

Site Investigation Schedule of Works
SAIPEM & SEAI for AFLOWT
File Ref: FS007062
Date: January 2020, Rev: A

1. Geophysical Surveys

a. Multi-Beam Echo Sounder (MBES)

Method: High resolution multibeam will be used (200-400 Khz); Contour intervals at 0.20 m will be used.

Equipment: Kongsberg EM2040, or equipment of similar specification, will be used for the bathymetric survey (200-400 Khz). It is composed of the latest high accuracy technology elements as well as innovative digital image treatment systems. This equipment operates high resolution works under International IHO standards.

Location: Sea area of AMETS as shown in 'AFLOWT_Foreshore Licence Map'.

b. Side-Scan Sonar (SSS)

Method: The towed vehicle is a cylindrical device with hydrodynamic design provided with fins, which is towed behind the stern of the boat. SSS is provided by two transducers that each emit acoustic waves across the water in a frequency range between 100 and 900 kHz. The reflection of this wave, coming from the bottom, is caught by the same transducers, amplified and transmitted across the cable, up to the recorder, where the corresponding sign is digitized, processed and recorded, to identify the different substrate morphologies, and the visualization of objects.

Equipment: Edgetech side scan sonar, or equipment of similar specification, will be used (100 -900khz).

Location: Sea area of AMETS as shown in 'AFLOWT_Foreshore Licence Map'.

c. Sub-Bottom Profiling (SBP)

Method: SBP is a method of determining the composition of the seabed using sound pulse techniques. SBP obtains high-resolution vertical profiles of the unconsolidated matter on the sea floor. The SBP transducer emits pulses of acoustic energy (conical, short and high intensity waves) onto the seabed. A portion of this energy is reflected from the seabed and a portion penetrates inside the sediment and is reflected back by the different layers. The reflected waves come back to the surface where they are caught by the same transducer that turns the echoes received in electrical signs. The acoustic waves cross the subsoil and the reflected echoes are caught by an acoustic receiver.

Equipment: Ixblue Echoes 3500 SBP, or equipment of similar specification, will be used (i.e. with operating frequencies ranging from 1.7 to 5.5 khz). The equipment will be hull mounted on a Marine Institute (MI) vessel.

Location: Sea area of AMETS as shown in 'AFLOWT_Foreshore Licence Map'.

2. Geotechnical Survey

a. Cone Penetration Testing (CPT)

Method: CPT involves pushing an instrumented device into the seabed at a constant speed with continuous measurement of a range of reactions. No significant underwater acoustic signal results from the operation. CPT uses a wheel drive system to push the CPT rods into the seabed. Wheel friction is imposed by hydraulic force. A self-tensioning electric winch with heave compensation feeds the umbilical for power supply and data communication. The system is therefore operated by a single direct force being applied to the rods rather than by a hammering, coring or drilling action. During the test the system pushes the cone into the seabed with a penetration rate of 2 cm/s (+/- 0.5 cm/s). Readings are taken every 1 cm and are displayed digitally and graphically on the screen on real time as well as stored in the computer.

Equipment: A Ronson seabed CPT, or equipment of similar specification, is expected to be used. The instrument weighs in the region of 10 tonne and is deployed by lowering it directly onto the seabed from the stern of the vessel using a crane. For safety purposes, it is recommended to combine the CPT frame with an acoustic USBL beacon to track the system during its descent and after it is landed on the seabed. The MI vessel's Ixblue GAPS USBL is suitable, operating with a frequency that is from 21.5 to 30.5 KHz.

Location: Sea area of AMETS as shown in 'AFLOWT_Foreshore Licence Map'.

3. Ecological survey / Environmental Sampling

a. Benthic sampling of the subtidal and the intertidal sediment

Method: Subtidal sediments will be collected by grab surveys (day grab) and intertidal stations will be collected using a standard 20 cm core to complement the original methodology and data set for AMETS. Standard sampling techniques for subtidal and intertidal collection will be employed to include collection of macrofauna and associated sediment particle size and organic content. It is considered likely that twenty-five (25) random stations from test area (A, B and the cable route) and fifteen (15) random stations from appropriate control locations for each test area and the cable route will require to be sampled for macrofauna particle size and organic content. This gives a total of forty (40) subtidal grab stations. It is considered likely that a further six (6) intertidal sediment stations will be required to characterise Belderra Strand, the cable landfall location.

Location: Sea area of AMETS and intertidal area as shown in 'AFLOWT_Foreshore Licence Map'.