1. Description of the Maritime Usage

It is proposed that the following activities are investigated and included within a Maritime Usage Licence (MUL) application to MARA (see Proposed MUL Map).

Geophysical surveys comprising the following within the Proposed MUL Area:

a. Bathymetric survey using either single or multibeam echo sounders from a specific vessel or towed behind a small survey vessel. Line spacing to be determined by survey method.
b. Sub-bottom profiler towed behind a small survey vessel. Swathe width achieving 25% overlap onto neighbouring lines.
c. Marine Refraction Seismic surveys may be undertaken across the proposed MUL Area along approximately 2no. lengths of 65m survey lines
d. Electrical Resistivity Tomography (ERT) survey which consists of electrodes placed on the seabed. There will be ERT lines of 300m in total length with a diameter of 20mm.

Site investigations - Allowance for:

- 02 no. marine boreholes
    - Boreholes will be carried out from a Jack Up Barge supported on four legs penetrating into the seabed. The barge will be delivered flat packed by road (Eden Quay or Burgh Quay) and assembled within the River Liffey and then manoeuvred into place using a supporting vessel.
    - Boreholes are to progress up to a maximum of 20m depth below bed level and may be terminated early if sufficient bedrock is encountered.
    - Boreholes will be carried out using sonic methods through the seabed sediment, with rotary coring used to advance through the bedrock. The borehole diameter will be 200mm within the overburden layer and 100mm within the rock layer.
- Archaeological Surveys within the proposed MUL area, comprising a non-disturbance dive inspection and quayside assessment to identify and record archaeological, historic and relevant natural features. The survey will include documentation of bridge structures, culverts, masonry remains, riverbed topography and existing riverside conditions, together with a probe survey and a metal-detector survey to identify features of archaeological potential.
- Marine environmental/ecological surveys may include benthic sampling. A Day grab is an instrument used for sampling soft seabed sediments.

When deployed overboard it is lowered on a winch to the seabed where the jaws open to take a small (approx. 5L) sample of the surface sediment (top 20cm).

1.1. Proposed licence duration and reasons for proposed duration.

The proposed duration and the reasons for proposed duration is set out as follows:

- Site Investigations Duration: Approx 14 days to 21 days dependent on favourable weather, tidal and site conditions. Start Date: Q1/Q2 2027 dependent on MUL consent.
- The proposed licence duration would be for 1 year to account for potential delays in the consenting process.

1.2. Indicative timing of the works/activity: (i) Start date (ii) Duration (iii) Any other information relevant to timing.

Works would commence as soon as feasible following licence execution taking into-account suitable weather windows and vessel availability. Works are currently programmed to start in Q1 2027.

2. Description of the Works

2.1. Overview

The objective of the proposed surveys is to provide high-quality data that can contribute to a reliable baseline for site selection and subsequent project design and development as well as informing the EIA.

As such, the following survey investigations are considered necessary and detailed further in Table 2.1:

- Geophysical survey, including:
  - Sub-bottom profiler
  - Multibeam Echo Sounder (MBES)
  - Marine Refraction Seismic
  - Marine Electrical Resistivity Tomography (ERT)
- Boreholes
- Archaeological surveys and other investigations (i.e. underwater inspections, dive surveys).
- Additional ancillary data may be collected. This may include the following:
  - Collection of, benthic ecology sampling, water samples, and data on temperature Conductivity/Salinity collected through the deployment

of a small overboard conductivity, temperature and depth (CTD) meter.

- These works are collectively referred to as the Site Investigation (SI) works throughout this report.

The following drawings have been prepared in support of the Maritime Usage Licence application to the MARA:

- Proposed Licence Area Map
- Proposed Borehole Locations Map
- SI Indicative Table of Coordinates

The exact technical specification of the equipment to be used will not be known until the survey contract has been awarded. However, descriptions of typical equipment and survey parameters have been used within this report. Predicted time and footprint for the activities are presented in Table 2.2. It is noted that the requirement for additional and more refined works may arise as the SI works progress and are analysed. This may include areas of particular interest using more targeted techniques and/or refined borehole locations and quantities. There will be no permanent structures, and all site investigation works will be temporary in nature. The moving marine plant will remain on site for the duration of the works.

2.1.1. SI Schedule

The intention is to begin SI activities as soon as feasible following MUL award. Timing of the SI activities is dependent on many factors including weather, tidal flows, availability of vessels and the grant of the MUL. The granting of the MUL will have a direct effect on the timing of SI activities. The duration of the SI works is approximately 14-21 days and are currently scheduled for Q1 2027. The proposed licence duration is for 1 year to account for potential delays in the consenting process.

Table 2.1 - Description of proposed works

Survey	Method	Method Detail	Sampling Effort
Geophysical	Multibeam Echo Sounder (MBES)	A bathymetric survey will be conducted using multibeam echo sounders. These systems may be mounted on a dedicated survey vessel or towed behind a smaller vessel, depending on site conditions and water depths. Multibeam systems emit wide acoustic signals to generate high resolution images, creating three-dimensional maps of the seabed. Line spacing will be between 5 and 20m, depending on depth. A Teledyne SeaBat T20-P multibeam system will be used for all data. The system will be run at 420 kilohertz for high resolution imagery. • Frequency: High Resolution 190-420 kilohertz • Bottom Detect Resolution: 2 cms • Swath Coverage: 140° Equi distance 170° Equi Angle • Number of Beams: 1024 discrete beams with 1° x 1° beamwidth @ 400 kilohertz • Sounding Depth: Up to 250 meters The MBES system will have an integrated sound velocity probe for real time, constant measurements of sound speed in the water at the sonar sensor. This will be used for beam forming in the Seabat as well as for processing data.	MBES may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 1 day.

Survey	Method	Method Detail	Sampling Effort
Geophysical	Sub-Bottom Profiling (SBP) – Parametric Sub Bottom Profiler	SBP is used to develop an image of the subsurface, identifying different strata encountered in the shallow sediments. The Innomar "standard" Sub-Bottom Profiler is an indicative example of a parametric system with a primary and secondary frequency range of 85-115kHz and 2-22kHz, respectively, and sound pressure levels of up to 232 dB (typically operated at <200dB) re1µPa @ 1m, which would be used in both nearshore and offshore areas. The SBP will be towed behind a small survey vessel.	SBP Parametric Sub Bottom Profiler may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 1 day.
	Sub-Bottom Profiling (SBP) - Boomer	The Applied Acoustics AA301 is proposed as the Sub-Bottom Profiling (SBP)- boomer, the instrument consists of a piezo electric plate transducer mounted on a surface tow catamaran frame. Reflected sound signals are recorded using a separate hydrophone such as the Applied acoustics HYD-360/08 (50m). The Boomer SBP operates in a frequency range of 0.5 kHz to 5 kHz, with sound pressure levels in the range of 205-211dB re1µPa @ 1m which would be used in the nearshore shallower area. The SBP will be towed behind a small survey vessel. Surveys completed in this region suggest silt and clay deposits above a gravel sediment layer. The gravel sediment layer from core data would not be able to be penetrated by the sub-bottom profiler proposed, but the depth of the layer is indicated to be below the 6m estimated burial depth of the pipeline. The potential for biogenic gas within the silt deposits is considered high for this area due to the freshwater and history of the deposition.	SBP Boomer may be undertaken traversely across the proposed MUL Area and pipeline route to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 1 day.

Survey	Method	Method Detail	Sampling Effort
Geophysical			
	Marine Refraction Seismic	Marine refraction surveys use controlled seismic sources, such as air guns or weight drops, to generate seismic waves that travel through sediment and rock layers. Arrays of hydrophones or geophones deployed on the seabed record the refracted seismic waves as they bend and travel along subsurface interfaces. By analysing the travel times and velocities of these refracted waves, detailed models of sediment thickness, bedrock depth, and structural features can be developed. Airgun impulse energy is mostly concentrated within low frequencies, with peak frequencies between 5 and 90kHz. Source levels are predicted to be within the range of 186-220dB re 1µPa @1m.	Marine Refraction Seismic may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 1 day.
	Marine Electrical Resistivity Tomography (ERT)	ERT surveys are conducted to investigate the electrical properties of subsurface sediments and rocks. The technique involves deploying a series of electrodes along the seabed, either towed or fixed. A marine electrical resistivity survey utilizing the MAPPEM S Geophysics system is proposed providing high-resolution imaging of subsurface variability by towing an electromagnetic array just above the seabed, injecting controlled electrical current and measuring the resulting response to map resistivity contrasts associated with changes in lithology, porosity, and saturation. As a non-invasive, non-seismic geophysical method, marine ERT produces no significant underwater noise and has minimal environmental impact.	Maximum ERT lines of 300m length line with diameter of 20mm. This activity is anticipated to occur within daylight hours over a period of up to 1 day.

Survey	Method	Method Detail	Sampling Effort
Geotechnical	Boreholes	Boreholes may be up to 20 m below bed level but some may be terminated if sufficient bedrock is encountered. The boreholes will be carried out using sonic methods through the seabed sediment, with rotary coring used to advance through the bedrock. The typical frequencies emitted from rotary drilling are between 0.001-0.120kHz and a recorded sound pressure of approximately 145dB re1µPa @1m. Marine rotary drilling involves rotating a drill bit attached to a drill string and applying downward pressure to cut through the rock formations. Geotechnical sampling tools, including push and piston samples, can then be deployed into the ground to recover intact material. All drilling equipment used will follow the ISO and API technical specifications for drilling equipment. All boreholes will be drilled from a jack-up barge to maintain stability when drilling. Each location would require the 4 legs to penetrate the seabed and cause a temporary disturbance on each occasion. Each leg is typically less than 1m2 in footprint.	2 no. boreholes of a diameter of 200mm (overburden) & 100 mm (rock) will be required within the proposed MUL Area. Mobilisation and demobilisation of jack-up barge is anticipated to occur by nights for total 4 nights. However, these activities may also occur during daytime hours if required. Drilling activities within MUL is anticipated to occur within daylight hours over a period of up to 14 days.

Survey	Method	Method Detail	Sampling Effort
Ecology	Benthic Sampling	Identify benthic communities and habitats at the site. Subtidal sample locations may be subject to drop down video in advance of sampling.	There will be up to 30 no. dedicated subtidal benthic ecology grab sampling locations within the proposed MUL Area and multiple samples (max 4) may be taken at each location. Samples would be of volume 0.1 m2.
Archaeological	Non-intrusive underwater inspection	Non-disturbance dive inspection and quayside assessment to identify and record archaeological, historic and relevant natural features. The survey will include documentation of bridge structures, culverts, masonry remains, riverbed topography and existing riverside conditions, together with a probe survey and a metal-detector survey to identify features of archaeological potential. All archaeological features encountered will be photographed, measured, described and accurately position-fixed using Total Station EDM and/or RTK-enabled GNSS equipment. River profiles and cross-sections will also be recorded and referenced to Malin Head Ordnance Datum. In addition, high-resolution laser scanning of the historic quay structures at Eden Quay and Burgh Quay will be completed to create a detailed pre-disturbance point-cloud record of the existing quay walls areas	To be confirmed

Table 2.2 - Predicted time and footprint for the activities

Survey Activity	Total time for activity	Maximum no. of operatives	Maximum number of samples	Footprint per sample (m^2)	Maximum total footprint per activity (m^2)
Geophysical survey	Up to 2 days	3 no. Operatives	SBP 20 m spacing of main lines and 100 m spacing of cross lines with 25% overlap onto neighbouring lines MBES: 5 -20 m line spacing	-	Area up to 1831.81
Marine refraction seismic	Up to 1 day	3 no. Operatives	5m line spacing	-	Area 50m x 5m = 250m2
ERT	Up to 1 day	3 no. Operatives	Up to 300m ERT Lines	-	Area up to 1831.81
Geotechnical: Boreholes	Up to 14 days	3 no. Operatives	2	0.071	0.142
Jack-up barge	Up to 14 days	3 no. Operatives	8	1	8

2.2. General Survey Requirements

The appointed survey contractor shall obtain and comply with all necessary marine operational permits including routine and customary vessel/crew/equipment clearances from Customs Agencies, Port Authorities, Marine Survey Office, etc. This will include adherence to all major international shipping conventions adopted by the International Maritime Organization (and the International Labour Organization) concerning maritime safety and pollution prevention.

Mobilisation and demobilisation of a Modular jack-up barge (indicatively 12mW x 14mL) craned into and out of the River Liffey from either Burgh Quay on the south bank or Eden Quay on the north bank of the River Liffey during night-time works with approval of Dublin City Council roads department, as well as all other required consents including traffic management. All equipment that will be used for the drilling work will be placed on the barge.

Small vessels to access MUL area from downstream of works at low tide launched from various suitable locations in Dublin Bay. **Quality Assurance** The appointed survey contractors shall comply with the following as a minimum:

- Quality and Environmental Management Systems based on ISO9001:2015 and ISO14001
- Provision of site and activity specific Method Statements for all the marine operations within their scope
- Provision of Quality Management Plans for all the marine operations.

2.4. Health & Safety

Health, safety, environment, and welfare considerations will be a priority in the evaluation of possible contractors for the various survey scopes and will be actively managed during the survey work. Appointed contractors will be required to comply with all legislation relevant to the activities within their scope of work, such as the Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005) and Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended. Project / survey specific Health, Safety and Environment (HSE) plans will be put in place which will form part of the project / survey execution plans.

2.5. Working Hours

The working hours for the SI works are proposed to be up to 12 hours per day, seven days a week, predominantly during daylight hours, except for mobilisation and demobilisation of the jack-up barge which may occur by night. It is anticipated that the main SI works will be carried out over a period of approximately 14 – 21 days including mobilisation and demobilisation. Weather conditions and/or sea-state will impact on the working hours, and it may be necessary to temporarily suspend operations when adverse weather conditions and/or sea-state are encountered or forecast. As such, survey plans will remain flexible to take advantage of optimal weather windows. Similarly, equipment or vessel maintenance and repair may impact on the SI works resulting in changes to the survey schedule.

2.6. Vessels

All vessels will be fit for purpose, certified and capable of safely undertaking all required survey work. Marine vessels will be governed by the provisions of the Sea Pollution Act 1991, as amended. In addition, all vessels will adhere to published guidelines and best working practices such as the National Maritime Oil/HNS Spill Contingency Plan (NMOSCP), Marine Pollution Contingency Plan (MPCP), Chemicals Act 2008 (No. 13 of 2008), Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated regulations. Vessels shall have a Health, Safety and Environmental Management system which should conform to the requirements of the latest International Maritime Organisation (IMO), Safety of Life at Sea (SOLAS) and environmental requirements for their classification and with any national requirement of the territorial or continental / EEZ waters to be operated in. The SI works will be undertaken from vessels in accordance with the relevant guidelines required to manage the risk to marine mammals from man-made sound sources in Irish waters (DAHG, 2014).