

Irish Water

## **UTAS - Whitegate - Aghada - Site Investigation**

Supporting Information for  
Foreshore License Application -  
Marine Based Site Investigation

257589

Issue | 8 May 2018

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 257589




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# Document Verification

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# 1 Introduction

This information supports a foreshore licence application for marine site investigation works in Cork Harbour (White Bay). The works are required for the design and construction of a proposed outfall, 500m long, in the bay. The outfall are to form part of the construction of a new waste water treatment plant in Whitegate – Aghada, Co. Cork.

It is intended to undertake geotechnical marine site investigation to support the above works.

The site investigation can be broken down as follows:

- 5 No. Grab samples of the seabed sediment;
- 4 No. cable percussion boreholes followed by rotary core drilling;
- Geophysical survey using seismic reflection and refraction.

## 1.1 Location of Marine Site Investigation Works

The locations and extent of the proposed marine site investigation works is shown in drawing number IW-10015229-03-04-001.

The coordinates, given in Irish National Grid (ING) and Irish Transverse Mercator (ITM), of the extent of area of the proposed marine site investigation works are summarised in Table 1 below.

Table 1: Coordinates of extent of marine SI works (ING)

Point	Easting (ING)	Northing (ING)	Easting (ITM)	Northing (ITM)
A	181744	61775	581699	561839
B	181475	61364	581429	561429
C	181535	60958	581489	561023
D	181838	60568	581792	560572
E	182272	60340	582226	560404
F	182860	61445	582814	561510
G	182745	61732	582699	561797

## 1.2 Indicative Timing of Works

A start date between June and August 2018 is anticipated, subject to the approval of the Foreshore License application, appointment of a suitable contractor and suitable weather conditions. In order to allow for unforeseen delays, we seek approval of a Foreshore Licence for the period until **31 December 2018**.

### 1.2.1 Duration of Works

Mobilisation of appropriate plant and equipment for marine site investigation works can be timely.

We envisage a period of approximately 8 to 12 weeks for mobilisation of the equipment following appointment of a suitable contractor. We anticipate the following duration for site works for the marine site investigation works and geophysical surveys:

Borehole installation is expected to take 4 to 6 weeks in total, subject to suitable weather conditions. Grab samples shall be taken concurrently.

The geophysical survey should be carried out in advance of the intrusive works. The lead in time from appointment is typically 1 month. The survey is expected to take 4 weeks.

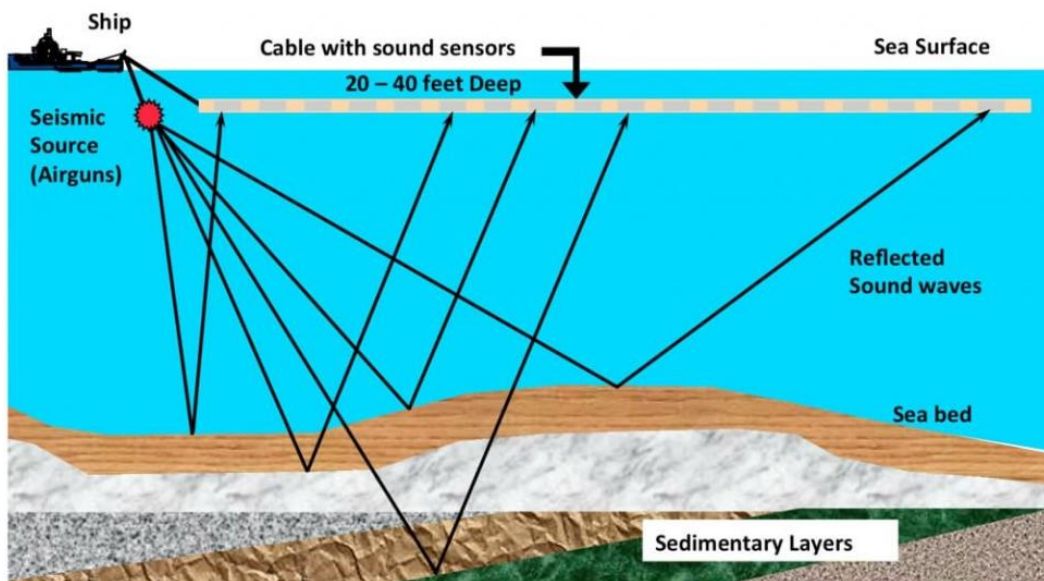
## 2 Description of Proposed Works

### 2.1 Offshore Geophysical Survey

The objectives of the proposed survey are to map the type and thickness of the sediment layers, determine sediment stiffness, map the depth to bedrock, map variation in bedrock type and rock quality and determine engineering parameters across the study area shown in drawing number IW-10015229-03-04-001. These works will involve a number of different geophysical methods, including seismic reflection and refraction methods.

Surveyors release compressed air into the water to create short duration sound waves that reflect off subsurface rock layers and are “heard” by sensors being towed behind the vessel. The sound produced during seismic surveys is comparable in magnitude to many naturally occurring and other man-made ocean sound sources, including wind and wave action, rain, lightning strikes, marine life, and shipping. Survey operations are normally conducted at a speed of approximately 4.5 to 5 knots (~5.5 mph), with the sound source typically activated at 10-15 second intervals. As a result, the sound does not last long in any one location and is not at full volume 24 hours a day.<sup>1</sup> This is illustrated in Figure 1.

Figure 1: Schematic of marine seismic survey<sup>2</sup>



These surveys will be carried out for the entire area enclosed by a red line (extent of survey area) on drawing number IW-10015229-03-04-001. A typical survey vessel is shown in Figure 2.

<sup>1</sup> Seismic Surveying 101 © Copyright 2014 – American Petroleum Institute (API), all rights reserved. Digital Media | DM2014-229 | 12.16 | PDF

<sup>2</sup> © Copyright 2014 – American Petroleum Institute (API), all rights reserved. Digital Media | DM2014-229 | 12.16 | PDF Seismic Surveying 101

The survey vessel will manoeuvre to obtain full coverage of the survey area. The appointed vessel will mobilise and de-mobilise on a daily basis to/from a port. This will be dependent on berth availability.

The findings of the geophysical survey will influence the final location of the offshore ground investigation locations.

Figure 2: Typical Survey Boat - Typical dimensions 10m to 12m length



## 2.2 Grab Samples

Grab samples obtain a sample for sediment analysis using a Van Veen type grab sampler or similar.

Grab samples are similar to grab buckets on land and tend to be either hydraulically or manually operated. These would be deployed from the platform set up for site investigation (See Section 2.43) via on-board cranes.

There are many different types of tools used to recover samples, the method used will depend on water depth, currents and sample size required. Typical tools include a Van Veen type grab sampler, shown in Figure 3.

Figure 3: Van veen grab sampler



Small Van Veen - 36 x 28cm

Large Van Veen - 70 x 36cm.

The preliminary locations of the proposed benthic sampling points are listed in Table 2 below and shown in drawing number IW-10015229-03-04-001.

Table 2: Grab Sampling Points

Point	Easting (ING)	Northing (ING)	Easting (ITM)	Northing (ITM)
BGS606	182287	61690	582241	561754
BGS607	181829	61674	581783	561738
BGS608	181782	61166	581737	561230
BGS609	182163	60792	582117	560857
BGS610	182543	61310	582497	561375

## 2.3 Geotechnical Testing and Sampling

The marine ground investigation works will extend across the study area of the proposed marine outfall, as shown in IW-10015229-03-04-001. The provisional locations of the 6 No. proposed boreholes are included on this drawing. The marine ground investigation will comprise of the collection of sediment and bedrock cores. These works will provide a greater understanding of the benthic (sea floor, the sediment surface and sub-surface layers) and bedrock character along the proposed outfall route.

Cable percussion boreholes will be carried out in the area followed by rotary core drilling at the same location to obtain samples of the firm to hard cohesive sediments and bedrock cores.

The anticipated locations of the boreholes required are shown in Table 3. Note that these may change depending on access.

Table 3: Marine site investigation boreholes – Provisional Locations

Number	Borehole Depth	Easting (ING)	Northing (ING)	Easting (ITM)	Northing (ITM)
TCBH601	15m	182448	61476	582402	561541
TCBH602	15m	182547	61615	582501	561679
TCBH603	15m	182656	61748	582610	561812
TCBH604	15m	182717	61769	582671	561833
TCBH605a	15m	182136	61316	582090	561280
TCBH606b	15m	181921	61071	581875	561136

## 2.4 Proposed Equipment and Methodology

It is envisaged that the installation of boreholes will be carried out from equipment mounted on a stable platform, for example a jack-up barge, floating pontoon or similar.



## Jack Up Barge

The jack-up barge is a type of mobile platform that consists of a buoyant hull fitted with a number of spud legs, capable of raising its hull using a hydraulic jacking system. The barge will be fully equipped with all specialist plant and tools required for the site investigation. Figure 4 illustrates a typical jack-up barge being used for similar marine geotechnical investigation.

The jack-up barge is manoeuvred from one location to the next by way of a dedicated tug boat. Once on location the platform level is raised to the required elevation above the sea surface, its legs supported by the seabed, before testing and sampling can begin. The barge then remains in location for the duration of that borehole installation.

Figure 4: Jack-up barge



## Floating Pontoon

The floating pontoon is normally constructed of individual elements making it modular in design. It can be assembled with a moon pool configuration allowing for a cable percussive rig to be set up in the centre of the pontoon. The pontoon will be fully equipped with all specialist plant and tools required for the site investigation. Figure 5 illustrates a typical floating pontoon being used for marine geotechnical investigation.

The pontoon is manoeuvred from one location to the next by way of a dedicated tug boat. Once on location, the pontoon is fixed in place by the deployment of anchors or spuds. For locations closer to the quay side, the pontoon may be moored to the quay wall, whichever arrangement is more suitable, before the soil investigation works can begin.

Figure 5: Floating Pontoon



It is likely that the platform used will be mobilise and de-mobilise to/from Cork Harbour. Personnel will transfer to and from the platform via a dedicated transfer boat.

Sampling will be performed by use of a cable percussive rig for the surface soil samples, and a rotary coring rig when rock is encountered.

When using the cable percussive rig, disturbed and undisturbed sample recovery is obtained by means of either self-weight or mechanical penetration of cutting tools and hollow tubes into the ground and withdrawing the resulting core.

Rotary coring to obtain samples is by way of wire-line, double-tube or triple-tube core barrels. Depending on the set up, the outer core barrel rotates and the core is obtained within the inner barrel and brought up the surface for removal.

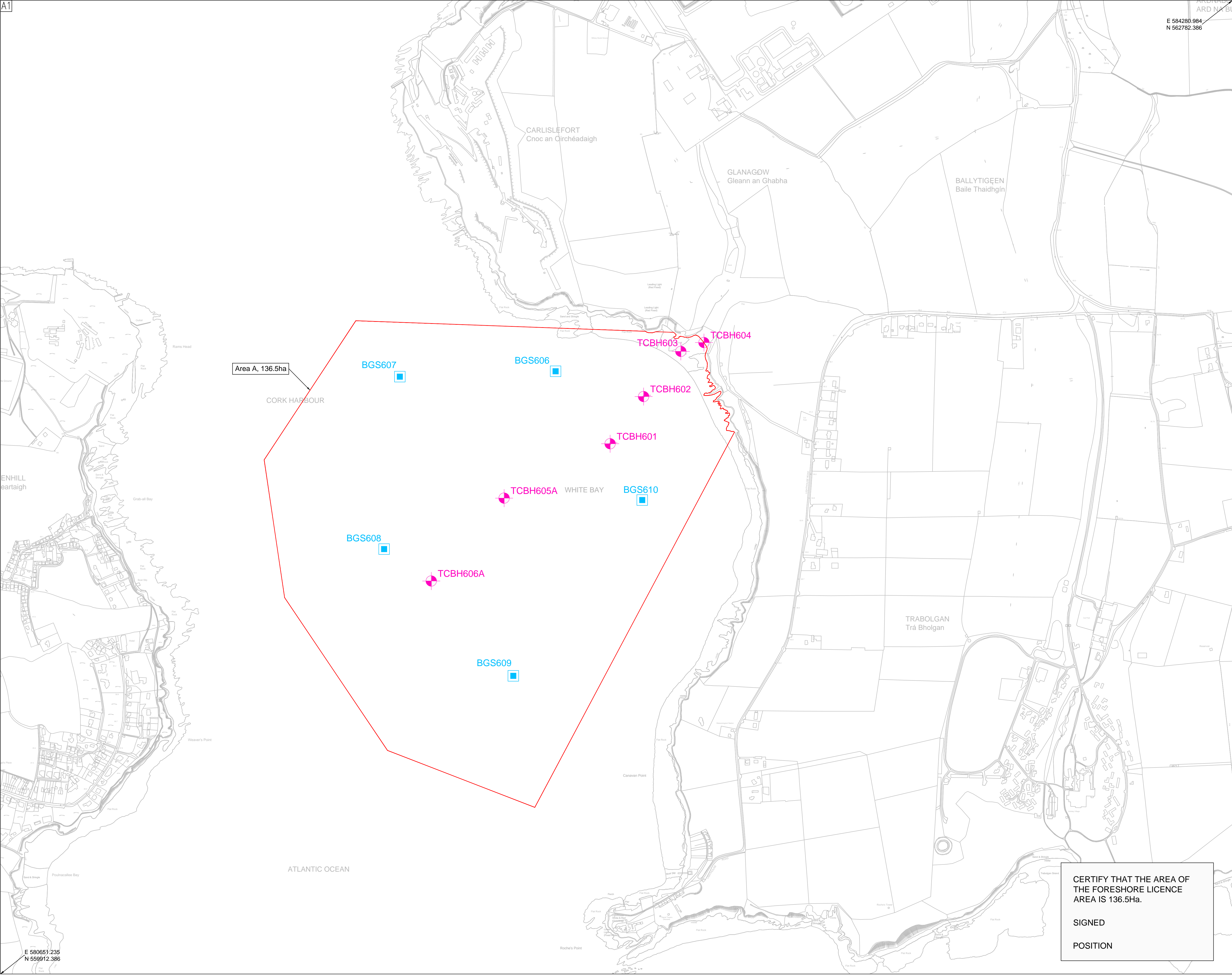
When bedrock is encountered, the cable percussive rig will be replaced with a rotary coring rig to recover rock cores for testing.

All marine plant will be fit for purpose and certified where required and navigation aid lightning will be used on all vessels and plant. The geotechnical investigation works will be coordinated around shipping activities. An exclusion zone will be allocated around the jack-up barge or floating pontoon to demarcate working areas. Navigation is to be undertaken with clearance of Port of Cork Authorities and appropriate notices to mariners will be issued to inform the locations of the investigation works.

# Drawings

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GENERAL NOTES

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W E  
S

**LEGEND:**

● **TCBHXXX** Borehole

■ **BGSXXX** Benthic Grab Sample

— **Foreshore Licence Area (136.5ha)**

**NOTES:**

- ORDNANCE SURVEY IRELAND LICENCE NUMBER EN 3-3-34
- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
- ANY QUERIES OR DISCREPANCIES ARE TO BE REFERRED TO THE EMPLOYER'S REPRESENTATIVE IMMEDIATELY.
- OFFSHORE WORKS SUBJECTED TO FORESHORE LICENCE.

11	30/04/18	FOR INFORMATION		JT	SR
Rev	Date	Description	By	Chk	App

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**CLIENT**

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Working in Partnership

**PROJECT**

UTAS - CORK BUNDLE  
WHITEGATE - AGHADA

**DRAWING TITLE**

FORESHORE LICENCE MAP

**STATUS**

FOR INFORMATION

Date: 04-04-18 Scale: 1:200 Drawn: TD Chk: SR App: MF

Project No: 257589-00 Dwg. No: IW-10015229-03-04-001 Rev: 11

CERTIFY THAT THE AREA OF THE FORESHORE LICENCE AREA IS 136.5Ha.

SIGNED

POSITION



# Schedule of Proposed Marine Ground Investigation Locations – Whitegate Aghada UTAS

Schedule to be read in conjunction with Drawing IW-10015229-03-04-001 and the supporting information provided with the application for the foreshore licence for the ground investigation for the UTAS project at Whitegate Aghada.

GI Number	Type <sup>2</sup>	Length	Depth	A (starting)		B (ending)		Surface Type	Vessel Type	Remarks
				Easting <sup>3</sup>	Northing	Easting	Northing			
BGS606	BGS	N/A	N/A	582241	561754	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
BGS607	BGS	N/A	N/A	581783	561738	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
BGS608	BGS	N/A	N/A	581737	561230	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
BGS609	BGS	N/A	N/A	582117	560857	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
BGS610	BGS	N/A	N/A	582497	561375	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
TCBH601	BH/RC	N/A	15	582402	561541	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
TCBH602	BH/RC	N/A	15	582501	561679	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
TCBH603	BH/RC	N/A	15	582610	561812	n/a	n/a	Beach	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
TCBH604	BH/RC	N/A	15	582671	561833	n/a	n/a	Beach	Jack up barge/Floating Pontoon	Foreshore <sup>9</sup> Arch <sup>8</sup>
TCBH605a	BH/RC	N/A	15	582090	561280	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	
TCBH606a	BH/RC	N/A	15	581875	561136	n/a	n/a	Foreshore	Jack up barge/Floating Pontoon	
GP601	GP	50		582367	561534	582408	561505	Foreshore	Boat with trailing equipment	Geophys <sup>10</sup>
GP602	GP	50		582431	561624	582472	561595	Foreshore	Boat with trailing equipment	Geophys <sup>10</sup>
GP603	GP	50		582495	561714	582536	561685	Foreshore	Boat with trailing equipment	Geophys <sup>10</sup>
GP604	GP	270.5		582373	561499	582530	561720	Foreshore	Boat with trailing equipment	Geophys <sup>10</sup>
Sub bottom	GP	138ha. Approx.						Foreshore	Boat with trailing equipment	Sub-bottom <sup>11</sup>

Notes:

2. BH = Borehole, RC = Rotary Core, ST = Slit Trench, TP = Trial Pit, IP = Inspection Pit, BGS = Benthic Grab sample, PLT = Plate Load Test, WAC = Waste Acceptance Criteria Sample, SPA = Special Protection Area ([www.npws.ie](http://www.npws.ie)), ATT = Archaeological Test Trench.
3. Coordinates given in ITM
8. An archaeologist may be required at these locations. Contact archaeologist before excavating for specific requirements.
9. Benthic surface grab sample. See foreshore license and Section 2.4.6 and 2.9 for restrictions.
10. Geophysical survey including underwater MASW and seismic refraction as per this specification.
11. Sub bottom profiling as per the BOQ and drawings