



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
ANTILLES OFFICE
FUND. ANGEL RAMOS ANNEX BLDG., SUITE 202
383 F. D. ROOSEVELT AVE.
SAN JUAN, PUERTO RICO 00918

April 12, 2019

Regulatory Division
South Branch
Antilles Permits Section

PUBLIC NOTICE

Permit Application No. SAJ-2019-00545 (SP-CGR)

TO WHOM IT MAY CONCERN: The Jacksonville District of the U.S. Army Corps of Engineers (Corps) has received an application for a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403) as described below:

APPLICANT: Ms. Loretta M. Roberson/Marine Biological Laboratory
7 MBL Street
Woods Hole, MA 02543

WATERWAY AND LOCATION: The project would affect waters of the United States associated with Jobos Bay near Sugar Mill pier or Pozuelo. The project site is located at Jobos Bay, Municipality of Salinas, Puerto Rico.

Directions to the site are as follows: Take expressway PR-52 San Juan to Salinas, exit at expressway PR-53 to Guayama, exit at state road PR-706, turn right at state road PR-3 toward Salinas and turn left at state road PR-705 and continue to the end of road and turn left at the road near the east side of the old Central Aguirre Sugar Mill.

APPROXIMATE CENTRAL COORDINATES:

Miniature Array:

Description	DDM Lat	DDM Lon	DMSLat	DMSLon
Sugar Mill Proposed site				
<i>Anchor</i>				
1	17.94961	-66.22	17 56 58.57845000N	66 13 12.09196920W
2	17.94895	-66.221	17 56 56.23432080N	66 13 15.58831440W
<i>Buoy on anchor</i>				
1	17.94961	-66.22	17 56 58.57845000N	66 13 12.09196920W
2	17.94895	-66.221	17 56 56.23432080N	66 13 15.58831440W
<i>Buoy (A3 Polyform)</i>				
1	17.94945	-66.2203	17 56 58.03056960N	66 13 12.90944280W
2	17.94911	-66.2208	17 56 56.78352240N	66 13 14.76930000W

<i>Buoy (A1 Polyform)</i>				
1	17.94943	-66.2203	17 56 57.94773000N	66 13 13.03205520W
2	17.94913	-66.2207	17 56 56.86507680N	66 13 14.64773880W
Pozuelo Proposed Site				
<i>Anchor</i>				
1	17.93801	-66.2155	17 56 16.84479840N	066 12 55.68697440W
2	17.93692	-66.2158	17 56 12.90867720N	066 12 56.83348080W
<i>Buoy on anchor</i>				
1	17.93801	-66.2155	17 56 16.84479840N	066 12 55.68697440W
2	17.93692	-66.2158	17 56 12.90867720N	066 12 56.83348080W
<i>Buoy (A3 Polyform)</i>				
1	17.93776	-66.2155	17 56 15.92485080N	066 12 55.95511680W
2	17.93718	-66.2157	17 56 13.83029160N	066 12 56.56563720W
<i>Buoy (A1 Polyform)</i>				
1	17.93772	-66.2156	17 56 15.78708600N	066 12 55.99544040W
2	17.93721	-66.2157	17 56 13.96810680N	066 12 56.52535320W

Pilot Array:

Description	DDM Lat	DDM Lon	DMSLat	DMSLon
Sugar Mill Proposed Site				
<i>Anchor</i>				
1	17.94925	-66.2212	17 56 57.28806960N	66 13 16.20035400W
2	17.94983	-66.2203	17 56 59.39791080N	66 13 13.08848160W
3	17.9498	-66.22	17 56 59.26343280N	66 13 12.06997680W
4	17.94955	-66.2198	17 56 58.38831960N	66 13 11.42231520W
5	17.94929	-66.2199	17 56 57.44210280N	66 13 11.60929560W
6	17.94871	-66.2208	17 56 55.34652840N	66 13 14.70010800W
7	17.94877	-66.221	17 56 55.55532480N	66 13 15.72603960W
8	17.949	-66.2212	17 56 56.39730000N	66 13 16.34917440W
<i>Buoy</i>				
1	17.949108	-66.221037	17 56.94647244N	66 13.26221580W
2	17.949676	-66.220181	17 56.98058916N	66 13.21084902W
3	17.949443	-66.220012	17 56.96660262N	66 13.20070872W
4	17.948875	-66.220868	17 56.93248578N	66 13.25207544W
Pozuelo Proposed Site				
<i>Anchor</i>				
1	17.93818	-66.2156	17 56 17.43262800N	066 12 56.11843080W
2	17.93811	-66.2153	17 56 17.19222720N	066 12 55.08761040W
3	17.93788	-66.2152	17 56 16.35558000N	066 12 54.56194560W
4	17.9369	-66.2154	17 56 12.85013400N	066 12 55.45421640W
5	17.93676	-66.2157	17 56 12.34874760N	066 12 56.38263480W

6	17.93683	-66.2159	17 56 12.58467720N	066 12 57.39427440W
7	17.93707	-66.2161	17 56 13.44446520N	066 12 57.89919600W
8	17.93804	-66.2158	17 56 16.92549240N	066 12 57.01314240W
<i>Buoy</i>				
1	17.93702	-66.215891	17 56.22118062N	66 12.95346612W
2	17.937988	-66.215642	17 56.27929044N	66 12.93851292W
3	17.93792	-66.215354	17 56.27521854N	66 12.92124246W
4	17.936952	-66.215603	17 56.21710872N	66 12.93619566W
Existing JBNERR pier	17.955458	-66.218288	17 57.3275' N	66 13.0973' W

PROJECT PURPOSE:

Basic: Seaweed cultivation and harvesting.

Overall: This is a pilot project for the design of a tropical macroalgae farm system to provide year-round feedstocks for conversion to biofuels and the production of bioproducts.

EXISTING CONDITIONS: Jobos Bay is a saltwater system. The depth at the project site is approximately 6 meters deep at mean low water. In accordance to the applicant, the proposed sites where the structure will be placed lack of reefs and seagrass, and silt and mud bottom are present.

PROPOSED WORK: The applicant seeks authorization to develop a pilot project for seaweed cultivation and harvesting in navigable waters of the United States. The pilot project consists of two stages of deployment as follows:

First Stage: Installation of a mini 5 – line farm rig at the preferred Jobos Bay site, either at the Sugar Mill site or the Pozuelo site. The total dimensions of the mini array are 132 meters long by 3 meters wide, and the grow area of the mini array is 61 meters long by 3 meters wide. This mini array is a variation on a typical longline system, suspended between two opposing anchors and aligned with tidal flows, and supports five 61 m grow-lines between 3-m spreader bars. Only one 5-line farm rig will be installed at the site at any given time. This mini module requires the installation of two anchors at the maritime bottom, as a spreader bar maintains the distance and tension between the five lines

Second Stage: After one full growing season with the mini 5-line rig, a pilot macroalgae farm module 161.5 m long x 78 m wide (100 m long by 33 meters wide of grow line) will be installed at the chosen site, either at the Sugar Mill site or the Pozuelo site. Only one module will be installed at any given time. This full pilot module will be aligned with the tidal-driven flows measured at the array's operating depth. This pilot module would reflect the on-site requirements for sampling, maintenance, and harvest and the need for an economically viable system that is efficient to operate and sensitive to the

ecological needs of Jobos Bay and the surrounding. This pilot module requires a total of eight anchors to maintain tension in the catenary system.

The applicant will cultivate the tropical red alga, *Eucheuma isiforme*, at the mini array and pilot array. This macroalgae species has a ready commercial market (in this case carrageenan). If there is not sufficient starting material available in local waters, applicant proposes use material from Caribbean basin, either the Florida Keys, Belize or Mexico. For the proposed tropical farm system, the grow lines are attached at each end to curved catenary lines, the shape of which are maintained by anchors at both ends. The orthogonal anchoring matrix maintains a desired pretension in the structure and in the grow-lines it supports. The number of grow-lines in between the two catenary lines can be varied according to the needs of the stage of growth or the specific purposes of the experimentations. The proposed spacing for the test species is 0.5 m, resulting in a total of 60 grow-lines. A 6 m length of 1" chain will go between each anchor and its mooring line. The variable displacement buoys (VDB) are intended for sinking the farm system in advance of tropical storm. The VDB will be at the surface, protruding approx. 0.6 m above water and supporting its required navigation light. For sinking, a portion of the lower compartment will be flooded by releasing air from a valve at the top of the buoy. It will sink slowly, remaining upright, until it rests on the seabed. An air hose from the surface will enable the buoy, and the farm to return to its normal depth. In between the VDB and the anchor chain will be positioned a submerged tensioner buoy that maintains system pre-tension in its bi-stable positions. A small subsurface buoy will be closely tethered to the rear of each anchor to facilitate the anchor inspection and retrieval as needed. The array will be marked with lighted buoys.

Routine inspections and servicing will be done regularly by the applicant using a purpose-built 19' catamaran based at the Jobos Bay National Estuarine Research Reserve dock. Several environmental parameters will be measured by the applicant such as benthic structure before, during and after the installation of the farm system, underwater temperature, pH, salinity, nutrient sampling, and the applicant will assess the species associated with the farm site before, during and after installation of the farm system. The applicant proposes two sites at Jobos Bay. The applicant stated that a decision of the preferred site (Sugar Mill Site or Pozuelo) will depend on results of preliminary field measurements prior to deployment. The duration of the project will be for two years.

CULTURAL RESOURCES:

The Corps has determined the activity is of such limited scope there is little likelihood of impact upon a historic property; therefore, the proposed project would have "No Potential to Cause Effect".

ENDANGERED SPECIES:

The Corps has determined the proposed project may affect, but is not likely to adversely affect the Antillean manatee (*Trichechus manatus manatus*); the Green Sea Turtle

(*Chelonia mydas*), the Leatherback Sea Turtle (*Dermochelys coriacea*), the Hawksbill Sea Turtle (*Eretmochelys imbricata*) and the Nassau grouper (*Epinephelus Striatus*). No designated critical habitat will be affected. The Corps will request U.S. Fish and Wildlife/National Marine Fisheries Service concurrence with this determination pursuant to Section 7 of the Endangered Species Act.

ESSENTIAL FISH HABITAT (EFH): This notice initiates consultation with the National Marine Fisheries Service on EFH as required by the Magnuson-Stevens Fishery Conservation and Management Act 1996. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or Federally managed fisheries in the Caribbean. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

NOTE: This public notice is being issued based on information furnished by the applicant. This information has not been verified or evaluated to ensure compliance with laws and regulation governing the regulatory program. The jurisdictional line has been verified by Corps personnel.

AUTHORIZATION FROM OTHER AGENCIES: A Coastal Zone Management Consistency Concurrence is required from the Puerto Rico Planning Board.

COMMENTS regarding the potential authorization of the work proposed should be submitted in writing to the attention of the District Engineer through the Antilles Permits Section, Fund. Angel Ramos, Annex Bldg., Suite 202, 383 F.D. Roosevelt Ave., San Juan, Puerto Rico 00918 within 30 days from the date of this notice.

The decision whether to issue or deny this permit application will be based on the information received from this public notice and the evaluation of the probable impact to the associated wetlands. This is based on an analysis of the applicant's avoidance and minimization efforts for the project, as well as the compensatory mitigation proposed.

QUESTIONS concerning this application should be directed to the project manager, Ms. Carmen G. Román, in writing at the Antilles Permits Section, Fund. Angel Ramos, Annex Bldg., Suite 202, 383 F.D. Roosevelt Ave., San Juan, Puerto Rico 00918; by electronic mail at carmen.g.roman@usace.army.mil; or, by telephone at (787) 729-6637.

IMPACT ON NATURAL RESOURCES: Coordination with U.S. Fish and Wildlife Service, Environmental Protection Agency (EPA), the National Marine Fisheries Services, and other Federal, State, and local agencies, environmental groups, and concerned citizens generally yields pertinent environmental information that is instrumental in determining the impact the proposed action will have on the natural resources of the area.

EVALUATION: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public

interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including cumulative impacts thereof; among these are conservation, economics, esthetics, general environmental concerns, wetlands, historical properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food, and fiber production, mineral needs, considerations of property ownership, and in general, the needs and welfare of the people. Evaluation of the impact of the activity on the public interest will also include application of the guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Clean Water Act or the criteria established under authority of Section 102(a) of the Marine Protection Research and Sanctuaries Act of 1972. A permit will be granted unless its issuance is found to be contrary to the public interest.

The US Army Corps of Engineers (Corps) is soliciting comments from the public; Federal, State, and local agencies and officials; Indian Tribes; and other Interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this determination, comments are used to assess impacts to endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

COASTAL ZONE MANAGEMENT CONSISTENCY: In Puerto Rico, a Coastal Zone Management Consistency Concurrence is required from the Puerto Rico Planning Board.

REQUEST FOR PUBLIC HEARING: Any person may request a public hearing. The request must be submitted in writing to the District Engineer within the designated comment period of the notice and must state the specific reasons for requesting the public hearing.

Proposed and alternative mini arrays



0 0.35 0.7 Km

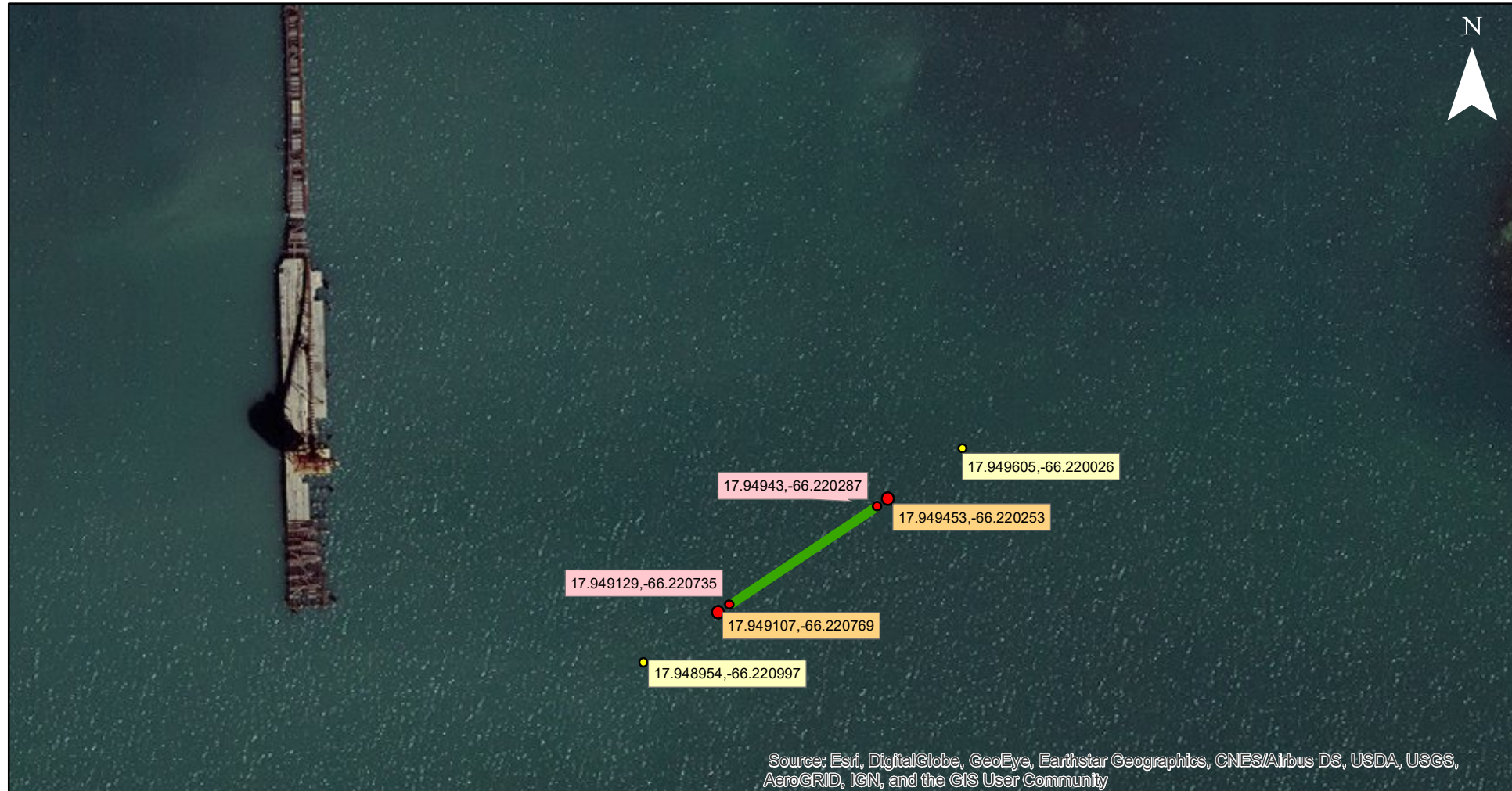
Legend

Mini array grow area

- Site 1: Sugar Mill
- Site 2: Pozuelo
- JBNERR pier
- Bouys



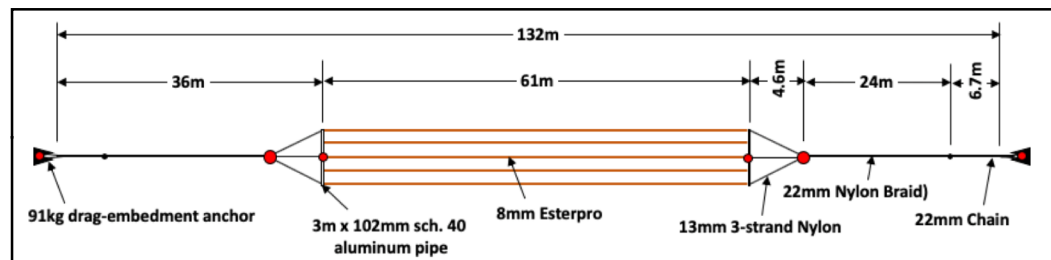
Sugar mill miniaturized array Jobos Bay Salinas, P.R.



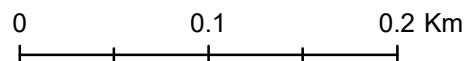
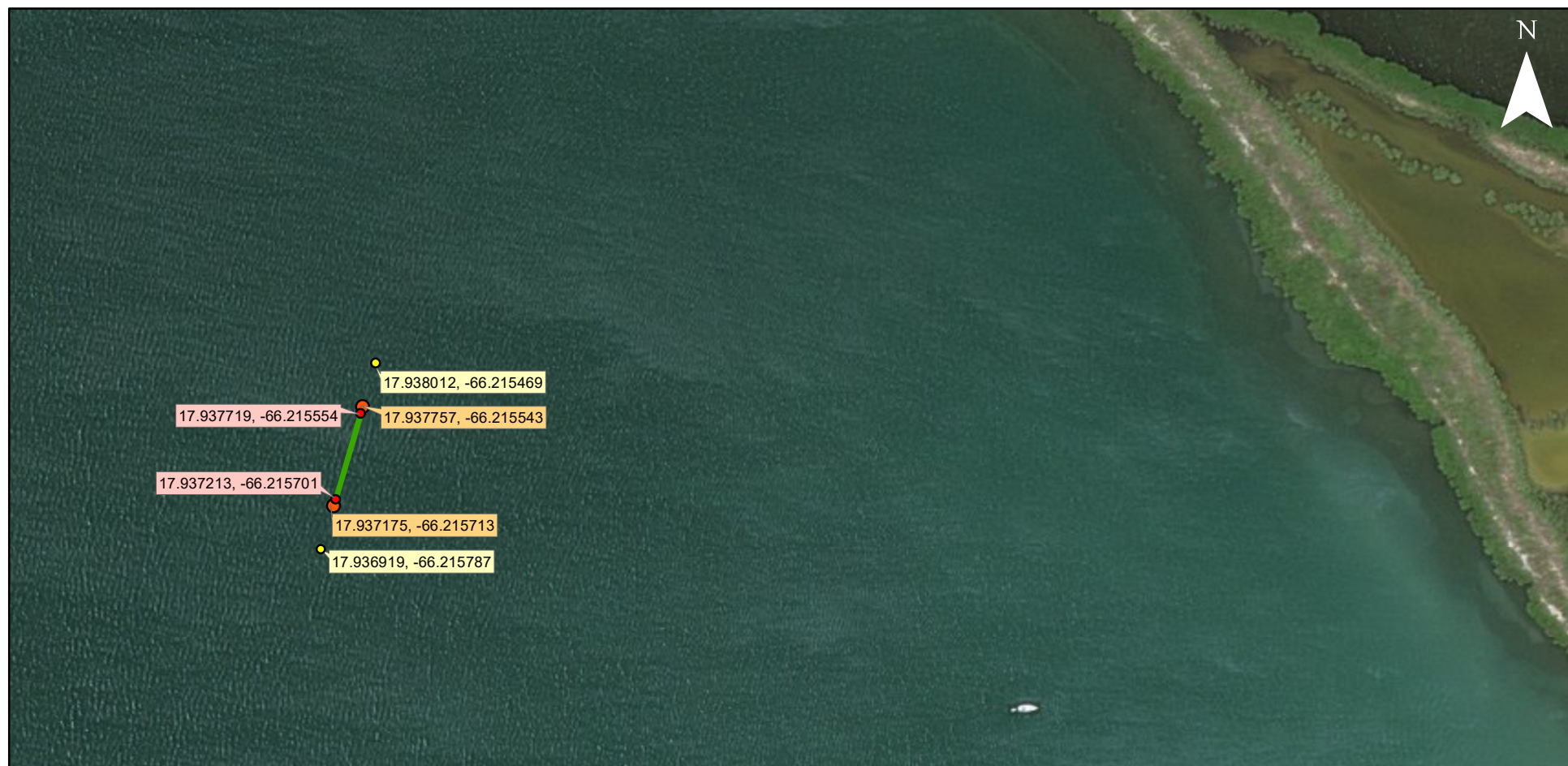
0 0.065 0.13 Km

Legend

- Buoy (A1 Polyform)
- Buoy (A3 Polyform)
- Anchor
- Grow area

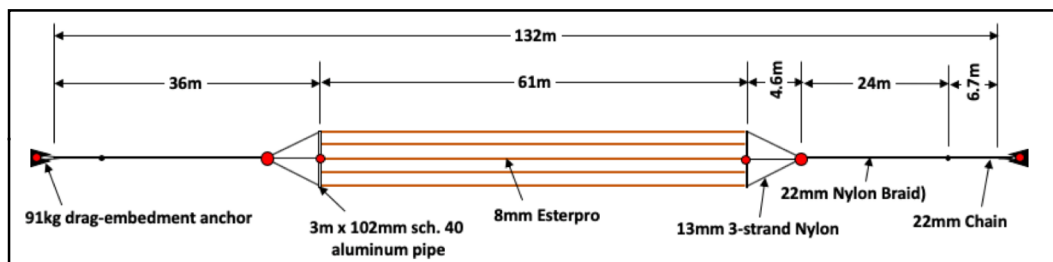


Pozuelo miniature array Jobos Bay Salinas, P.R.

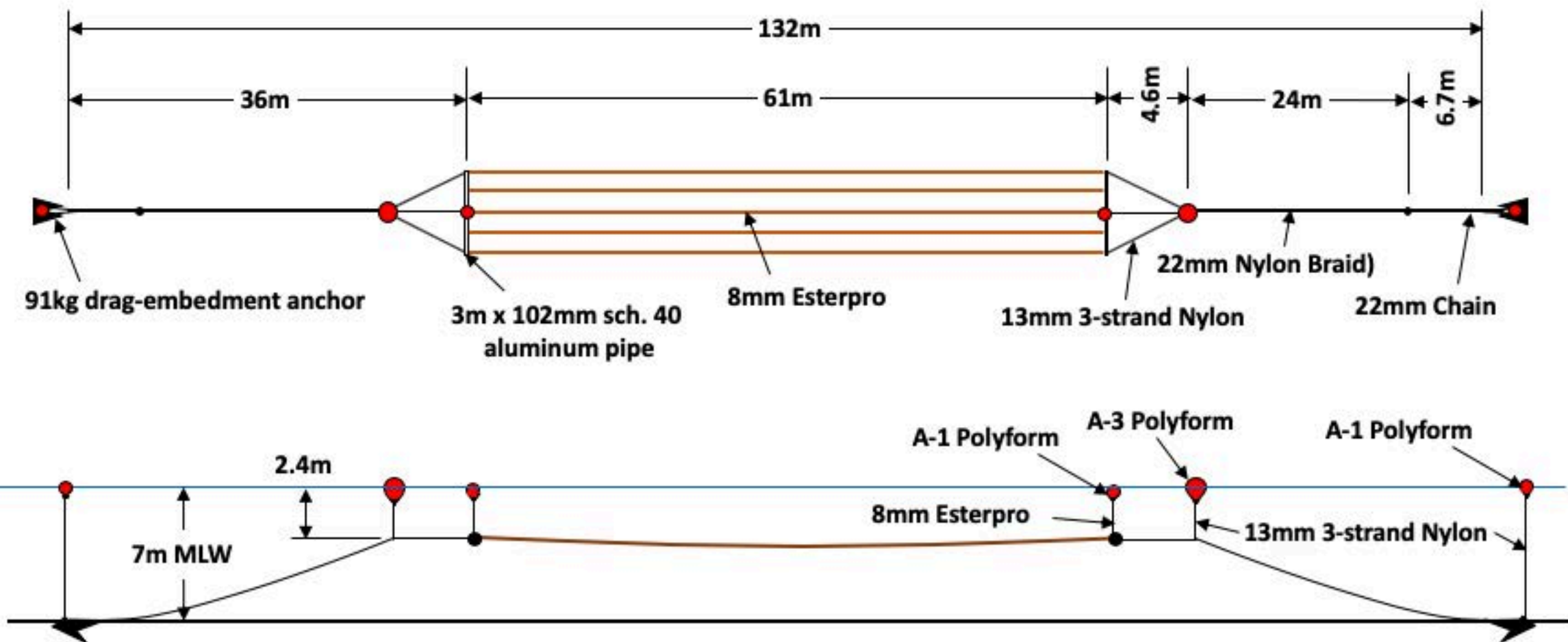


Legend

- Buoy (A1 polyform)
- Buoy (A3 polyform)
- Anchor
- Grow area



61m, 5-line Eucheuma Rig



Materials list				
Item	Quan.	Description	Unit length	Total req'd.
Grow lines	4	8mm Esterpro three-strand sinking pot warp	61m	305m
Spreader buoy lines	4	8mm Esterpro three-strand sinking pot warp	2.9m	11.6m
Center bridle	2	13mm Nylon three-strand	4.6m	9.2m
Outer bridles	4	13mm Nylon three-strand	4.8m	19.3m
Mooring buoy lines	2	13mm Nylon three-strand	2.4m	4.9m
Mooring line	2	22mm Nylon eight-strand plaited (4:1 scope)	25.2m	50.3m
Anchor chain	2	22mm Galvanized open-link steel chain (1/4 shot)	6.7m	13.7m
Mooring buoys	2	A-3 Polyform		
Spreader buoys	2	A-1 Polyform		
Anchor marker buoys	2	A-1 Polyform		
Anchor	2	TendOcean 91 kg		

(All lengths nominal and do not include knots or splices.)

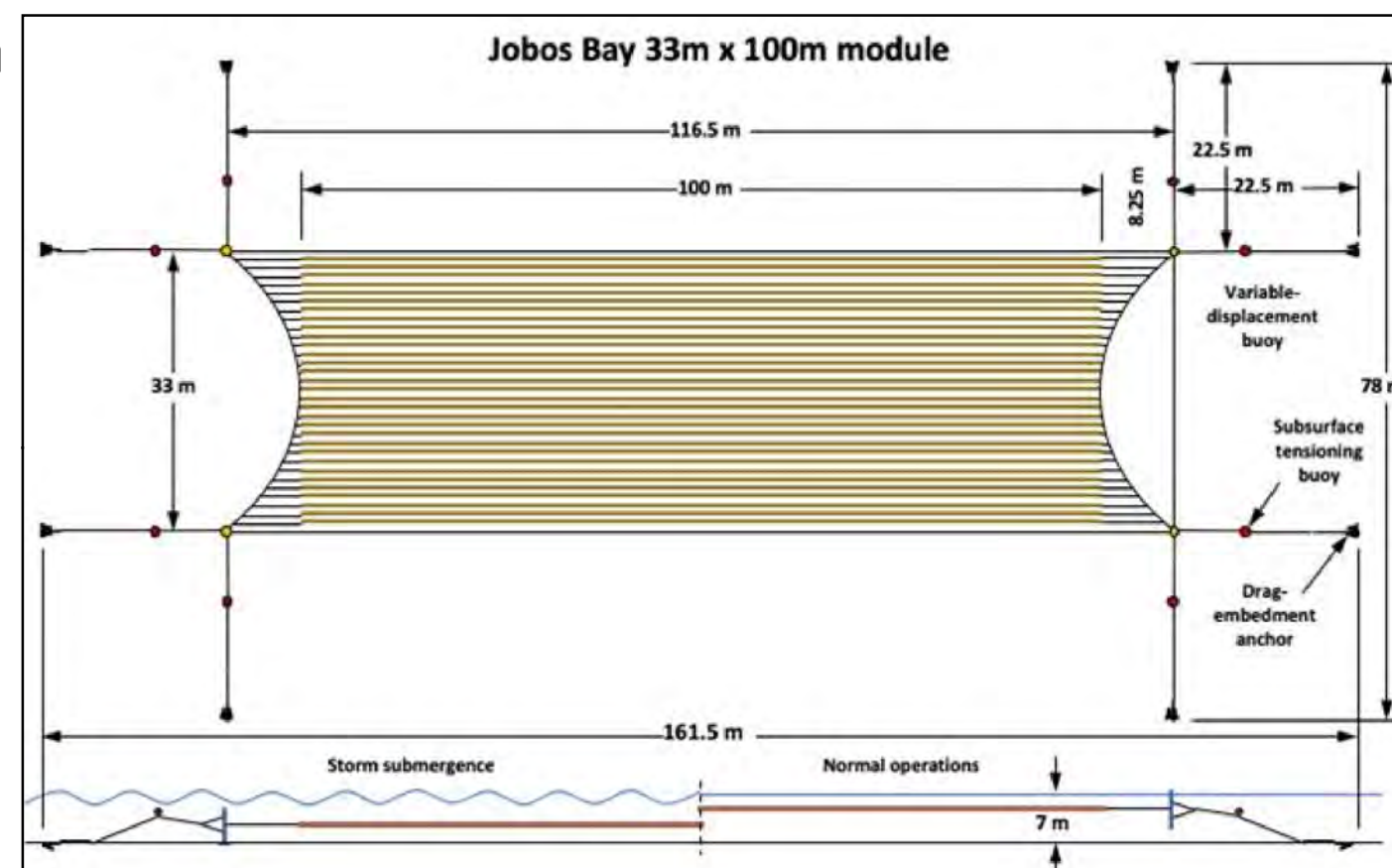
Sugar mill pilot array, Jobos Bay Salinas, P.R.



0 0.055 0.11 0.165 0.22 Km

Legend

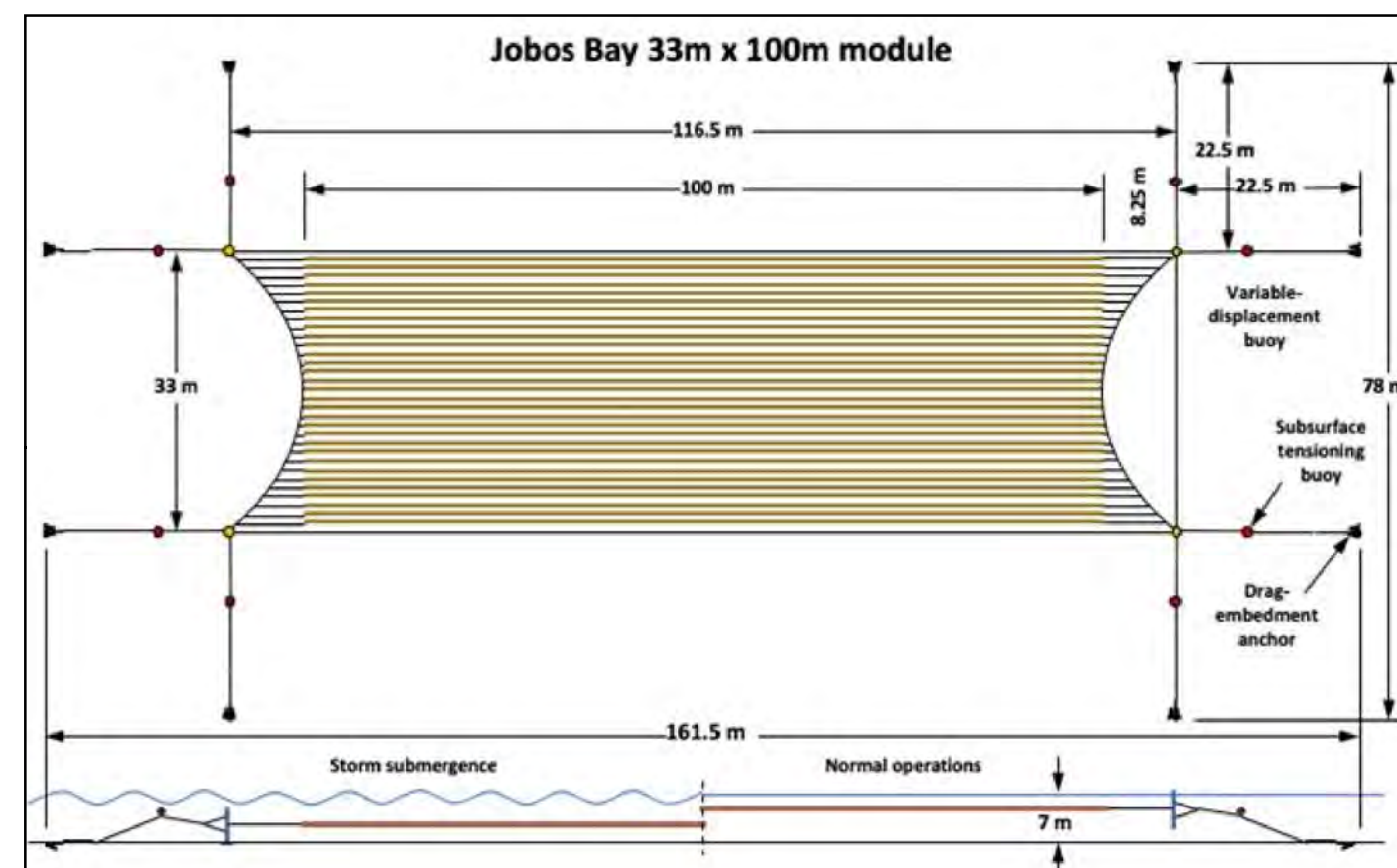
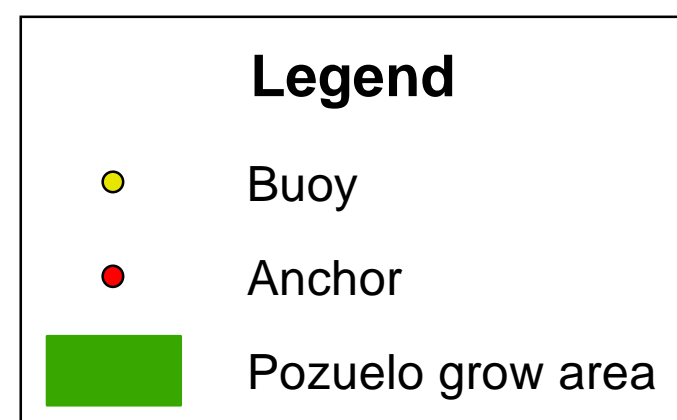
- Anchor
- Buoy
- Sugar mill grow area



Pozuelo pilot array, Jobos Bay Salinas, P.R.



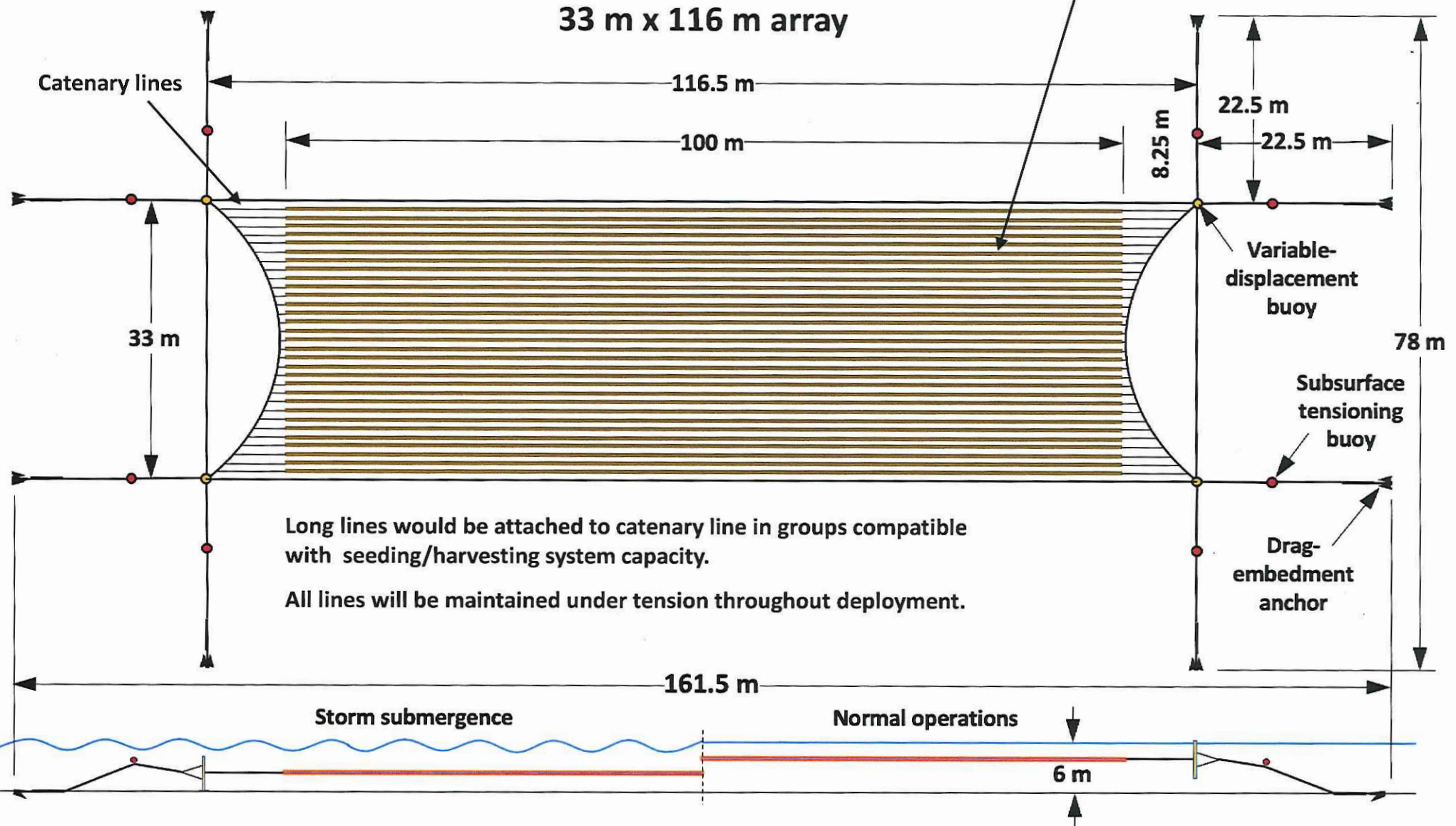
0 0.09 0.18 0.27 0.36 Km



Macroalage farm module (full size)

60 grow-lines spaced 0.5 m apart for a total culture length of 6 km.

Algal culture density = 0.5 kg/m.



Catenary Array Components

Specifications will vary based on a detailed site survey
and monitoring of wind, waves, and current



Anchors – 675 lb
Drag embed anchors



Anchor chain - 1"
Open-link Galvanized

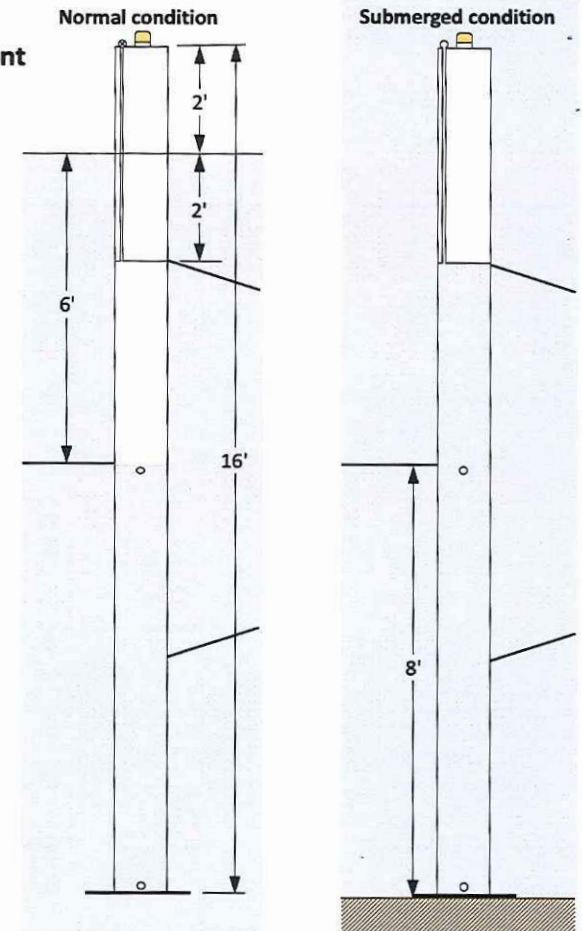


Structural line -
Sampson Tenex
12-strand polyester



Connectors – custom-designed
Galvanized weldments

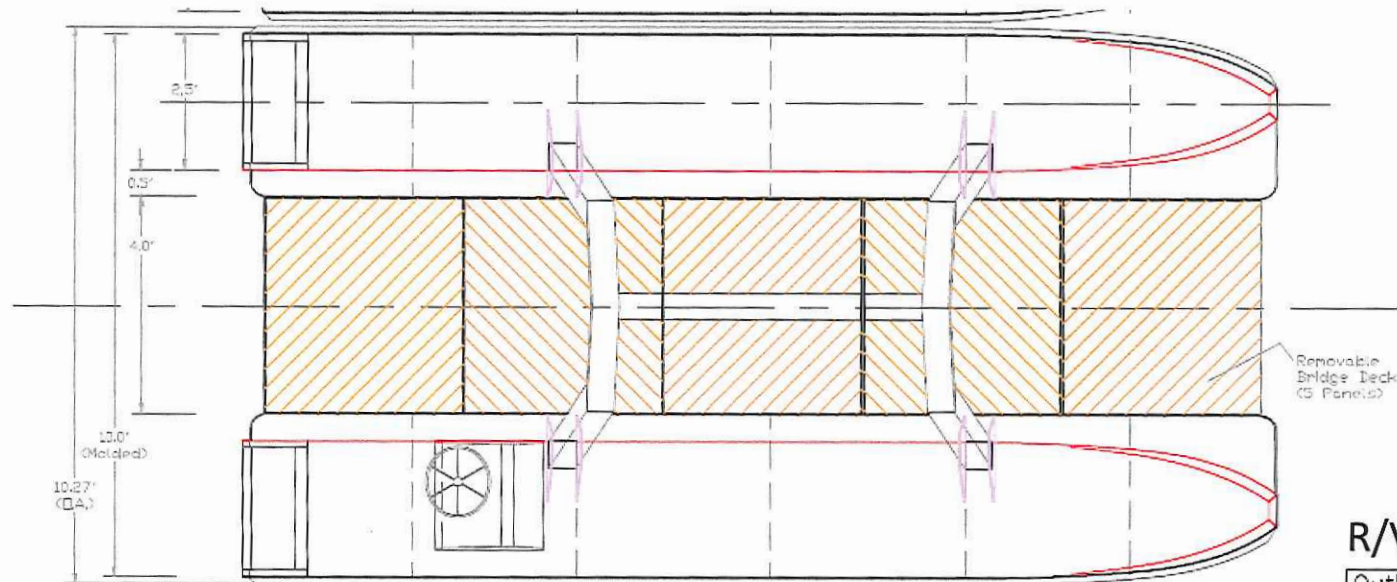
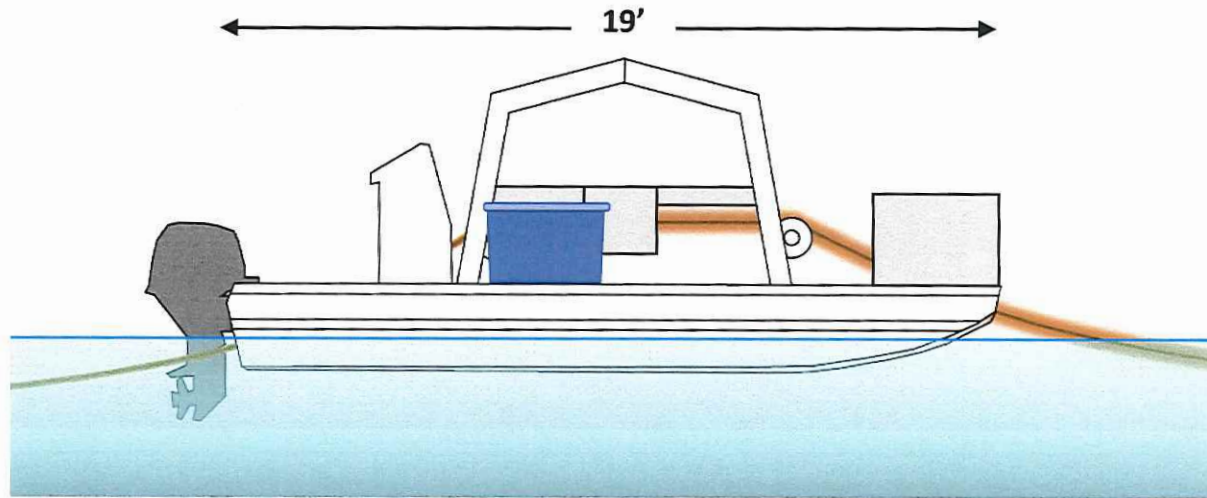
Variable
Displacement
Buoy



Array corner buoys -
Variable displacement buoy

Attachment 5

Farm vessel – custom catamaran



R/V Damisela

Outboard Pro & Plan
Goudey - Eucheuma 19'

SCALE	DATE	DESIGN
1/2" = 1'	WAL	11/22/18
Response Marine, Inc.	PER	11/27/18
MercuryPart, Inc. www.responsemarine.com	Draw No.	584-1