

Paper No. 16/2021

LOCAL VESSELS ADVISORY COMMITTEE

**Deployment of Real-time Water Current
and Water Quality Monitoring Station to the East of Sha Chau**

Purpose

Members are invited to refer to the Annex for perusal of a paper concerning the captioned matter, and submit any comments on the paper by replying to the Secretariat on or before 30 July 2021.

Marine Department
16 July 2021

**Deployment of Real-time Water Current
and Water Quality Monitoring Station to the East of Sha Chau**

Purpose

Members are invited to note the details of the deployment of a real-time water current and water quality monitoring station to the East of Sha Chau (ESC) as set out in this information paper.

Background

2. The Civil Engineering and Development Department (CEDD) has been managing the contaminated mud disposal facility to the ESC (the ESC facility) since 1992. For each dumping operation, we need to measure the prevailing water current (including speed and direction) near the ESC facility to ensure that the materials being dumped will not be transported outside the facility boundary by the water flow, thus minimizing environmental impact. All along, we deployed a marine-based office on a vessel anchored near the ESC facility for management of the dumping operation, and the water current was measured using an instrument fixed to the marine-based office.

3. Upon a recent review, it is considered beneficial to change the marine-based office to a land-based office from operation point of view. To continue the water current measurement, we propose to set up a monitoring station (in form of a tailor-made scientific buoy) in close vicinity to the ESC facility so that the measuring instrument can be fixed to it. The data collected by the measuring instrument will be transmitted wirelessly to the land-based office. The scientific buoy shall be certified by an authorized surveyor and maintained by the contractor employed by CEDD.

4. The deployment of the proposed scientific buoy will also provide a good opportunity to affix additional monitoring instruments onto the buoy to help collect other useful information wirelessly, such as the real-time water quality monitoring data for assessing the environmental performance of the ESC facility.

Proposal

5. The proposed real-time monitoring station in the form of a scientific buoy will be placed at 22° 20.495'N 113° 55.917'E, which is to the East of Sha Chau and about 1.5 km offshore from the new airport third runway reclamation area. (**Appendices A and B**)

6. The scientific buoy comprises three main components, including scientific instruments for measurement and sensing; communication and data transmitting equipment plus cloud storage of data; and a power unit to harness and store solar energy. The system is self-contained and running automatically to conduct real-time monitoring of water quality, tidal and marine conditions. No discharge will be generated during the operation of monitoring system as all the analyses will be carried out optically or acoustically with no chemical reaction needed. The performance of the buoy will be closely monitored via remote terminals and mobile phones. During the early phase of deployment, weekly inspection on the integrity of the scientific buoy (e.g. anchorage connections, lights) would be arranged, though routine maintenance needs to be conducted only monthly, at most.

7. The sensing instruments installed on the scientific buoy include an Acoustic Doppler Current Profiler (ADCP) for capturing the water current; multi-sensors for monitoring various water quality data parameters; and sounder for recording water depth.

8. The scientific buoy is designed with a diameter of 2m and focal height of 4.2m (**Appendix C**). Safety features include lights, top mark, signs, radar reflector and automatic identification system. It is designed in compliance with the specifications and requirements of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Guideline No. 1099 on the Hydrostatic design of buoys (Edition 1 May 2013) published by the IALA. According to the Navguide 2018 Marine Aids to Navigation Manual (8th Edition) published by the IALA, the minimum length of mooring chain should be two times of the water depth. For the water depth of about 7.5 - 8.5m, an about 17m long single mooring chain connected to a concrete block sinker with total weight of about 10 tonnes will be used for the scientific buoy. The particulars of the scientific buoy are as follows:

Name	:	ESC
Position (WGS 84 Datum)	:	22°20.495'N 113°55.917'E
Shape	:	Pillar
Colour	:	Yellow

Light Characteristics	:	F1 (5)Y.20s
Top Mark	:	Yellow “X”
Radar Reflector	:	Fitted
Automatic Identification System	:	Fitted

9. The position of the scientific buoy will be real-time monitored by GPS device in the buoy. Any drift of the buoy from its original position for more than 30m, the contractor will perform inspection within 3 hours after receiving the report, or as soon as after the passage of typhoon if the weather allows. If the scientific buoy was found to be disconnected from the sinker, the contractor would immediately recover the out-of-position scientific buoy for emergency repairing. We will aim for relocating the scientific buoy back to its original position within 1 day if the weather allows.

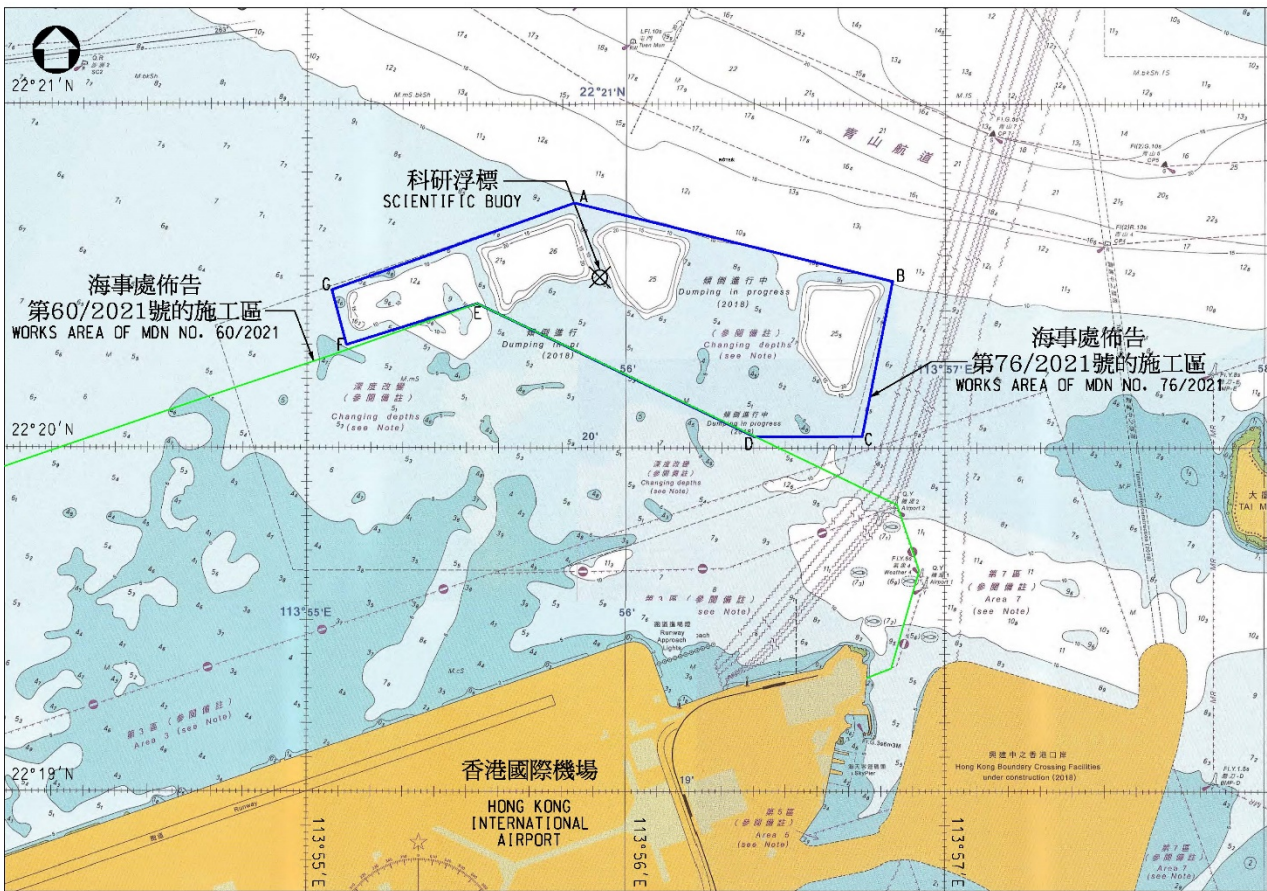
10. The scientific buoy including the sinker is proposed to be removed upon the decommissioning of the ESC facility and completion of all associated environmental monitoring work. The tentative time of removal will be in 2030 and may subject to change.

Way Forward

11. Members are invited to note the details described in paragraphs 5 to 10 above. In case of any enquiry on the related matters, please contact Miss LI Kit-man of CEDD by phone at 2762 5559, or by email: kmli@cedd.gov.hk.

Fill Management Division
Civil Engineering and Development Department
July 2021

Location of the proposed real-time water current and water quality monitoring station (Scientific Buoy)

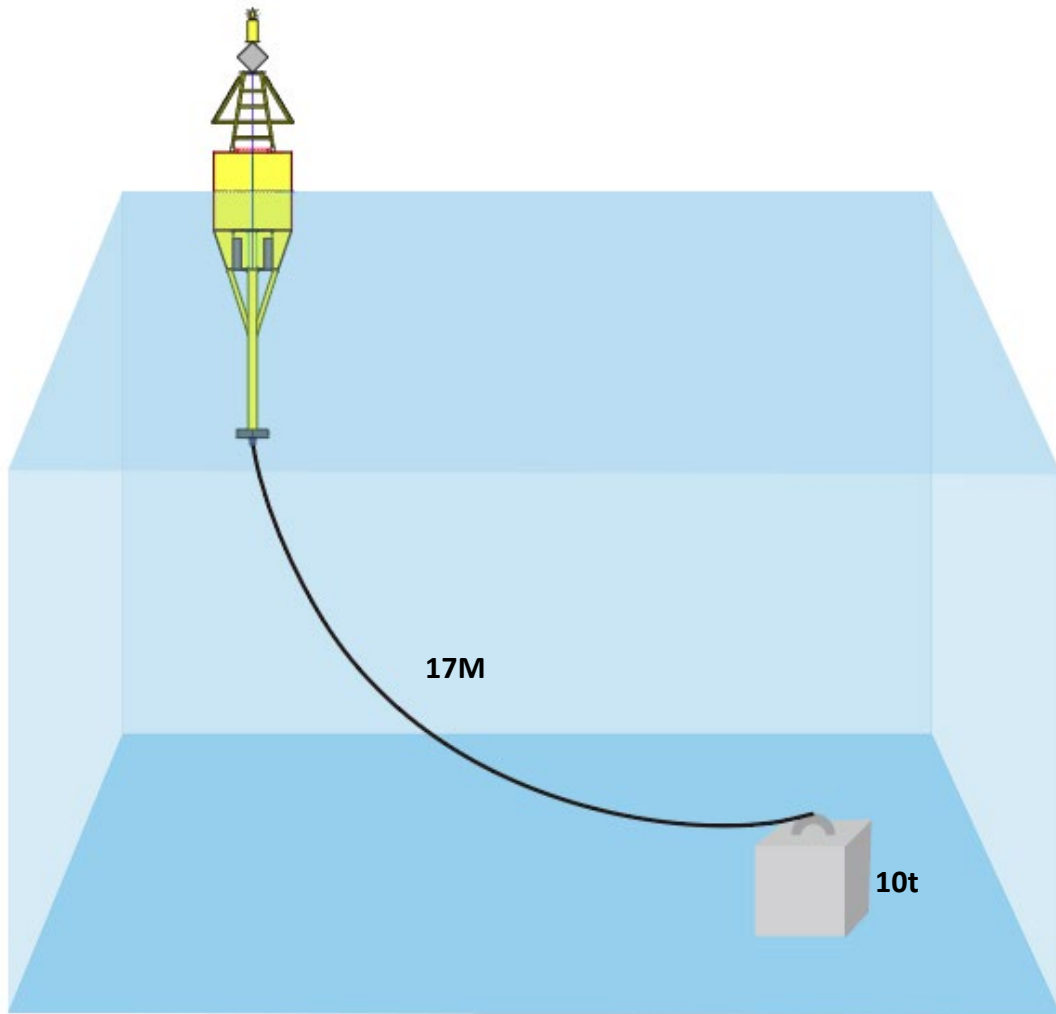


Note: Location of Scientific Buoy: 22°20.495'N 113°55.917'E (WGS 84 Datum)

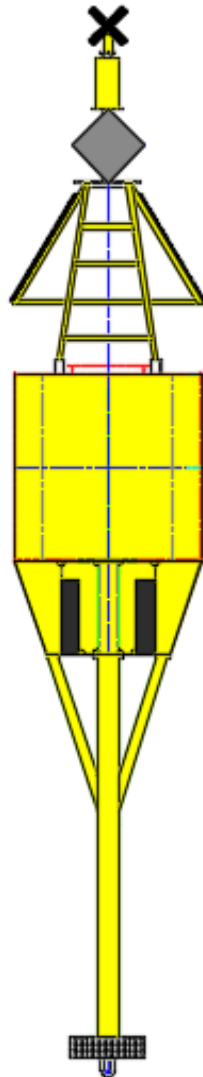
Location of the Scientific Buoy



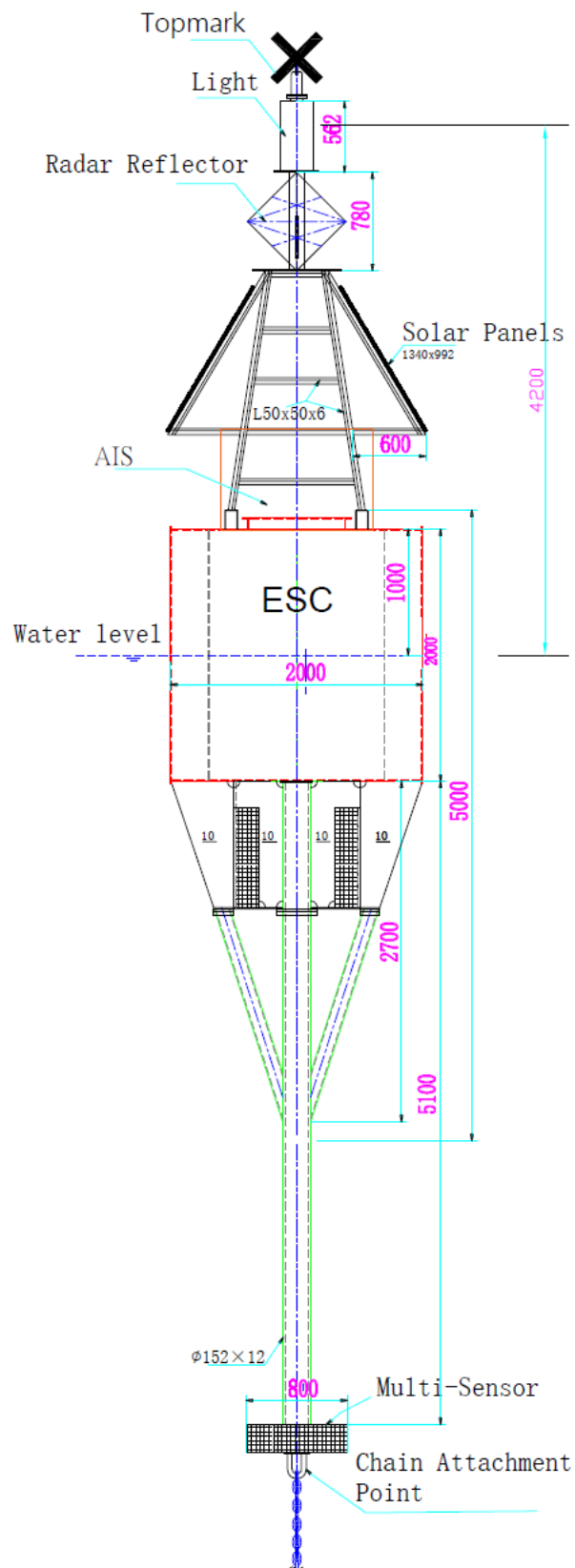
Schematic diagram of Scientific Buoy



Isometric view of Scientific Buoy



Dimensions and components of Scientific Buoy



Note: All dimensions in millimetres.