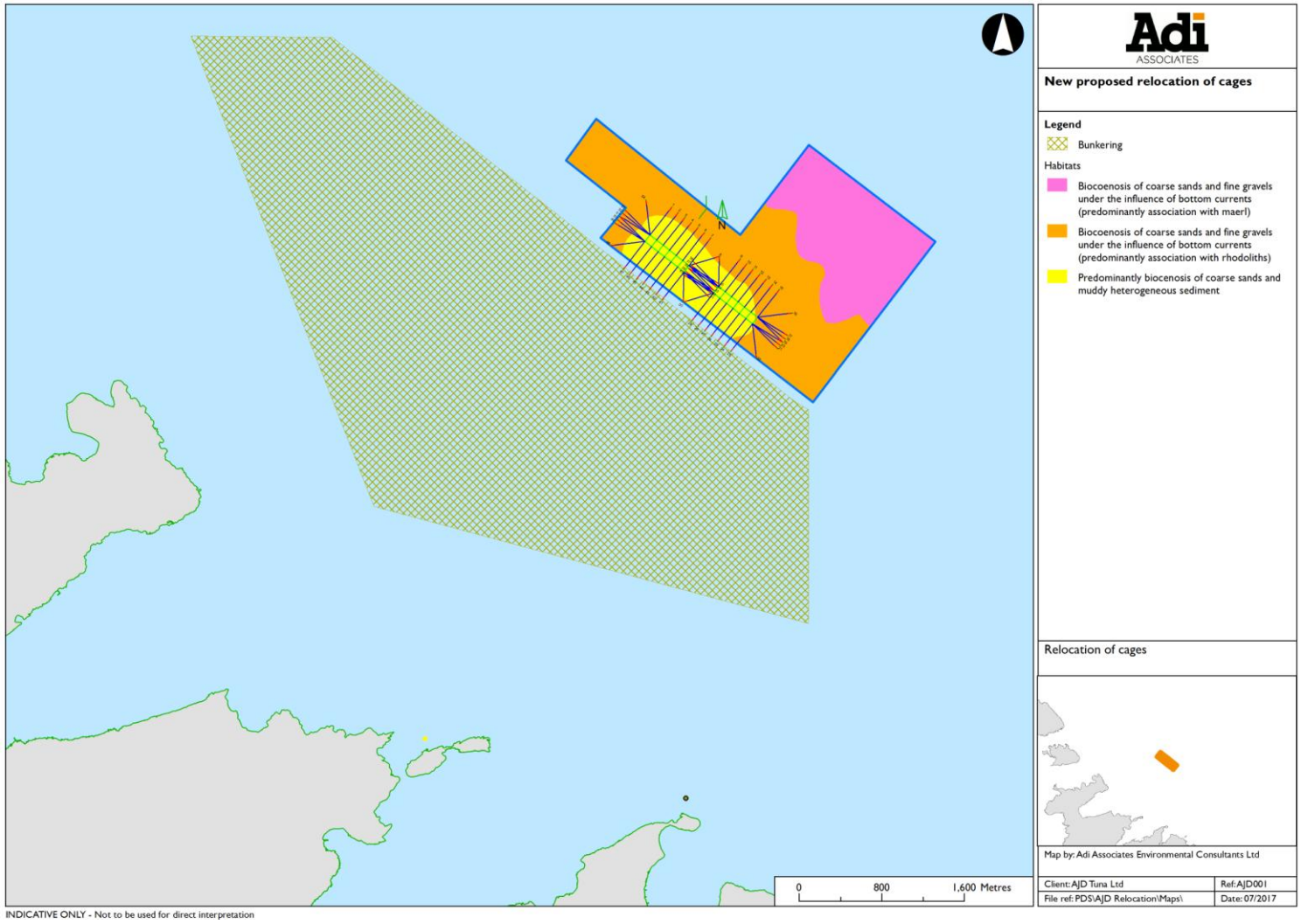


Figure 4: Site identified for relocation in the context of the identified benthic habitats



Alternative Layouts and Techniques

27. The Scheme involves the mooring of 50 m diameter cages using concrete mooring blocks laid on the seabed to which the cages are tied by means of mooring ropes and chain. While this is a tried and tested method, the applicant has upgraded the mooring system from that used in the inshore site until 2016 to cater for the more exposed nature of the Scheme site. The system is regularly checked for need of maintenance and inspected after storms to determine the need for any additional measures.

28. As regards the mooring layout, this is optimised to deploy the cages in the correct position as identified in the EIA. Following discussions with the Armed Forces of Malta and Transport Malta, the Scheme area had to be shifted to the northwest to move all cages outside of the AFM's firing practice danger area. Environmental and cultural heritage considerations also necessitated a rearrangement in the mooring layout such that the overall area occupied by the moorings was reduced (see **Figure 5**).

DESCRIPTION OF SCHEME

29. As explained, the Scheme involves the consolidation of the temporary tuna farming area into one operation located in the general area occupied by the cages approved under PA/03072/17 and PA/05858/17, approximately 5 km from the shore, and providing the necessary flexibility to rear the approved maximum quota of 3,300 tonnes of tuna as per ICCAT[1] certification. The Scheme location is as shown in **Figures 2** and **5**).

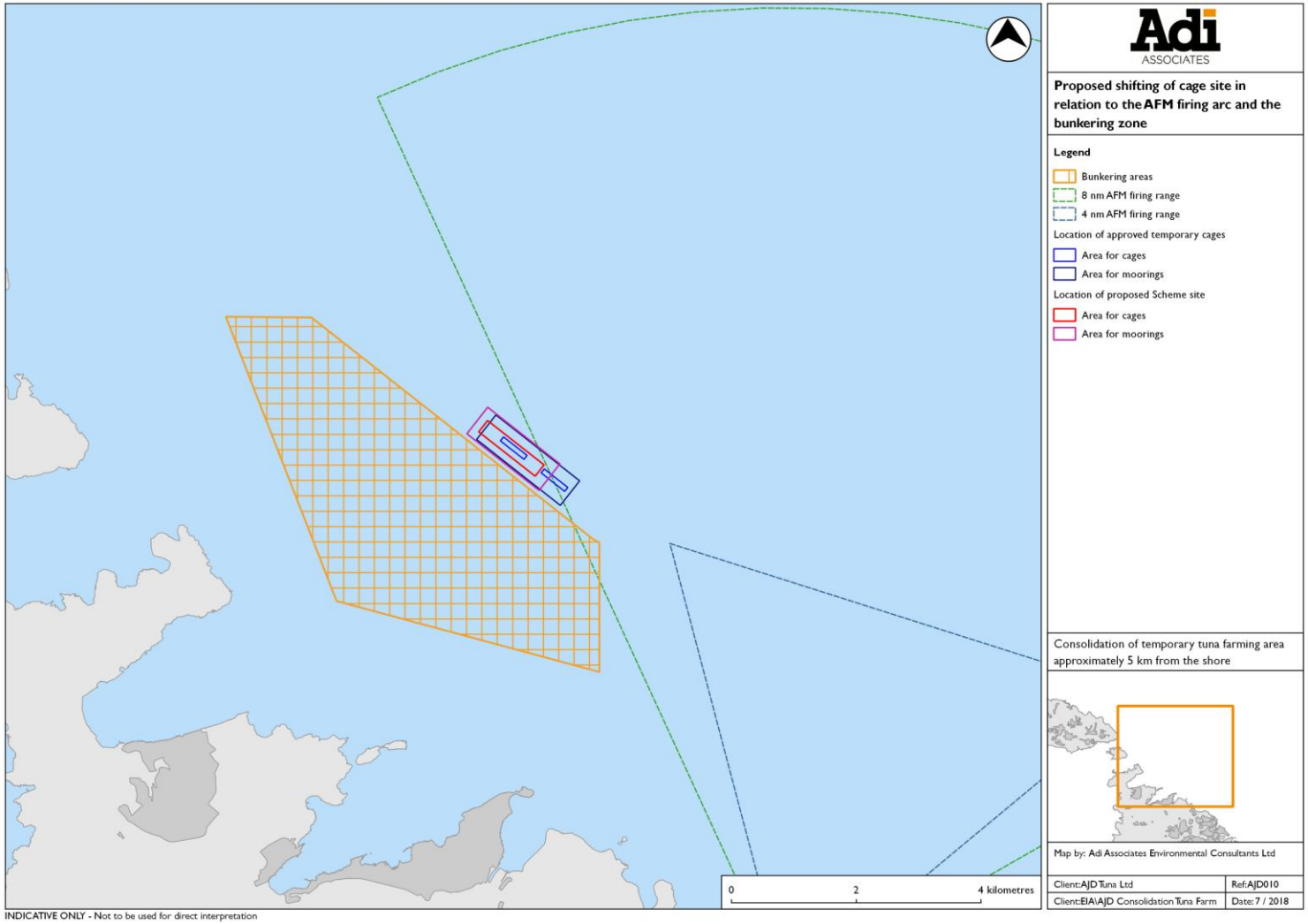
30. The Scheme will essentially operate in the same way as it currently does. The following lists the types of vessels used in the operations, all of which are registered with ICCAT, as per requirements:

- One feeding vessel used to transport the feed to the cages;
- One service boat;
- Two other feeding vessels that are leased as required; and
- Vessel for transportation of offal waste offshore.

31. The Applicant's main client sends over the processing ship where the fish are transferred and processed following harvesting.

[1] ICCAT is the International Convention for the Conservation of Atlantic Tunas

Figure 5: Proposed shifting of cage site in relation to the AFM firing arc and the bunkering zone



SCHEME OPERATION – THE TUNA PENNING PROCESS

Tuna capture and transfer to farm

32. Tuna are caught by purse seining on the high seas. This activity is allowed under ICCAT rules for a restricted time during the year as the fish are migrating through the Mediterranean Sea. There are no Maltese purse seiners and therefore the fish are caught by foreign vessels from whom the Applicant purchases stock.

33. The tuna caught in the purse seines normally range in size from 50 to 300 kg, with the vast majority of the fish being between 100 and 200 kg.

34. Once the tuna are caught in the purse seines and the required amounts are purchased, they are led through openings in the purse seine into the farm's towing cages. Once the cages are filled with the required stock, they are slowly towed to the on-growing site[2] where they are anchored in position to the mooring system that would have already been deployed at the site.

35. The entire operation is overseen by ICCAT international observers.

[2] Towing speeds rarely exceed 1 knot, with the transfer taking a number of weeks (depending on the distance between the catch area and the farm).

Penning

36. Once on the farm, the tuna are fed and fattened, largely a process of conditioning, through which the fat-to-protein ratio is adjusted through a high fat diet. The tuna are kept in the pens for between 3 and 7 months, after which they are harvested and sold to the Japanese market.

Feeding and feed management techniques

37. The tuna are fed small pelagic fish, usually, herring, mackerel, anchovy, sardines, etc. It is estimated that it takes 10-25 kg of baitfish to produce 1 kg of tuna. Approximately 5,500 kg of baitfish per day are provided to each cage to feed the farmed tuna.

38. The feed is ordered from a number of international suppliers and five reefer containers with feed arrive in Malta on a daily basis; these are stored at the Freeport. Every day a number of containers (usually between 1 and 4, depending on the stock) are transferred to the Kordin land base facility operated by AJD Tuna Ltd. The fish are transferred from their transportation packing and placed in impermeable jumbo bags. The bags are then placed in crates and stored on flat bed trailers, where they are allowed to partially thaw overnight.

39. Early the next day (around 4:00 am), the baitfish are transferred to the Grand Harbour where they are loaded onto a feeder vessel. Once loaded, the vessel sets sail towards the farm.

40. The tuna are fed once a day, at dawn. Semi-frozen baitfish are normally placed in small feeding cages floated at the centre of the pen, and once they have been thawed enough, the central cage is opened by divers and the fish dispensed into the pen. The divers monitor the tuna and control the amount of feed released into the pen to minimise wastage. Once the tuna are satiated, the diver stops feeding. The process may be repeated two hours later; however, if the tuna are satiated, any remaining fish can be lifted from the pen and transferred to other cages.

41. In order to optimise feeding efficiency it is necessary to ensure that when fed to the tuna the baitfish are not completely defrosted so that the high calorific oils are ingested too and not lost from the feed. Nonetheless, the process does involve the development of an oily slick originating from the semi-frozen feed. In order to address this issue, a number of measures have been taken throughout the past season. These include:

- The baitfish is retained in the impermeable jumbo bags while transported from the land base in Kordin to the farm to contain the thaw water;
- An oil boom is permanently deployed inside each cage to contain any fish oils that may be released from the feed;
- When the baitfish are transferred to the fattening cages, they are transferred inside the impermeable jumbo bags referred to above and their contents emptied inside the cage when the tuna are ready to be fed. This would release both the baitfish and some of the thaw water inside the cages; however, the presence of the oil boom along the entire internal diameter of the cage contains most, if not all , such surface materials within the cage;
- The oily material so released and contained in the cages is then collected from the surface of the sea inside the cages by means of a skimmer operated by divers inside the cages. The collected oil is stored in IBCs and transferred to land for onward transmission to a waste oil recycling company.

42. The efficiency of these measures is currently being assessed through the monitoring required as part of the implementation of the environmental permit of the current farm; improvements may be proposed to address lacunae in the process. These measures may include deploying different (non-diver operated) proprietary oil skimmers, thawing of the baitfish on board and containing the thaw water prior to feeding the tuna the thawed fish, and deploying further oil slick collection measures outside the farm (e.g. a cleaning vessel), for any oil that escapes from the farm area.

Harvesting and processing

43. Harvesting of fresh tuna is largely on demand, although the vast proportion of the tuna is today being harvested

for the frozen fish market.

44. When harvesting occurs, the bottom of the net is raised to a degree, forcing the fish closer to the surface. Slaughtering is particularly delicate since the amount of stress the fish are subjected to must be kept low because if the fish are stressed their body temperature rises sharply, which would compromise the quality of the meat. Slaughtering is carried out by divers who enter the cage and harvest the tuna one by one by shooting them in the head.

45. The tuna are transferred to a service vessel by crane from where they are then quickly transported by service boats to a waiting processing vessel anchored further out at sea. Onboard the ship, the tuna are weighed, heads and tails are cut off and the guts removed. Currently, the head, tails and guts are a waste by-product. These are currently being disposed of at sea beyond the 12 nautical mile limit as directed by the Veterinary and Phytosanitary Regulation Department. The option of incinerating the material was discounted as the abattoir incinerator is too small to handle the volume of waste generated by the tuna farms; the incinerator operator has rejected this possible waste stream. The operation typically generates approximately 8-10 tonnes of offal per day during the peak fattening period. The Applicant is studying the possibility of selling the by-product to foreign companies for the generation of fish meal to be used for feeding pets; however, to date, this has encountered difficulties in relation to maritime and EU legislation. Further discussions on this matter are being pursued with the relevant authorities in an attempt to identify an alternative option to offshore dumping. This is also a requirement of the environment permit issued by the ERA for the current tuna penning operations.

46. If the harvested fish are to be sold to the fresh fish market, they are normally processed onboard the service boats (not the processing vessels / freezer ships) and at the land base facility in Marfa. In this case, processing has to take place in a short time interval in order to minimise the length of time that the fish remain at ambient temperatures. The fish are processed in the same manner as described above, except that rather than blast frozen, the fish are cooled in an ice and salt mixture to the desired temperature and packed in purposely designed carton boxes for export.

47. The fresh fish produce is air freighted to its final destination, whereas the fish intended for the frozen fish market are transferred to a reefer vessel or exported on the same factory vessel on which they were processed.

Post-harvest

48. Following harvesting, between November and May, the Applicant is allowed to keep up to 15% of the stock in the cages for research purposes. The fish so retained are fed between two and three times a week during this period.

Waste Management

49. Wastes generated by the Scheme are likely to include:

- Packaging waste from importation of baitfish;
- Thaw water from baitfish preparation;
- Oily slick (from baitfish);
- Uneaten feed;
- Fish excreta;
- Dead tuna;
- Blood (during slaughtering);
- Wastewater from onboard processing of fish (mixture of blood, water, and offal);
- Offal (gutted heads, tails, and internal organs);
- Algal and other net fouling marine growth; and
- Marine litter.

50. Details on each waste stream and measures employed for its management are provided in the EIA Report.

Environmental Management System

51. In order to fulfil the environmental permit conditions, the Applicant is devising an Environmental Management System (EMS) that will be integrated with the current operational system. The EMS will include:

- An assessment of how the Applicant's activities, processes, services might affect the environment including (i) the evaluation of significant environmental aspects; (ii) development of a register of environmental aspects; and (iii) development of a register of legislation;
- The development of an environmental policy;
- Developing objectives and targets and setting up an Environmental Management Programme (EMP) to achieve them;
- Defined roles and responsibilities for all employees;
- A training and awareness programme;
- Procedures to control activities with a significant environmental impact (also in relation to the EMP);
- A controlled system of records;
- Periodic auditing to ensure effective operation; and
- A formal review by senior management.

Employment

52. The Applicant currently employs 40-45 full-timers and 40 part-timers. Employees include divers, boatmen, handymen, and drivers. The number of full-time employees is expected to increase to 55 whereas the part-timers will remain 40 once the additional cages are deployed.

SIGNIFICANT ENVIRONMENTAL IMPACTS AND MITIGATION

53. The predicted impacts of the Scheme were assessed on a topic area basis, in accordance with the ToR. Particular attention was given to the predicted principal impacts and how these could be mitigated.

54. The potential, unmitigated major impacts identified during the assessment related solely to benthic ecology, arising from the placing of mooring blocks on the seabed and changes to benthic habitats containing live rhodoliths from shading effects by the cages. Other impacts may be of major significance under certain circumstances, but a degree of uncertainty or a range of possible conditions do not allow the impact to be conclusively defined. These include:

- Water Quality impacts:
    - Deterioration in water quality from increased nutrient loads from uneaten feed;
    - Operational discharges of oil and bilge waters from maritime traffic associated with the Scheme;
    - Discharge of sewage from processing vessels;
    - Marine pollution from ship litter;
- Impacts on Marine Ecology:
    - Loss of habitats through settlement of uneaten feed;
- Impacts on avifauna:
    - Disturbance to avifauna for light pollution;
    - Predation impacts on seabirds from increased gull population;
    - Impacts on birds from ingestion of marine debris;
- Archaeology impacts:
    - Potential damage or disturbance to unknown buried artefacts and to the identified target from moorings;
- Effects on humans and their activities:
    - Impacts on the use of the AFM firing practice area;

- Impacts on navigation near the Scheme site;
- Deterioration of inshore waters and impact on local recreation, including diving, from discharge of fish oils and slime;
- Impacts on tourism and tourism activities from fish oil and slime in coastal areas.

Benthic Ecology

55. The impact on benthic habitats from the placement of moorings is considered to be of major negative significance for those sessile fauna and flora located beneath the mooring blocks. This is more so for those blocks located in areas with increased cover of live rhodoliths.

56. Benthic habitats are also affected by the uneaten feed settling on the seabed. This impact could be major for the area of seabed directly beneath the cages but reduces to not significant with distance from the cages. The extent of this impact depends on the effectiveness of feed management and the amount of feed actually lost / uneaten. Good feed management can significantly reduce this effect.

Water Quality

57. It is considered that the Scheme may have a major negative impact on marine water quality from increased nutrient loading resulting from uneaten feed settling on the seabed, operational discharges of oil and bilge waters, discharge of sewage from marine vessels, and discharge of marine litter or loss of anthropogenic items overboard.

58. Most of these impacts are either uncertain or can vary depending on a number of factors. Impacts from uneaten feed will depend on the amount of such material settling on the seabed, with the impact likely to be higher directly under the cages and reducing in extent with distance from the cages. Impacts from oil or bilge losses depend on the amount of pollutant lost; likewise the impacts from sewage, which will also depend on the maintenance of available containment or treatment measures on board (e.g. holding tanks or sewage treatment plant). The impact from marine litter can be severe, both on avifauna and on benthic species. Evidence of considerable amount of anthropogenic material at and near tuna farms has been recorded in past monitoring reports. Effective action to minimise such accidental losses or deliberate discharges are required to mitigate this impact.

Avifauna

59. The Scheme has the potential to create impacts of major significance on the breeding seabird populations. Impacts can result from increased light pollution, predation effects from gulls attracted to the farm, and ingestion of marine debris. All these impacts depend on the extent of intervention, e.g. amount of lights and intensity thereof applied to cages, or amount of marine litter lost; the impact from gull predation depends on whether the gull

population does increase as a result of the Scheme, and whether the gulls actually do attack the other seabirds or compete with them for food and nesting sites.

Archaeology

60. The Scheme could impact archaeology either through direct impact of the identified target or through exposure of as yet unknown buried artefacts. The impact is unlikely for the former since the target is known and hence can be avoided, and uncertain for the latter since it depends on the presence or otherwise of such artefacts.

Effects on Human Populations

61. The effects on humans and their activities can be split into two types: effects from the presence of the Scheme and effects from the discharge of fish oils and slime.

62. The presence of the Scheme can affect the AFM firing practice area and may also impact navigational safety. The impact on the AFM range will only be major if the Scheme remains in its current location. The fact that the current application subject of this EIA has been changed to shift the farm completely out of the firing arc and maintain a buffer area in between should mitigate this impact. As regards navigational safety, this can be mitigated though normal navigational safety practices, including proper charting and on site marking of the farm.

63. The unmitigated discharge of fish oils and slime can affect inshore waters, as has been registered in recent years. This would impact bathing, yachting, diving, and related recreation, tourism, and the general quality of life of coastal residents and visitors. The significance of the impact will depend on the amount of fish oil released into the marine environment during feeding and the amount of oils that escape the farm and the collection systems deployed to counteract this issue.

Mitigation

64. Where appropriate, mitigation measures have been identified and agreed to by the Applicant. These mitigation measures are described at the end of each topic area chapter, and are listed in **Chapter 9** of the EIA Report. Some of the mitigation measures are already taken account of in the Scheme design (in-built mitigation); other mitigation measures are recommended arising from the EIA. The following is the list of in-built and recommended further mitigation measures.

<u>In-built Mitigation Measures:</u>

- Mooring design optimised to ensure against drifting during storms;
- Tuna feeding is supervised by divers to avoid overfeeding and loss of feed;
- Deployment of permanent oil booms inside each cage and use of oil skimmers to collect oil released in each cage;

- Use of flat-form cartons as packaging material;
- Control of marine discharges from processing vessels in line with MARPOL Regulations.

Further Mitigation Measures:

- Deployment Stage:
  - Good practice during moorings deployment to ensure against dragging of blocks on the seabed;
  - Good project management to minimise operational losses of oils and fuels from maritime vessels and their consequent water quality effects;
  - Good project management and use of proper mooring technology to minimise sediment re-suspension;
  - If feasible, consider relocation outside of priority areas for breeding Procellariiformes species;
- Operational Stage:
  - Good feed management to minimise carbon loading in sediments from uneaten feed and nutrient loadings in the water column, namely:

1. Careful monitoring of tuna feeding to avoid overfeeding; experiment with stopping feeding before satiation to minimise food loss;
2. Implementing a procedure to ensure proper feed management by having random checks of the seabed below the tuna pens made by an independent environmental monitor;
3. In the case of accident, should an inordinate amount of dead uneaten feed-fish end up on the bottom, every attempt should be made to recover as much of the material as possible and as quickly as possible after the event in order to minimise the adverse effects on the seabed habitat;

  - Avoidance of large stocking densities;
  - Consider the possibility of thawing and washing of baitfish on shore prior to placement in the impermeable jumbo bags and transfer to the farm to reduce the amount of fish oils and mucus released into the marine environment;
  - Use skimmers with improved efficiency to those deployed until now;
  - Availability of additional oil collection services outside the farm to ensure immediate collection of any slick escapes from the farm to

avoid wide dispersal of same;

- Consider the deployment of additional oil booms on the farm perimeter if acceptable from a navigational safety point of view (partial deployment in the direction of the prevailing currents could also be considered);
- Appropriate contingency planning including ensuring that all stakeholders are aware of their responsibilities in the event of an accident;
- Ensuring that offal and dead tuna remains are managed in line with EC Regulation 1069 of 2009;
- Macerate offal prior to disposal at sea;
- Deployment of nets on cage collars to be done as late as possible just before the arrival of the towing cages and once the tuna from a cage is harvested, the net should be removed immediately in order to minimise the length of time with net shading effects on the seabed;
- Good practices aboard ships to minimise discharges, noise, light, and littering;
- Preparation and enforcement of waste management plan to ensure proper disposal of wastes onshore. Staff to be trained on the need of eliminating marine litter from the Scheme operations;
- Screen vessel scuppers to prevent loss of material overboard;
- Immediate recovery of any items that may accidentally end up in the sea (whether floating or deposited on the seabed) and collection of any third party marine litter that may float towards the farm;
- Prohibition / strict control of fishing activities in the vicinity of tuna farms.
- Minimise use of lights to the minimum required for navigational safety purposes and on vessels use only downward-facing shaded light sources;
- Adopt seasonal lighting plan, with all internal cage lights (i.e. not the external navigational lights) to be switched off after the harvesting period when the nets are empty or only cage collars are present on site;
- Minimise requirements to operate at night and remove the need for vessels to be in the area at night;
- Set up a seabird monitoring programme,

including digital camera monitoring to monitor which bird species are visiting the cages and their behaviour at the farm;

- Use visual bird deterrents;
- Remove dead fish from cages immediately;
- Monitoring of gull colonies annually if observed feeding at the farm;
- To reduce risk of entanglement, nets should be kept taut, mesh size should be within the 6-7 cm range and nets should be well-maintained (any holes should be repaired);
- Reduce lines and riggings on vessels;
- Train staff in appropriate bird handling and reporting; and
- Ensure regular maintenance of farm infrastructure.

ENVIRONMENTAL RISK ASSESSMENT

65. An environmental risk assessment was carried out for the Scheme operation (**Volume 2** of the EIA Report). The risk assessment:

- Describes and evaluates the risks to the environment associated with the Scheme, mainly the risks arising from the operations at the farm; and
- Describes the measures which will be undertaken to mitigate such risks, and evaluates the residual risk levels.

66. The Scheme includes measures to minimise the likelihood and consequences of an accident, such as proper navigational marking and optimising of mooring arrangements to withstand storms. As a result, environmental risks will be reduced from high and extreme to low and very low with some moderate risk related to operational discharges from vessels, "external" impacts from oil spills generated outside the Scheme, and impacts from uneaten feed settling on the seabed.