

# SWMID Method Statement for Seaweed Cultivation

## Introduction

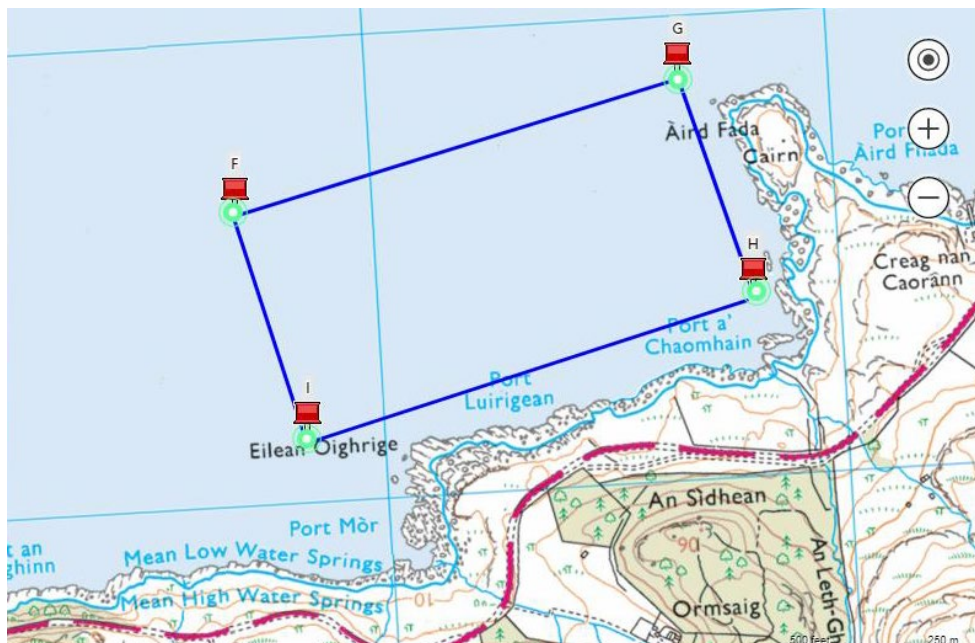
To give perspective to operations of this relatively new industry to decision makers, we will set out some of the timings, scale and techniques to be used.

Southwest Mull and Iona Development (SWMID), intend to apply to Marine Scotland for license consent to set light lines seeded with algae (up to 9 species) on a new, purpose built Seaweed Farm. A site been identified as suitable for Seaweed Cultivation through studies by Scottish Association for Marine Science (SAMS) [Feasibility Study](#). Some of the figures used in this report are acknowledged to have been taken from that report.

The potential site Aird Fada, in on the north coast of Ross of Mull at the entrance to Loch Scridain. The outer limits to the Aird Fada site are bounded by the Lat/Lon in the table below and can be seen at this [LINK](#).

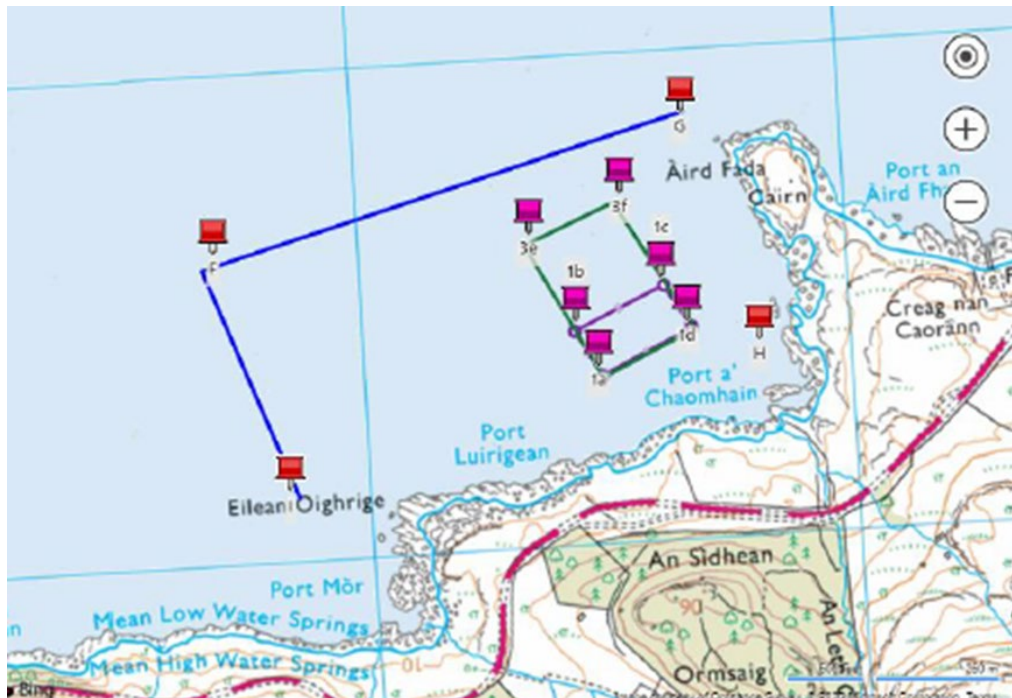
Points	Grid Reference	Lat (dec deg)	Lon (dec deg)	N	Lat (dec min)	W	Lon (dec min)
F	NM 43702 24635	56.344458	-6.1492846	56	20.667	6	8.957
G	NM 44675 24868	56.347074	-6.1338136	56	20.824	6	8.029
H	NM 44810 24395	56.342904	-6.1311743	56	20.574	6	7.870
I	NM 43831 24142	56.340111	-6.1467243	56	20.407	6	8.803
1a	NM 44478 24361	56.342421	-6.1364973	56	20.545	6	8.190
1b	NM 44436 24455	56.343242	-6.1372751	56	20.595	6	8.237
1c	NM 44617 24534	56.344045	-6.1344266	56	20.643	6	8.066
1d	NM 44664 24442	56.343252	-6.1335844	56	20.595	6	8.015
3e	NM 44350 24637	56.344826	-6.1388322	56	20.690	6	8.330
3f	NM 44541 24711	56.345599	-6.1358174	56	20.736	6	8.149

**Aird Fada site** Points F,G,H & I are the outer limits of the licensed site.



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**Aird Fada site** Point 1a, 1b, 1c & 1d are the 1<sup>st</sup> phase deployment points showing the layout of the actual 2 Ha Seaweed Farm and points 3e & 3f are the 2<sup>nd</sup> phase deployment points to give a 6 Ha Seaweed Farm. Points F & G are the outer points that will have 2 special marks as is standard practice at Aquaculture sites.



It is our intention to have the necessary consent in place to put the first equipment in the water by late Autumn 2020. Seeding lines in Oct/Nov 2020 will produce a harvestable crop in late spring and early summer 2021. The far reaching effects of Covid 19 mean that delays and false start are inevitable. We will work to the above timetable, but inform all parties involved as necessary should our timetable slip significantly through Attestation form submission to Marine Scotland.

The license application and associated documents (such as this) will have the critical information required and we hope that when MS-LOT approach the statutory consultees you receive replies from each that Marine Scotland will be confident about consenting licences.

Our commitment to “Scotland’s National Marine Plan” can be seen in attachment “SWMID Scotland’s National Marine Plan – General Planning Principles”. We will undertake regular monitoring of seaweed growth and duty of care over lines.

Our commitment to wildlife, environmental and seen in attachment “SWMID Seaweed Farm – Aird Fada – Site designations”.

The attachment “SWMID Method Statement” is comprehensive document that details SWMID’s commitment to adhere to best practice when considering other users of the environment, human and wildlife alike.

The documents "SSMID Aird Fada site lat lon and links", gives the above scaled layout of a suitable Seaweed Farm. At this point final contractors have not been finalised.

A primary site at Ardtun, 4 km west was being considered, but due to verbal concern from a local creel fisherman about the use of the Ardtun site, a 2<sup>nd</sup> site at Aird Fada is now being pursued.

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SWMID hope this mediation with the local fisherman will win their trust and show that a Community led project such as this will take consideration of all members of the Community.

### Seaweed Species

We are applying for consent to cultivate several Seaweed species – *alaria esculenta*, *laminaria hyperborea*, *laminaria digitata*, *saccharina latissima*, *himanthalia elongata*, *porphyra species*, *palmaria palmata*, *osmundea pinnatifida* and *ulva lactuca*. All these are found growing wild locally.

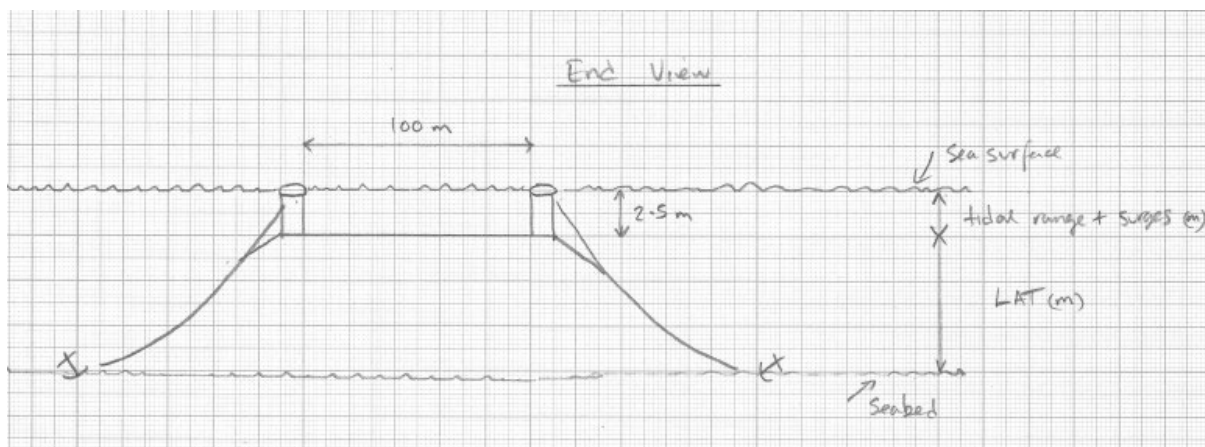
Our main target species at this time are *alaria esculenta* (Atlantic Wakame) and *saccharina latissima* (Sugar Kelp). The details of the cultivation process described is for Atlantic Wakame deployed on spools of string, but is essentially identical to the process of the other species.

### In water equipment

The initial expected cost of the Seaweed Farm will be in the region of £150,000, so the marine licence application fee for a pair will be £2,325. SWMID, the proposed license holder and site owners, will pay immediately by BACS to begin the process.

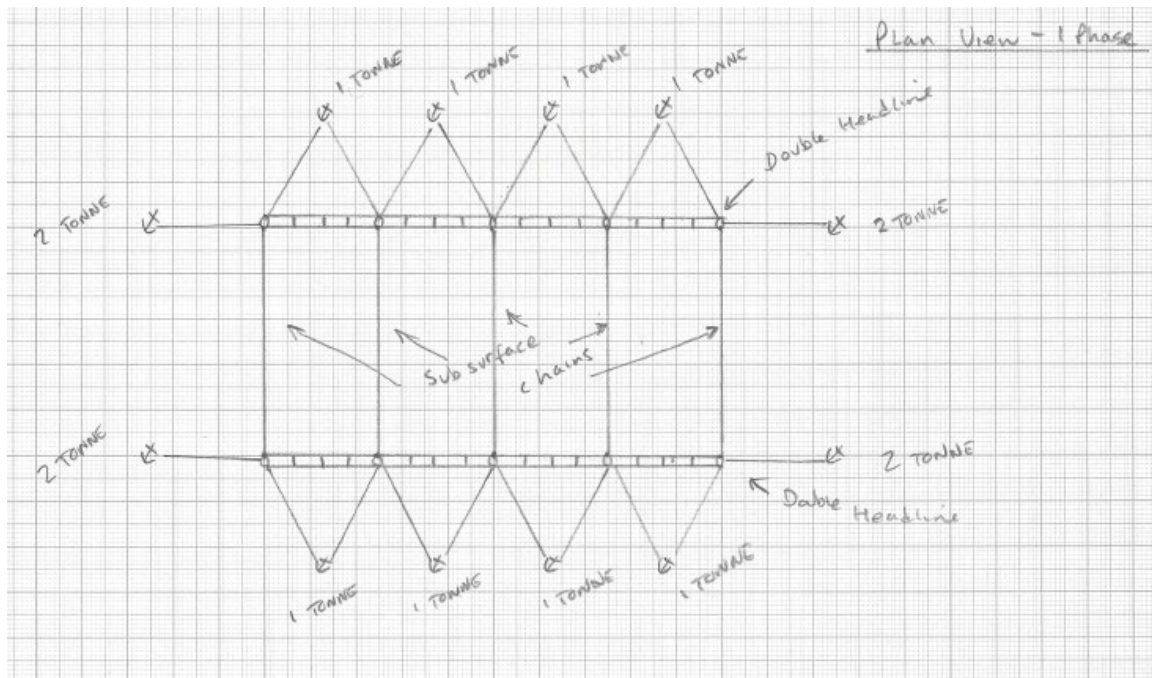
The farm will be set out in two phases. In the first phase (year 1), a rectangular Growing Grid roughly 100m x 200m will be set out along the site to give 2 Ha of growing area.

This Growing Grid will consist of 2 x double parallel floating headlines (similar to a double mussel growing line) 200m long each. These will be moored securely to the seabed 100m apart (see End View, Plan View - 1 Phase). The final design of the Growing Grid is being tendered for by 3 Marine Service companies who are amending the materials to be used to increase the durability of the Growing Grids, while reducing the maintenance requirements.

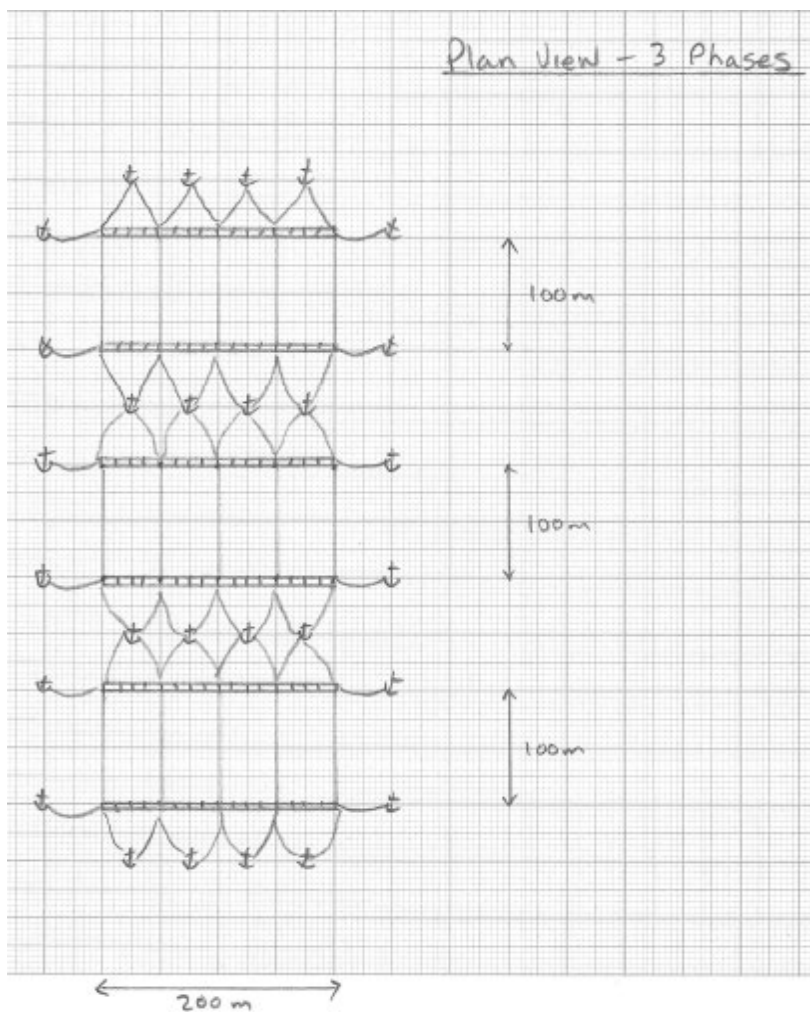


End view of Grid

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Plan View – Phase 1



Plan View – Phase 2

The coordinates of the 3 Growing Grids are noted in the Longlines section 5(f) of the Marine License Application. Between the 2 x double parallel floating headlines will be deployed 100 x 100m long light growing lines laced with seaweed seeded growing medium.

These light growing lines will be secured at the surface at each end and weighted in the middle to form a long V shape and held approximately 1.5m below the surface. We envisage a 2m spacing between the seaweed lines.

In the second phase (see Plan View - 3 Phases) a further 2 identical Growing Grids will sit abreast the original to create a grid of rectangles (3 x 100m x 200m) to give 6 Ha of growing area.



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The anchoring system will be robust to ensure farm stability but use the minimum amount of infrastructure possible to reduce the footprint of the site and reduce seabed impact. The anchoring system will be removeable if required as is all the in water equipment being used.

### **Seeding Process**

Atlantic Wakame is a brown seaweed found on lower littoral and sub-littoral rocks exposed to strong wave action across Argyll. The plant seeds into the water in late Nov through to early January, through fruiting bodies that develop near the base of the plants. Seeded stock is sourced from local shore sites and will be cultured onto growing medium at commercial hatcheries such as Scottish Association for Marine Science (SAMS) at Dunstaffnage or any of the other hatcheries that are emerging around Scotland.

The collection of seeding plants will be very small volumes (<1 wet kg) and by taking no more than around 25% in any given patch on a shore. The species to be farmed are all found locally at or near the farm site. There are no chemical additions or treatments used for the seaweed growing process. The small amounts collected are propagated in laboratory conditions into huge amounts of fertile material. This can be stored for long periods to suit operation needs.

### **String Method Deployment Process**

Deploying seaweed on string will be the main deployment method for seaweed cultivation. There is an alternative method of direct seeding, where propagated material is affixed to ropes directly instead of the string medium. This is in development and may become a costs effective method of deployment once research test results are more consistent.

Fertile seaweed material is allowed to settle onto thin string wound round spools in 100m lengths. This is done in controlled conditions in an aquarium. The process can be seen [here](#).

These spools will be laced onto seaweed lines to be grown in the sea on the Seaweed Farm. The lines will be deployed by existing small creel vessels or mussel farm landing craft style vessels. Narrow ropes (10mm or 12mm) are passed through the spools of Alaria string and the two fixed together.

These combined lines are strung out in either horizontal, vertical or zig-zag patterns (optimum growing patterns are still being assessed) at depths between 0m and 3m below the surface.

Line deployment is done between mid October and late December to give the juvenile plants time to settle on the lines before the darkest winter days shut down their growing. Growth should start to pick up again in late February as day length grows.

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## **Harvesting Process**

Regular monitoring of seaweed growth will be done via visits to the seaweed farm by small vessels. This will decide the optimum harvest periods.

Harvesting will be a reversal of the process using the same style of vessels.

The plants will grow rapidly through April into May. We would expect that we could achieve 1.5kg per m to 3kg per m of line between April and mid May. At these rates each Ha will produce between 7.5 tonnes and 15 tonnes of wet weight seaweed. Greater growth would be achieved if the lines were left into June and July, possibly 5kg, perhaps even 7kg per metre (certainly for species such as Sugar Kelp) but seaweed begins to be heavily fouled by other seaweeds, crustaceans and slimes and the value as a sellable crop reduced to zero.

Harvesting will initially use by hand, using scissors or shears. Automated harvesting machines are being developed which will use a simple roller frame with cutting heads that will trim the useable frond of the plant into bins or boxes while leaving the rope and growing base (stipe) of the plant intact. This coppicing method may allow multiple harvest from these rapid growing plants.

## **Onward Processing**

To keep the seaweed to the highest standard the product needs to be brought to shore and loaded onto temperature controlled vehicles, then to be processed as soon as possible.

Drying is one processing method, essentially lowering the water content without using excessive heat (which would cook the plant) similar to herb processing. This creates a stable, storable product that can be rehydrated as an ingredient.

For other processing routes, Seaweed will be kept as a wet, fresh ingredient with shorter shelf life, but the bulk of seaweeds will go through a drying process.

## **Future Work and support**

At this time, processing will be done at distant sites across Scotland or beyond. In time there will need to develop a drying facility local to their growing site to take on the increased volumes and do add value to the product to SWMID's financial benefit. A shore base, office and storage facilities, purpose built deployment and harvesting vessels plus contracted equipment, staff and other consumables will be required to make this new venture into a success. As will reasonable decisions by decision makers, both local and central.

Seaweed Cultivation requires no input other than sunlight, creates a clean new habitat whilst it grows and other than a week at deployment in Oct/Nov and a few weeks harvest in Apr/May, minimum wildlife disturbance is taking place. It will be a wholly organic and truly sustainable industry if allowed to begin.

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### **Economic and Social Case for approval**

South West Mull & Iona Development (SWMID) is a company limited by guarantee and a member of the Development Trusts Association Scotland (DTAS). Formed in 2014, the purpose of the company is to enhance the strength and wellbeing of the local community, to secure a competitive and prosperous economy, and to develop attractive and sustainable settlements.

Having developed a community plan based on extensive engagement with local people, SWMID is committed to undertaking projects which contribute to meeting the following outcomes:

- A larger and more balanced population
- A fit-for-purpose infrastructure
- A stronger more diverse business base
- Increase in average household income
- Strengthened local culture
- Improved community resilience
- A fully developed social infrastructure

SWMID wish to prove that the development of a new Seaweed Cultivation industry will not be a negative impact on the environment or the wildlife within it. We also wish to prove that the visual impact will not have likely significant effect at the site.

It is not the authors wish to win the argument with promises of substantial inward investment and sustainable employment opportunities. We wish to show these as additional benefits beyond satisfying the impact argument.

SWMID have already invested heavily in time and appropriate assessments and studies of seaweed cultivation over the last 2 years. Existing local infrastructure and resources are being utilised to accommodate technical and logistical capacity for the success of this project.

Over the next 3 years, SWMID will invest over £½ million directly in the South West Mull and Iona area to develop Seaweed Farm at sea, build or modify vessels and shore base facilities for their operations and to establish a processing facility in the area for the cultivated harvest.

The projections for turnover suggest that this investment will be made good by year 5 and provide up to a dozen full, part-time and casual jobs at the shore side and the same at the onshore processing facility.