

**LOCAL VESSELS ADVISORY COMMITTEE
PILOTAGE ADVISORY COMMITTEE**

**Pilot Deployment of Real-time Hydrographic and Water Quality Monitoring
Station in Southeast Lamma Waters**

Purpose

Members are invited to note the Annex containing a paper issued by the Environmental Protection Department concerning the captioned matter.

Marine Department
January 2024

Pilot Deployment of Real-time Hydrographic and Water Quality Monitoring Station in Southeast Lamma Waters

Purpose

Members are invited to note the details of the pilot deployment of a real-time hydrographic monitoring station in southeast Lamma waters as set out in this information paper.

Background

2. To enhance the government's capability in water quality management, the Environmental Protection Department (EPD) has currently installed three scientific buoys, one in waters off Tsuen Wan Park, one in the north Lantau waters and one in waters off North Point, to provide real-time monitoring on the hydrographic and water quality conditions there. The EPD plans to install a fourth buoy in the southeast Lamma waters to monitor the hydrographic and water quality conditions there, from which valuable reference information can be obtained to better understand the water quality variation in relationship to interaction with open waters in the South China Sea.

3. The real-time data collected serves a number of purposes, including (i) the calibration and verification of the hydrodynamic and water quality model; (ii) the real-time analysis of changes in environmental factors such as tidal level, hydrology and weather conditions, etc.; and (iii) the provision of accurate real-time hydrological and water quality information, thereby facilitating the formulation of quick response actions to tackle occasional pollution or emergency environmental incidents.

Proposal

4. The EPD will launch an one-year pilot scheme tentatively in February 2024 to deploy a real-time hydrographic and water quality monitoring station in southeast Lamma waters mounted on a refurbished scientific buoy (former CityU scientific buoy at Tai A Chau waters) for measuring flow speed and direction in the water column, and a few key water quality parameters. The scientific buoy will be placed at 22°11.500' N 114°9.616' E, which is about 180m from inshore traffic zone,

1,600m from the navigation channel and 2,200m from the South East Lamma Anchorage. The proposed location and the schematic diagram of the real-time hydrographic and water quality monitoring station are shown in Appendices A and B.

5. The proposed scientific buoy comprises three main components including scientific instruments for measurement and sensing; communication and data transmitting equipment; and a power unit to harness and store solar energy. The system is self-contained and running automatically to conduct real-time monitoring of hydrographic and water quality conditions. No discharge will be generated during the operation of monitoring system as the analyses will be carried out acoustically and optically with no chemical reaction involved.

6. The sensing instruments include an Acoustic Doppler Current Profiler (ADCP) for measurement of sea current and wave; two multiparameter sensors hanging below the buoy for monitoring the physical properties of sea water and the water quality status; and a camera module for capturing the conditions of the surrounding environment.

7. The scientific buoy is designed with a diameter of 3m and focal height of 3.7m (**Appendix C**). Safety features include lights, top mark, signs, radar reflector and automatic identification system. The scientific buoy 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 chains should be at least two times of the water depth. For the water depth of about 20m, two mooring chains each of about 50m long will be connected to two 12.5 tonne concrete block sinker for anchoring the scientific buoy. The particulars of the scientific buoy are as follows:

Name	: EPD-4
Position (WGS 84 Datum)	: 22°11.500' N 114°9.616' E
Shape	: Pillar
Colour	: Yellow
Light Characteristics	: Fl (5) Y.20s
Top Mark	: Yellow “X”
Radar Reflector	: Fitted
Automatic Identification System	: Fitted

8. The position of the scientific buoy will be monitored by on-board GPS device in real time. For any drift of the buoy more than 60m from its original position, the contractor will perform inspection and relocate the buoy back to its original position within 1 day if the weather allows. Routine maintenance will be conducted on a bimonthly basis. Additional maintenance may be conducted on need basis.

9. Upon completion of the one-year pilot scheme, EPD will review its further deployment afterwards.

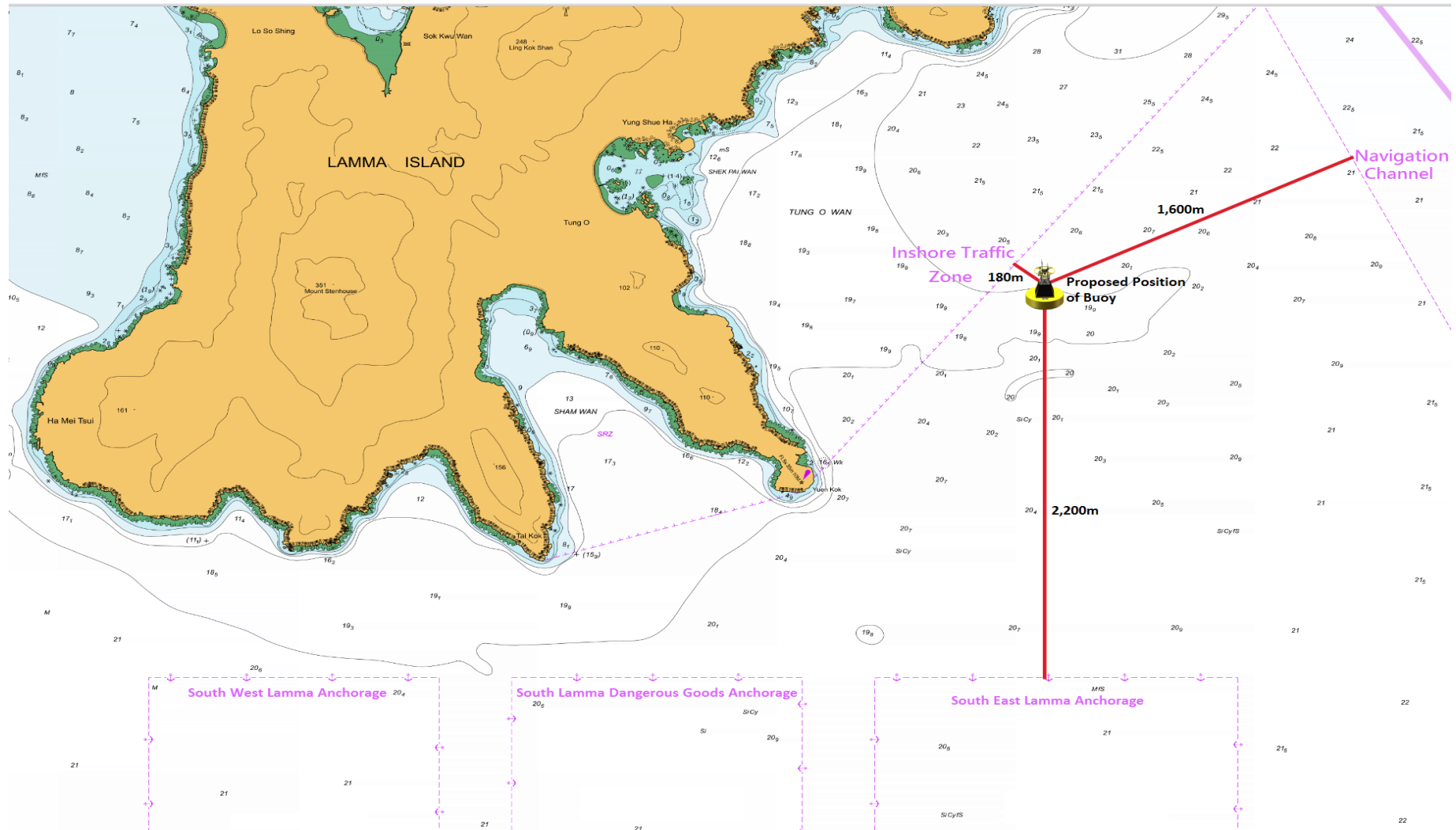
Way Forward

10. EPD will liaise with the Marine Department for the installation of the scientific buoy in southeast Lamma waters.

11. Members are invited to note the details of the proposal described in paragraphs 4 to 9 above. In case of any enquiry on the related matters, please contact Dr. WONG Tse Man, Ken of EPD by phone at 2594 6542, or by email: kentmwong@epd.gov.hk. For matters regarding the 24 hours maintenance of the scientific buoy, please contact Mr. CHAN Lawrence of Sha Tau Kok Marine Innotech Circle Ltd. by phone at 9872 9175.

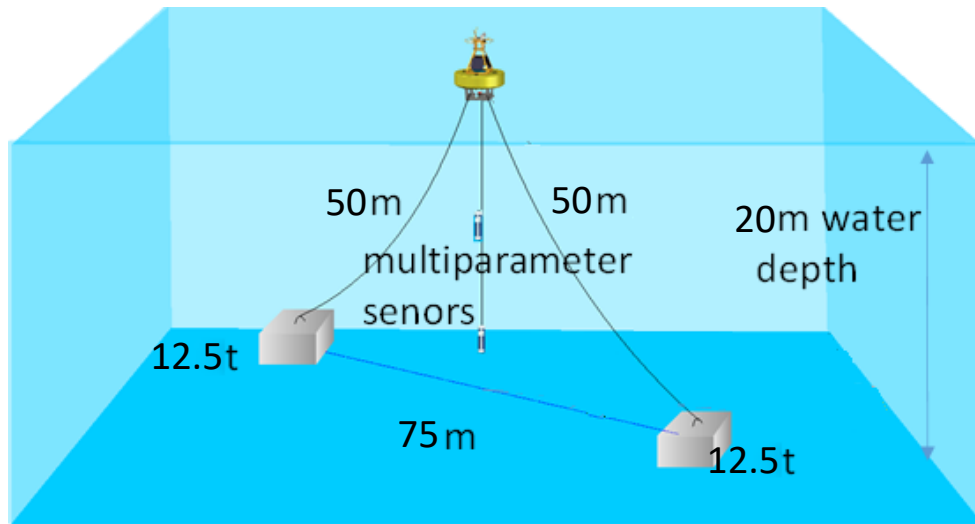
**Water Quality Management Group
Environmental Protection Department
January 2024**

Location of the proposed real-time hydrographic and water quality monitoring station



Position: 22°11.500'N 114°09.616'E (WGS 84 Datum)

Schematic diagram of real-time hydrographic and water quality monitoring station deployment



The design of the scientific buoy

