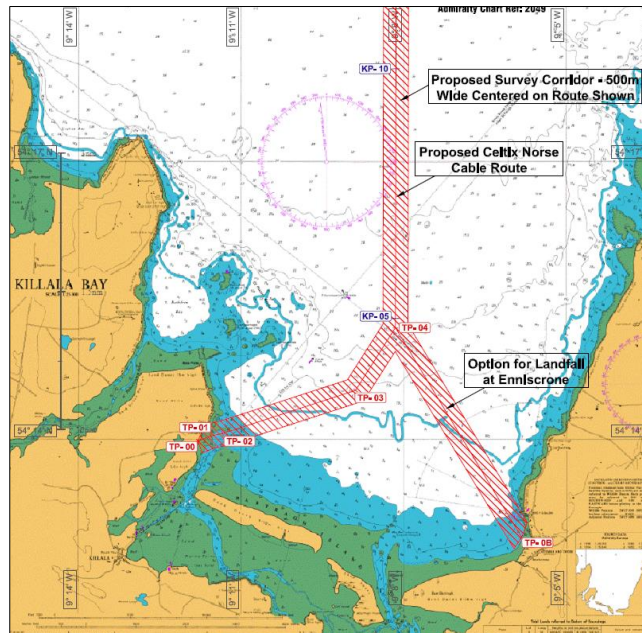




**AQUACOMMS**

## **APPLICATION FOR FORESHORE LICENCE FOR MARINE SURVEY & SITE INVESTIGATION WORKS**



**March 2016**

**MDM**

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## 1.0 INTRODUCTION

1.1 Aqua Comms Ltd. is planning to construct a fibre optic cable, Celtix Norse, extending from a landfall at Killala Bay in Co. Mayo to Trondheim, Norway with a connection to Iceland.



**Figure 1: Schematic of the Planned Network**

1.2 Aqua Comms is a provider of bandwidth infrastructure services including dark fibre, wavelengths and ethernet whose subsea fibre optic networks are designed to meet the needs of content providers, cloud based networks, data centres, IT companies and the global media. The company specialises in sub-sea telecoms and owns and operates the AEConnect transatlantic cable (Killala to New York) and CeltixConnect which runs from Dublin to Anglesey in the UK.

1.3 This document forms part of an application for a Foreshore Licence for Marine Survey and Site Investigations. The works will be carried out predominantly by seaborne electronic equipment (geophysical survey) with some selective sampling of the seabed (geotechnical survey). Once the results of the survey are obtained detailed route selection, design and method statements will be developed as part of a further submission for a Foreshore Licence for installation works.



## 2.0 PLANNED SURVEY ROUTE IN IRISH WATERS

### Offshore

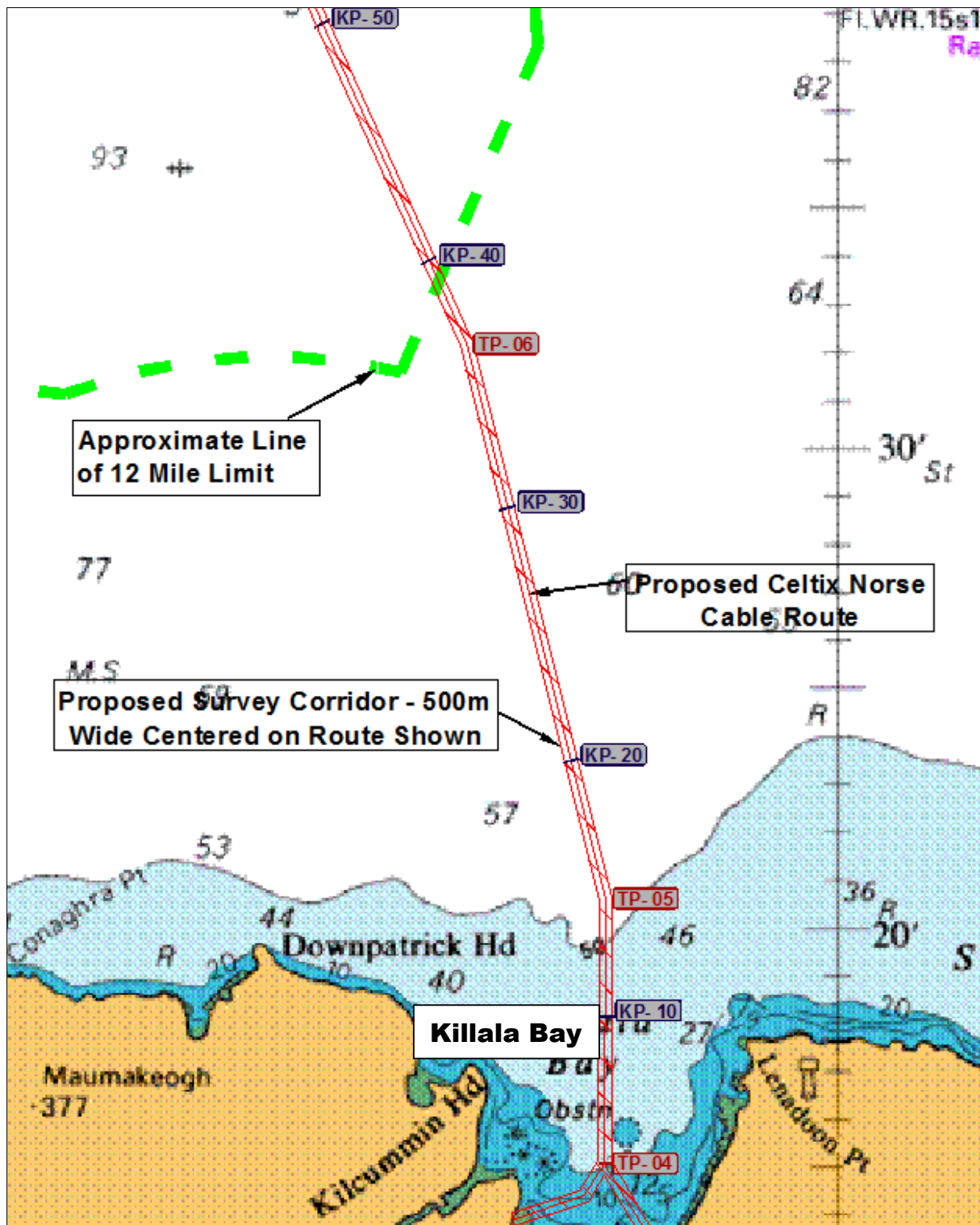
2.1 The general line of the planned survey route is shown in Figure 2 on an Admiralty Chart base. The figure shows the route extending in a northern direction from a point in Killala Bay and then on a northwesterly course as it exits Killala Bay and continues to the 12-mile limit.

2.2 The key Turning Points (TP) for the survey route are shown below in Table 1. Distances from the High Water Mark are shown as Kilometre Points (KP).

### KEY TURNING POINTS (to WGS-84)

Turning Point	Chainage (km)	Latitude	Longitude
TP 0	KP 0.00	54° 13.9960' N	9° 11.7700' W
TP 1	KP 0.287	54° 14.0548' N	9° 11.5248' W
TP 2	KP 0.526	54° 14.0786' N	9° 11.3085' W
TP 3	KP 3.326	54° 14.5388' N	9° 8.8542' W
TP 4	KP 4.813	54° 15.2140' N	9° 8.1125' W
TP 5	KP 14.984	54° 19.9272' N	9° 8.1026' W
TP 6	KP 36.937	54° 31.3295' N	9° 12.0658' W
TP 1B	KP 1.00	54° 13.2180' N	9° 6.3890' W
TP 0B	KP 0.00	54° 12.8643' N	9° 5.7233' W

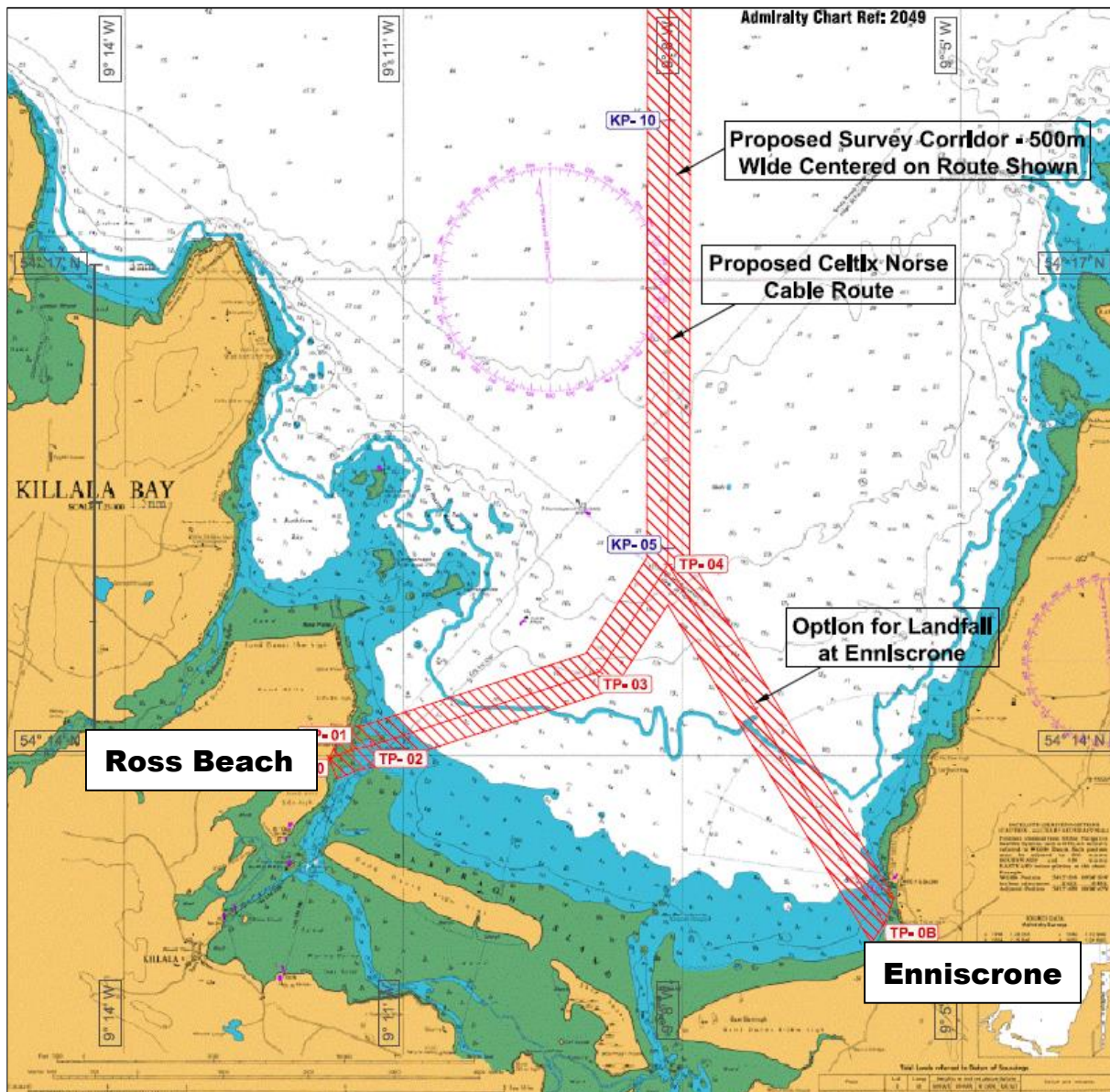
**Table 1: Survey Route Turning Points (WGS-84)**



**Figure 2: Proposed Offshore Survey Route**

## Inshore

2.3 The planned survey route in Killala Bay is shown in Figure 3. The proposed inshore survey route includes for two possible landfall options. One is at the existing landfall for AEConnect at Ross Beach to the west of the bay and the other is at Enniscrone Beach to the east of the bay.



**Figure 3 – Proposed Inshore Survey Route in Killala Bay**



## Landfalls

2.4 The proposed survey includes options for a landfall at either Ross Beach or Enniscrone Beach and the general location of the possible landfalls is shown in Figure 4.



**Figure 4 – Landfall Location Options on Discovery Map**



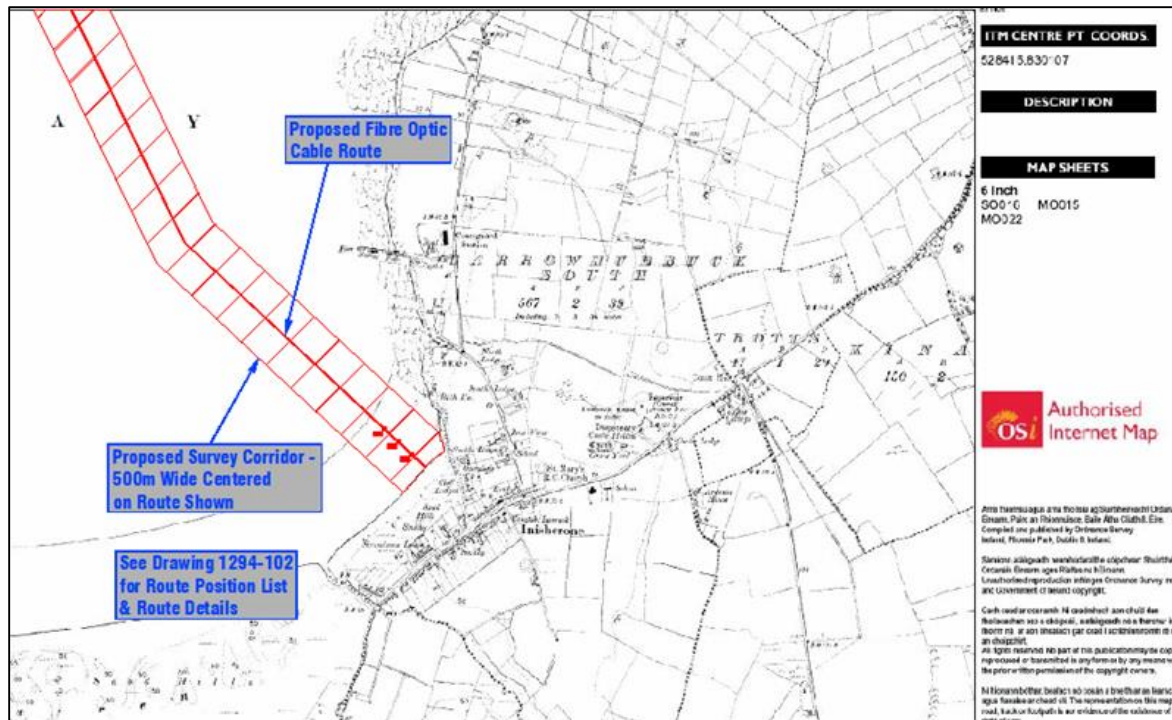


## Foreshore Application Report

### Celtix Norse Site Investigation Works

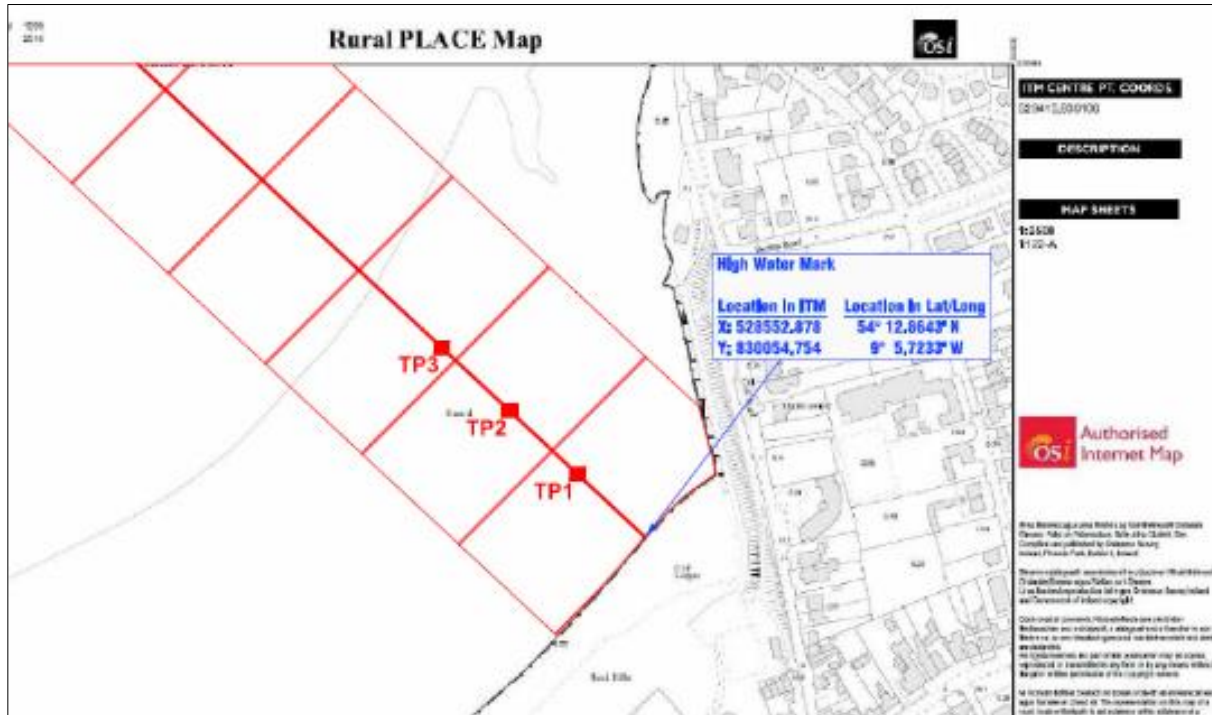
## Landfall Option – Enniscrone Beach

2.7 The location of the landfall option at Enniscrone Beach is shown on the 6" to 1 mile Ordnance Survey map and the 1/2,500 Ordnance Survey map in Figures 7 & 8 respectively.



**Figure 7 – Enniscrone Landfall Location Option on 6" Ordnance Survey Map**





**Figure 8 – Enniscrone Landfall Location Option on 1/2,500 Ordnance Survey Map**

2.8 The survey and site investigations requirements at Enniscrone are set out in the following section.

### **3.0 PROPOSED MARINE SURVEY & SITE INVESTIGATIONS**

3.1 The principal objective of the Marine Survey & Site Investigations is to ascertain a feasible and safe route for cable system design, deployment, survivability and subsequent maintenance with due regard for environmental considerations. The survey will also allow decisions to be made about cable armouring and burial. The survey will identify all route obstacles and cable hazards and provide detailed information to support cable route and installation engineering. The site investigations will enable “ground-truthing” of the seabed along the route.

3.2 The Survey Operations will be broken down into separate but overlapping areas, with boundaries defined by water depth as specified in the technical requirements outlined below. These water depth boundaries may be adjusted due to limitations of the survey vessel(s) and survey gear. The surveys will ensure that there are no gaps or unsurveyed areas between all of the different survey operations. For the marine route survey, the sidescan ranges will be limited to those providing the greatest resolution possible (able to resolve a 0.5m object or better), while following the required minimum line spacing and overlap. The maximum speeds outlined will be used as guidelines. Bathymetry data collection will, at minimum, comply with the requirements in this document or with International Hydrographic Office standards (S44).

3.3 Survey line spacing is to be designed to ensure adequate coverage and overlap of geophysical measurements.

3.4 For swathe bathymetry, “20% overlap” signifies that adjacent acquisition swathes within the survey corridor overlap by 20%. For side scan sonar (SSS), 100% overlap requires two passes of complete coverage over a given area of seafloor, with the two passes each ensonifying the seafloor from opposite directions to ensure targets are adequately imaged.

3.5 In order to ensure data continuity, the following overlaps between survey regions are to be established as a minimum;

- Landfall Site Survey to Diver Swim Survey – 50m overlap
- Diver Swim Survey to Small Boat Survey – 50m overlap
- Small Boat Survey to Offshore Survey – 500m overlap

### **Landfall Site Survey & Site Investigations (Enniscrone Only)**

3.6 The Landfall Site Survey & Site Investigations apply to Enniscrone only and are not required at Ross.

3.7 A topographic survey of the beach along the line of the proposed cable route is required from the carpark to the low water mark.

3.8 Site Investigations at Enniscrone will consist of;

- 3 No. Trial Pits on the beach (2.5m depth, excavated and immediately reinstated by JCB)
- Bar probes on the beach (effectively non-intrusive investigation)
- Bar probes from the Low Water Line to the 3 metre contour (effectively non-intrusive investigation)

### **Diver Swim Survey (Ross & Enniscrone)**

3.9 The Diver Swim Survey will extend from the low water line outward to the small boat survey limits in accordance with the defined overlaps. A diver swim rope with 25m gradations will be positioned along the route. Dive lines will be configured to provide representative coverage across the entire survey corridor (nominally spaced at 125m).

3.10 Bathymetry will be measured by diver depth gauge at each 25m gradation. Geomorphology will be determined by underwater video along the length of the diver swim rope. The diver video will be undertaken along each line in the survey swathe; divers will use a dive slate or other clearly written method to indicate Kilometre Point (KP) and water depth at the specified gradations along the rope.

3.11 Tie lines will be nominally spaced at 125m parallel to shore and will verify primary survey data within the Diver Swim area. Bathymetry and seabed composition are to be noted along tie lines. A minimum of 2 tie lines will be performed.

3.12 The Diver Swim Survey will also investigate and identify any obstacles found during the Small Boat Survey up to safe diving limits. Two spot dives will be considered part of the standard scope of work.

Survey Area	Depth Range	Corridor	Min. # of Lines
Diver Swim	0 (LAT) to 3m	250m	5

**Table 2: Diver Swim Survey Requirements**

3.13 The Diver Swim Survey will comply with the requirements of the Underwater Archaeology Unit of the Department of Arts, Heritage & the Gaeltacht.

### **Small Boat Survey**

3.14 The area extending seaward from the 3m water depth contour and inshore of the safe working draft limits of the primary survey vessel will be accurately surveyed with a small craft using Multibeam Echosounder (MBES), sidescan sonar and sub-bottom profile equipment. Sub-bottom profile equipment will be able to discern the nature and density of the upper 3 meters of seabed, and will be used on a non-interfering basis with other sounding systems. Tie lines will be performed to verify primary survey data and will have a nominal spacing of 10 times the primary line spacing with a minimum of two tie lines. A minimum of seven survey lines, based upon the Survey RPL, is required.

3.15 Features such as shallow reefs, surge channels, debris fields, archaeological features or anything that could be a hazard to the cable or installation team will be noted. General reconnaissance of the survey corridor beyond the planned survey lines and tie lines may be necessary to describe the seabed as accurately as possible. A diver swim survey (spot dive) may be required to investigate and identify any obstacles or

archaeological features found during the small boat survey up to safe diving limits. A line plan showing number of survey lines as a function of depth will be provided prior to start of survey operations.

Survey Area	Depth Range	Corridor	Min. # of Lines	Min. Overlap	Max. Speed
Small Boat	3m to 15m	500m	7	SSS: 100% MBES Bathy: 20%	4 knots

**Table 3: Small Boat Survey Requirements**

### Offshore Survey

3.16 A continuous bathymetric swathe (Multibeam Echosounder), along with side scan sonar imagery and sub-bottom profile will be obtained, centred on the preliminary route and along all wing lines needed to complete the corridor coverage. A minimum depth accuracy of 0.5% is required. Sub-bottom equipment will be able to discern the nature and density of upper 3m of seabed, and is to be used on a non-interfering basis with other sounding systems. Additional sounding lines may be necessary to develop any obstacles or archaeological features that may be encountered, and/or to meet the overlap and corridor requirements.

Survey Area	Depth Range	Corridor	Min. # of Lines	Min. Overlap	Max. Speed
Offshore	> 15m	500m	3	SSS: 100% MBES Bathy:20%	4 knots

**Table 4: Offshore Survey Requirements**

## **Seabed Sampling**

3.17 Seabed sampling will be required at locations covered by the Small Boat and Shallow Water Surveys. The proposed sampling locations (21 No.) are shown on the Drawings 1294-101 & 102 in Appendix 3.

3.18 A minimum of two attempts will be made at each sampling location to acquire a suitable seabed sample. If an acceptable sample is achieved on the first attempt, there is no need to perform a second attempt.

3.19 An acceptable sample is defined as;

- Grab Sample – recovery of approximately a full bucket of soils. Recovery of rocks and/or large size granular material will be taken as indication of a hard seabed and be deemed an acceptable sample.
- Gravity Core – recovery of no less than a 2m deep core of soil. If stiff or hard soils are encountered below 1m of seabed and are clearly indicated in the sample, a 1m+ soil sample will be deemed acceptable. Any sample site yielding less than 1m of recovery must be investigated a second time unless there is obvious damage to the coring equipment indicating a hard or rocky substrate.
- CPT – Penetration to the 2m below seabed. Any push resulting in less than 2m penetration will warrant a second attempt.

Survey Area	Depth	Type	Avg. Spacing	No. of Samples
Small Boat	3 – 15 m	Grab Sampler	1 per 500 m	13
Offshore	> 15m	Gravity Corer (GC) or Cone Penetrometer (CPT)  Grab Sampler (After GC/CPT Failure)	1 per 5km	8

**Table 5: Seabed Sampling Requirements**

3.20 The sampling required on the beach at Enniscrone will involve 3 No. Trial Pits at 50m centres starting seaward of the High Water Mark. The 3 No. Trial Pits will be excavated, logged, photographed and backfilled in a single intertidal period of less than 1 hour. The trial pits will be backfilled with the original excavated materials in the sequence in which they are excavated.

3.21 A summary Method Statement for excavation of the Trial Pits is as follows;

- 3 No. Trail Pits
- JCB or equivalent.
  - Depth 2.5m.
  - Excavate sand and place to one side. Excavate substrate and place separate from sand. Measure, log and photograph each Trial Pit.
  - Backfill in sequence compacting with bucket of back-hoe as the backfilling proceeds.



3.22 The bar probes on the beach and out to the 3m contour are simply to prove the depth of sand, gravel or soft material and are effectively non-intrusive.

3.23 The site investigations in the area from the Low Water Line to the 15m contour will be undertaken from a small vessel having the appropriate draft.

3.24 The site investigations seaward of the 15m contour will be undertaken from a larger sea-going vessel.

3.25 The marine survey and site investigations will be undertaken in compliance with best practice and having regard for the protection of marine mammals.

3.26 The marine survey and site investigations will be undertaken along the route line shown on the Foreshore Licence Map Drawings. However a 500m wide route corridor is shown to allow for local diversions in the event of obstructions or other routing considerations.

3.27 The schedule of Site Investigations is set out in Table 1

Survey Area	Depth	Type	Avg. Spacing
Landfall	HWM - LWM	Trial Pit	1 per 50 m
Landfall	HWM - LWM	Bar Probing	1 per 25 m
Diver Swim	0 – 3m Water Depth	Bar Probing & Diver	1 per 25 m

**Table 6: Site Investigations Schedule**

3.28 The overall scope of the Site Investigations is as follows

- Trial Pits 3 No. on the beach at Ennsicrone
- Bar Probes 10 No. on the beach at Ennsicrone
- Bar Probes 10 No. from Low Water to the 3.0m contour
- Grab Samples 13 No. from the 3m to the 15m contour
- Gravity Cores or 8 No. from the 15m contour to the  
Cone Penetration Tests 12-Mile Limit

## 4.0 SURVEY EQUIPMENT PARAMETERS

4.1 The marine surveys will include

- Bathymetry
- Side Scan Sonar
- Sub-Bottom Profiling
- Magnetometer

### Equipment and Procedures

4.2 The marine survey will be carried out in compliance with the Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters and with the General Requirements for a Geophysical Survey for Archaeological Purposes.

4.3 The survey equipment acoustic properties have the following characteristics;

Equipment Type	Frequency (Energy level in dB re 1 $\mu$ Pa)
<b>Dual Frequency Single Beam Echosounder –</b> Reson Navisound 420	33 and 210kHz (168 – 174)
<b>Dual Frequency Side Scan Sonar -</b> Edgetech 4200 Sidescan Towfish	100 and 400kHz (226 effective)
<b>Sub-bottom Profiler -</b> Geoacoustics 4 x 4 Hull-mounted SBP Pinger System	3 – 7.5kHz (-225)

4.4 In the case of the Small Boat Survey the survey line spacing will be set at 50m for the Side Scan Sonar. In deeper water the spacing will increase.

4.5 Specific soft-start procedures (to comply with the Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters) will be developed and incorporated in the project execution plan before mobilisation.

4.6 The duration of noise-generating surveys will be reduced to the minimum necessary to collect results of sufficient quality.

4.7 The survey will be undertaken by a specialist survey vessel having experience of marine survey and having approved appropriate survey equipment.

4.8 Details of the survey vessel and of the survey equipment to be used will be made available prior to commencement of the survey. The data to be provided will include;

- Name of vessel
- Name of Captain
- Name of Client's Representative
- Contact details for the vessel
- Details of Multi-Beam Equipment including;
- The sound intensity, the frequency of pitch and the tone or bandwidth for the Echo Sounder, the Side Scan Sonar and the Sub-Bottom Profiler.

## **5.0 MAPPING**

### **Landfall Option at Ross Beach**

5.1 The general location of the Landfall Option at Ross Beach is shown in Figure 5 respectively on a 6 inch OS map.

5.2 The detailed location of the landfall, incorporating the inshore routing and survey corridor are shown in Figure 6 on a 1/2500 OS map.

5.3 All OS maps are presented as diagrams in this report and are issued true to scale in the corresponding drawings in Appendix 3.

### **Landfall Option at Enniscrone Beach**

5.4 The general location of the Landfall Options at Enniscrone is shown in Figure 7 on a 6 inch OS map.

5.5 The detailed location of the landfall, incorporating the inshore routing, Trial Pit locations and survey corridor is shown in Figure 8 on a 1/2500 OS map.

5.6 All maps are presented as diagrams in this report and are issued true to scale in the corresponding drawings in Appendix 3.

### **Site Investigation Corridor**

5.7 The site investigation corridor is shown at a width of 100 metres on either side of the planned centre-line for the inshore area. This width increases to 250metres on either side of the centre-line (a 500m corridor) beyond the 3 metre contour.

## **Killala Bay**

5.8 The route of the cable in Killala Bay is shown in Figure 3 on the Admiralty Chart base. The map shows the route, key Turning Points, Kilometre Points, and Sampling Points.

## **Offshore**

5.9 The route of the cable in the offshore area is shown in Figure 2 on an Admiralty Chart base. The map shows the line of the route, key Turning Points, Kilometre Points, the Sampling Points, and the 12 Mile Limit.

## **6.0 MARINE LIAISON & CONSULTATIONS**

### **Sea Fisheries Protection Agency**

6.1 It is proposed to contact the Sea Fisheries Protection Agency (SFPA) to seek advice regarding the timing of survey works to avoid clashing with spawning periods of marine fish in the area. This will reduce any potential for noise damage to larval and juvenile life stages of fish when they are more susceptible to noise damage than adults.

6.2 It is proposed to appoint a Fisheries Liaison Officer for the inshore and offshore sections of the survey. The appointment of a Fisheries Liaison Officer would have the purpose of keeping commercial fishermen informed of the survey works including time lines, dates of sampling and locations of sampling vessels. The Fisheries Liaison Officer may also inform the survey team of commercial activity and locations of fishing nets or pots that may be impacted by the survey activities.

6.3 The SFPA will be requested to advise on consultation with the relevant fishermen's producer organisations on details of the project.

### **National Parks & Wildlife Service**

6.4 It is proposed to appoint a Marine Mammal Observer on board the survey vessel for the small boat survey in Killala Bay.

### **Irish Coast Guard**

6.5 It is proposed to liaise with the Irish Coast Guard to arrange appropriate radio / nav-text broadcast warnings to advise shipping approaching the survey area.

### **Marine Notice**

6.6 It is proposed to publish a Marine Notice through the Marine Safety Directorate giving a general description of operations and approximate dates of commencement and completion.



## 7.0 NATURA 2000 SITES / APPROPRIATE ASSESSMENT

7.1 There are various Natura 2000 sites in the general area of Killala Bay and offshore along the proposed survey route. Accordingly, an Appropriate Assessment Screening Report was commissioned and this was carried out by Altemar Ltd. as part of this application process. The route which has been selected for the site investigations has no significant impact on the various Natura 2000 sites and a copy of the formal Appropriate Assessment Survey Report is incorporated in Appendix 1.

7.2 The overall conclusions from the Appropriate Assessment Screening report are as follows;

*The site investigations and marine survey for the proposed fibre-optic cable landing at Ross Beach or Enniscrone Beach are minor in nature and local in extent. However, site investigations would occur within an SAC and SPA. In particular the digging of trial pits on Enniscrone Beach may cause minor disturbance of overwintering/ passage migrants bird populations. It is planned that the works will be carried out in September 2016 before overwintering populations are present. However, mitigation measures are proposed including having an ecologist present to initiate or halt site investigations based on the presence/absence of species of conservation importance. This is particularly important for roosting birds on the intertidal of Enniscrone Beach. No significant impact on associated NATURA 2000 sites is foreseen.*

# **APPENDIX 1**

## **APPROPRIATE ASSESSMENT SCREENING REPORT**

## NATURA Impact Statement



Appropriate Assessment Screening for site investigations and marine survey (Foreshore Licence Application) for the Aqua Comms Celtix-Norse fibre-optic cable landing in Killala Bay, Co. Mayo.

**11<sup>th</sup> March 2016**

**Prepared by:**  
Bryan Deegan (MCIEEM) of Altemar Ltd.

**On behalf of:**  
McMahon Design & Management Ltd.

<b>Document Control Sheet</b>			
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Report	Appropriate Assessment Screening		
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## **1. Introduction**

An Appropriate Assessment is an assessment of the potential effects of a proposed project or plan, on its own, or in combination with other plans or projects, on one or more NATURA 2000 sites (Special Areas of Conservation (SAC) or Special Protection Areas (SPA)).

The following Appropriate Assessment (Screening Stage) has been prepared by **Altamar Ltd.** at the request of McMahon Design & Management Ltd. as part of the site investigations and marine survey application for a Foreshore Licence. The Foreshore Licence survey relates to the groundtruthing (site investigations) and marine survey of the potential route of a fibre-optic cable, from Ireland to Norway having a landfall in Killala Bay, Co. Mayo.

As part of an application for a Foreshore Licence an Appropriate Assessment screening report has been prepared. The purpose of the report is to assess the potential impact of site investigations and marine survey on NATURA 2000 sites and species individually or in combination with other plans or projects.

### **Background to Altamar Ltd.**

Since its inception in 2001, Altamar has been delivering ecological and environmental services to a broad range of clients. Operational areas include residential, infrastructural, renewable, oil & gas, private industry, local authorities, EC projects and State/semi-State Departments. Bryan Deegan (MCIEEM) is the managing director of Altamar. Bryan is an environmental scientist and marine biologist with 20 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He has extensive experience in environmental data collation, project management, GIS, habitat mapping, appropriate assessment, environmental impact assessment and in renewable energy.

Bryan Deegan holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture). He is also a JNCC approved Marine Mammal Observer, trained in Passive Acoustic Monitoring and holds HSE Part IV & III Commercial Diving qualifications.

## 2. Background to the Appropriate Assessment

The Habitats Directive 92/43/EEC (together with the Birds Directive (79/409/EEC)) forms the cornerstone of Europe's nature conservation policy. The directive protects over 1000 animals and plant species and over 200 "habitat types" which are of European importance. In the Directive, Articles 3 to 9 provide the legislative means to protect habitats and species of European Community interest through the establishment and conservation of an EU-wide network of conservation sites (NATURA, 2000). These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive), Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect NATURA 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment:

*"Any plan or project not directly connected with or necessary to the management of the [NATURA 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the component national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public"*

As outlined in the guidance document on Article 6(4) (January 2007):

*"Appropriate assessments of the implications of the plan or project for the site concerned must precede its approval and take into account the cumulative effects which result from the combination of that plan or project with other plans or projects in view of the site's conservation objectives. This implies that all aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field.*

*Assessment procedures of plans or projects likely to affect NATURA 2000 sites should guarantee full consideration of all elements contributing to the site integrity and to the overall coherence of the network, both in the definition of the baseline conditions and in the stages leading to identification of potential impacts, mitigation measures and residual impacts. These determine what has to be compensated, both in quality and quantity. Regardless of whether the provisions of Article 6(3) are delivered following existing environmental impact assessment procedures or other specific methods, it must be ensured that:*

- *Article 6(3) assessment results allow full traceability of the decisions eventually made, including the selection of alternatives and any imperative reasons of overriding public interest.*
- *The assessment should include all elements contributing to the site's integrity and to the overall coherence of the network as defined in the site's conservation objectives and Standard Data Form, and be based on best available scientific knowledge in the field. The information required should be updated and could include the following issues:*
  - *Structure and function, and the respective role of the site's ecological assets;*
  - *Area, representativity and conservation status of the priority and nonpriority habitats in the site;*
  - *Population size, degree of isolation, ecotype, genetic pool, age class structure, and conservation status of species under Annex II of the Habitats Directive or Annex I of the Birds Directive present in the site;*
  - *Role of the site within the biographical region and in the coherence of the NATURA 2000 network; and,*
  - *Any other ecological assets and functions identified in the site.*



- *It should include a comprehensive identification of all the potential impacts of the plan or project likely to be significant on the site, taking into account cumulative impacts and other impacts likely to arise as a result of the combined action of the plan or project under assessment and other plans or projects.*
- *The assessment under Article 6(3) applies the best available techniques and methods, to estimate the extent of the effects of the plan or project on the biological integrity of the site(s) likely to be damaged.*
- *The assessment provides for the incorporation of the most effective mitigation measures into the plan or project concerned, in order to avoid, reduce or even cancel the negative impacts on the site.*
- *The characterisation of the biological integrity and the impact assessment should be based on the best possible indicators specific to the NATURA 2000 assets which must also be useful to monitor the plan or project implementation.”*

## *Plans & Projects*

### *Plans*

*Plans, as defined by NPWS (2009), include all statutory and non-statutory land use, framework and sectoral plans and strategies to the extent that they have the potential to have significant effects on a NATURA 2000 site. This incorporates ‘plans and programmes’ covered by the SEA Directive 11, and other plans and strategies, including those that are designed or intended to benefit the environment or heritage, such as Heritage and Biodiversity plans, recreation/ amenity plans or strategies, and River Basin Management Plans.*

### *Project*

*The Commission (EC, 2006) puts the position as follows: “such a definition of project[i.e. definition of ‘project’ from the ELA Directive] is relevant to defining the concept of plan or project as provided for in the Habitats Directive, which, seeks, as does Directive 85/337, to prevent activities which are likely to damage the environment from being authorised without prior assessment of their impact on the environment”, and goes on to say that “the fact that the activity has been carried on periodically for several years on the site concerned and that a licence has to be obtained for it every year does not in itself constitute an obstacle to considering it, at the time of each application, as a distinct plan or project within the meaning of the Habitats Directive”.*

### 3. Stages of the Appropriate Assessment

This Appropriate Assessment screening was undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC 2001) and the European Commission Guidance *'Managing NATURA 2000 Sites'*, in addition to the December 2009 publication from the Department of Environment, Heritage and Local Government; 'Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.'

In order to comply with the above Guidelines, the Appropriate Assessment has been structured as follows:

1) Screening stage:

- Description of the proposed project;
- Identification of NATURA 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result from the proposed project;
- Assessment of the significance of the impacts identified above on site integrity. Exclusion of sites where it can be objectively concluded that there will be no significant effects; and,
- Conclusions.

2) Appropriate Assessment Stage(Not relevant to this Appropriate Assessment):

- Description of the NATURA 2000 sites that will be considered further;
- Description of significant impacts on the conservation feature of these sites likely to occur from the project; and,
- Mitigation/Recommendations/Conclusions.

3) Alternative Solutions (Not relevant to this Appropriate Assessment):

If mitigation is possible that enables a risk to be avoided fully, then, subject to other necessary approvals, the project or plan may proceed. If mitigation measures are insufficient, or are not actually practicable and achievable to avoid the risk entirely, then, in the light of a negative assessment, the plan or project may not proceed. A wider search for alternative solutions may need to be considered – Stage 3.<sup>1</sup>

4) Imperative Reasons of Overriding Public Interest (IROPI)/Derogation. (Not relevant to this Appropriate Assessment):

Stage 4 is the main derogation process of Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a NATURA 2000 site to proceed in cases where it has been established that no less damaging alternative solution exists. The extra protection measures for Annex I priority habitats come into effect when making the IROPI case.

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<sup>1</sup> (DoEHLG, 2009) Appropriate Assessment of Plans and projects in Ireland: Guidance for planning authorities.

## 4. Screening Stage

### *a) Management of the Site*

The project is not directly connected with, or necessary to, the management of NATURA 2000 sites.

### *b) Relevance to the County Development Plan*

As outlined in the Draft Mayo County Development Plan 2014-2020 “it is an objective of the Council to support and facilitate the delivery of high capacity ICT infrastructure, broadband networks and digital broadcasting in the County having regard to the Government Guidelines Telecommunications Antennae and Support Structures - Guidelines for Planning Authorities 1996 (DoEHLG) and Circular Letter PL 07/12 and where it can be demonstrated that the development will not have significant adverse effects on the environment including the integrity of the NATURA 2000 network.”

“The Council recognises the importance of telecommunication infrastructure which is important in removing the peripheral barrier that the county experiences. It is also recognised that the location of telecommunication infrastructure is dictated by service provision and hence each application will be determined on its own merits.”

“The Council will also support innovation in infrastructure such as the development of Renewable Energy, Information and Communication Technology and Smarter Travel.”

### *c) Description of the Proposed Project*

Aqua Comms Ltd. is a provider of bandwidth infrastructure services including dark fibre, wavelengths and ethernet whose subsea fibre optic networks are designed to meet the needs of content providers, cloud based networks, data centres, IT companies and the global media. The company specialises in sub-sea telecoms and owns and operates the AEConnect transatlantic cable (Killala to New York) and CeltixConnect which runs from Dublin to Anglesey in the UK. Aqua Comms Ltd. is planning to construct a fibre-optic cable, Celtix Norse, extending from a landfall at Killala Bay in Co. Mayo to Trondheim, Norway with a connection to Iceland.



**Figure 1.** Schematic of the Planned Network

The site investigation works will be carried out predominantly by seaborne electronic equipment (geophysical survey) with some selective sampling of the seabed (geotechnical survey). Once the results of the survey are obtained detailed route selection, design and method statements will be developed as part of a further submission for a Foreshore Licence for installation works. An EcIA and Natura Impact Statement (AA or AA screening) will also be carried and submitted with the Foreshore Licence application for installation works.

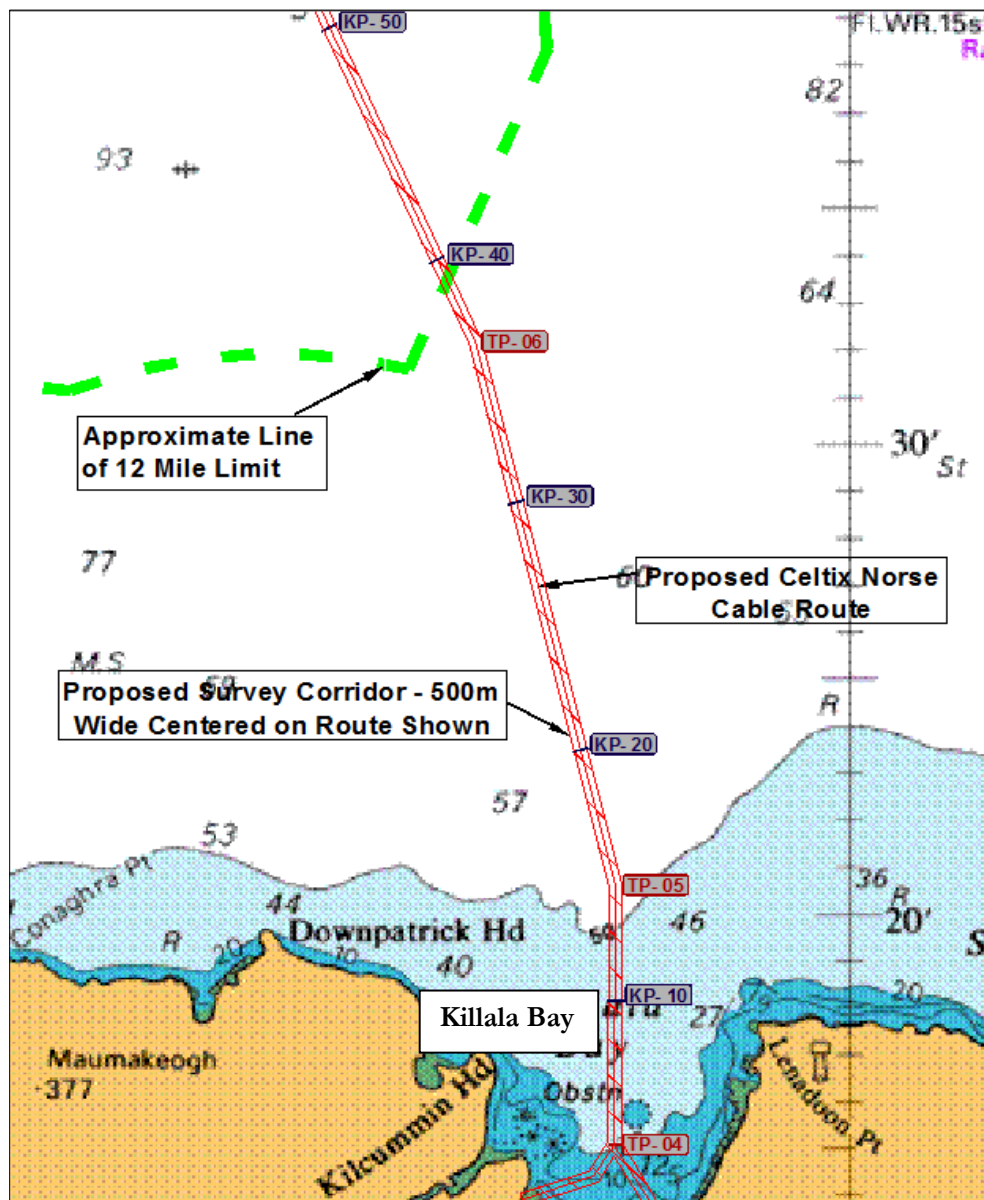
## Alternative Sites

As part of the AEConnect trans-Atlantic fibre optic cable project, Emerald Networks have previously investigated landfall sites on the west coast of Ireland,. During the AEConnect project (2013-2015), following a desk based and visual review two areas Belmullet Peninsula and Killala Bay were selected for further assessment. Detailed investigations were carried out at four sites at Belmullet and at four sites in the less exposed Killala Bay. Consideration of environmental, exposure, substrate and engineering parameters resulted in Ross Beach at Killala Bay being the optimal landfall for the AEConnect fibre-optic cable which made landfall in 2015. As part of the Celtix-Norse route assessment an additional site, at Enniscrone Beach in Killala Bay is being investigated.

## Planned Route in Irish Waters

### *Offshore Route*

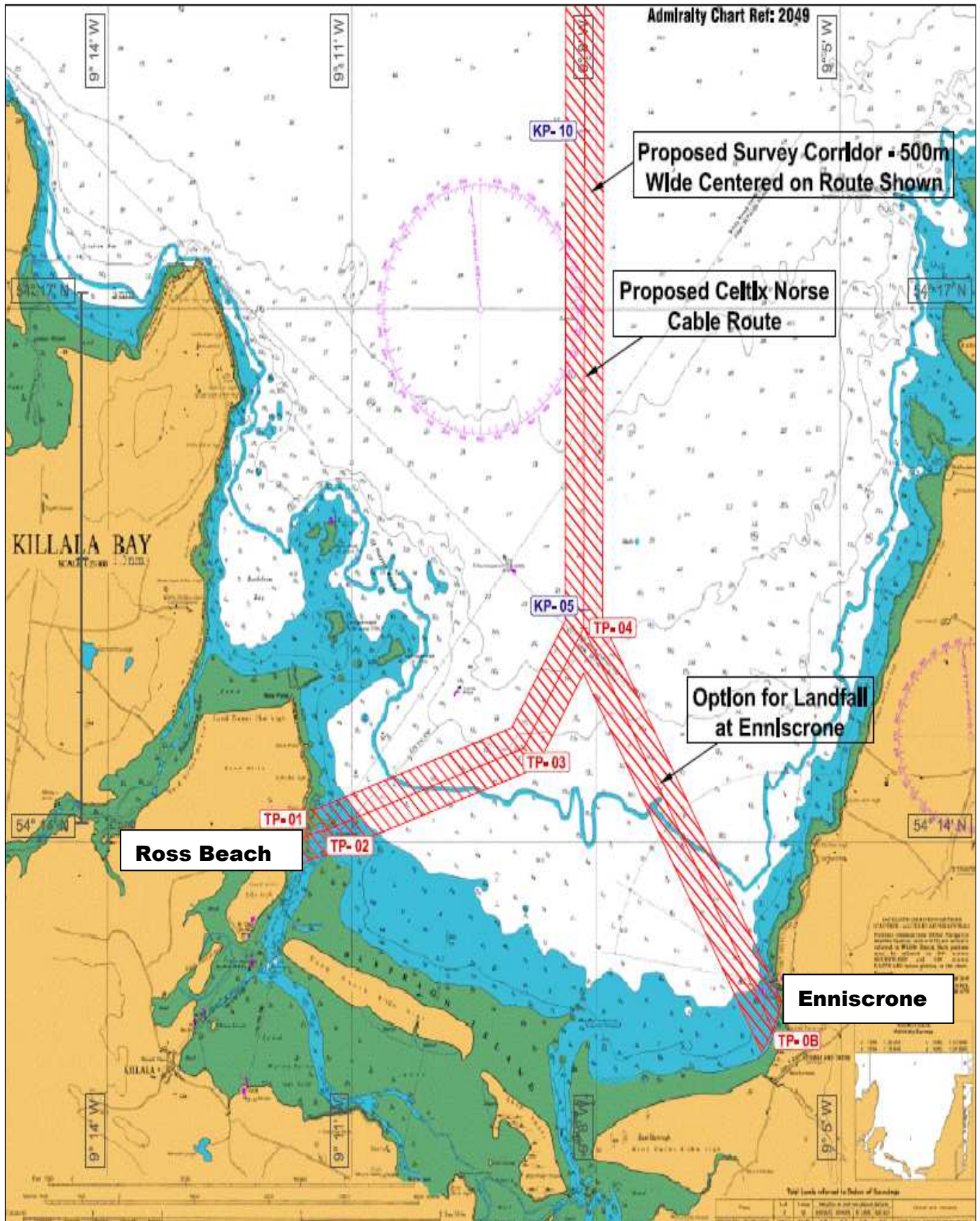
The general line of the planned survey route within territorial waters is shown in Figure 2. The figure shows the route extending in a northern direction from a point in Killala Bay and then on a northwesterly course as it exits Killala Bay and continues to the 12-mile limit. From here the proposed route extends down the continental shelf slope and then up the Rockall Trough in to UK waters. The proposed route then passes through the Faroe-Shetland Channel to Norway.





### *Inshore Route*

The planned survey route in Killala Bay is shown in Figure 3. The proposed inshore survey route includes for two possible landfall options. One is at the existing landfall for AEConnect at Ross Beach, Co. Mayo, to the west of the bay and the other is at Enniscrone Beach, Co. Sligo, to the east of the Bay.



**Figure 3.** Proposed Inshore Survey Route in Killala Bay (Source MDM, 2016).

## Landfall Options

### A) Ross Beach

The location of the landfall option at Ross Beach is shown on the Ordnance Survey map and the 1/2,500 Ordnance Survey map in Figures 4 & 5 respectively. The landfall option at Ross Beach will make use of the existing AEConnect duct that links the foreshore to the beach manhole. There is no requirement for any site investigation or intertidal survey works at Ross Beach.

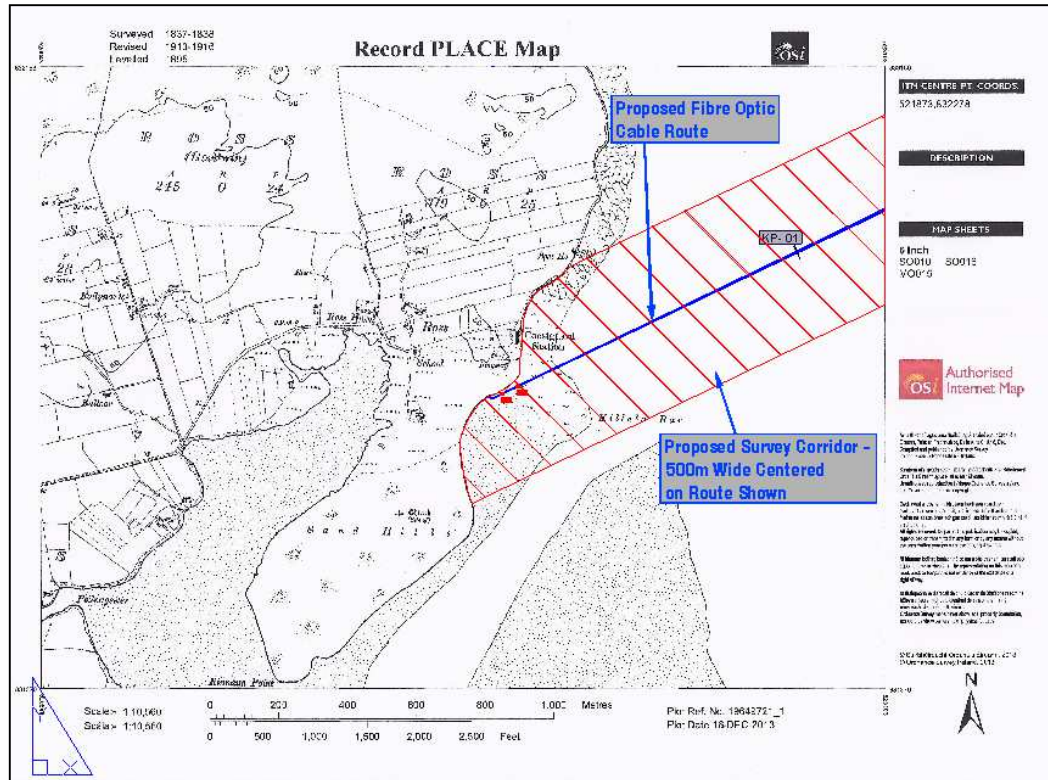


Figure 4. Ross Beach Landfall Location on 6'' Ordnance Survey Map (Source MDM, 2016)

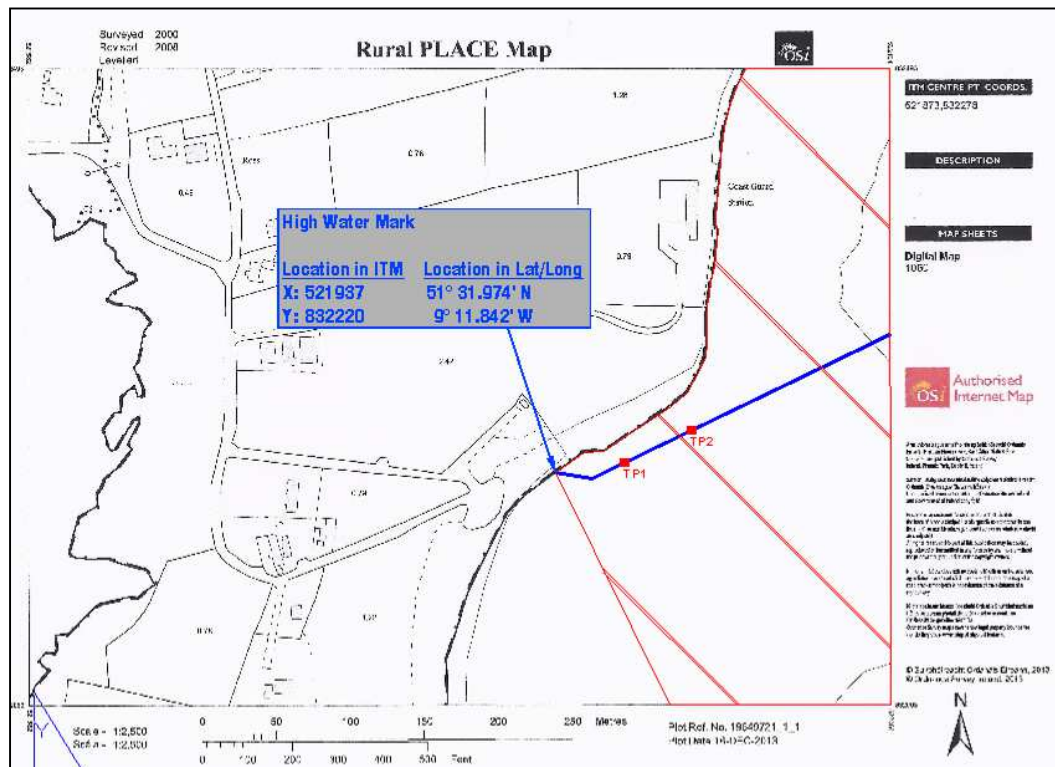


Figure 5. Landfall Location at Ross Beach on 1/2,500 Ordnance Survey Map (Source MDM, 2016)



## B) Enniscrone Beach

The location of the landfall option at Enniscrone is shown in Figure 6. The proposed route extends from the carpark and along the public beach and into the subtidal.



**Figure 6.** Landfall Option at Enniscrone Beach (Source MDM, 2016)

## Site Investigations

The objectives of the Site Investigation survey are to “ground-truth” the Geophysical Data along the route and to confirm a safe route for cable design, cable installation, survivability and subsequent maintenance. The survey will enable decisions to be made about the cable armouring specification and cable burial. The planned survey route in Killala Bay is shown in Figure 3.

In order to ensure data continuity, the following overlaps between survey regions are to be established as a minimum

- Landfall Site Survey to Diver Swim Survey – 50m overlap
- Diver Swim Survey to Small Boat Survey – 50m overlap
- Small Boat Survey to Offshore Survey – 500m overlap

## Proposed timing of Site Investigations

It is proposed to carry out site investigations in September 2016. This survey window allows for sufficient time for the Foreshore Licence application process to be completed, while ensuring that the site investigations within the Enniscrone and Ross Strand areas are complete, prior to the arrival of overwintering birds.

### Landfall Site Survey & Site Investigations (Enniscrone Only)

The Landfall Site Survey & Site Investigations apply to Enniscrone only and are not required at Ross Beach due to the existence of the relevant data from the 2015 survey and the existing duct being in place. At Enniscrone Beach, a topographic survey of the beach along the line of the proposed cable route (Figure 6) is required from the carpark to the low water mark. In addition the following are required (Table 1):

**Table 1.** Site Investigations Schedule

Survey	Survey Area	Depth	Type	Avg. Spacing	Number
a	Landfall	HWM - LWM	Trial Pit	1 per 50 m	3 pits to 2.5m
b	Landfall	HWM - LWM	Bar Probing	1 per 25 m	10 probes
c	Diver Swim	0 – 3m Water Depth	Bar Probing & Diver	1 per 25 m	10 probes

- 3 No. Trial Pits – JCB or equivalent.  
The sampling required on the beach at Enniscrone will involve 3 Trial Pits at 50m centres starting seaward of the High Water Mark. The 3 Trial Pits will be excavated to 2.5m, logged, photographed and backfilled in a single intertidal period of less than 1 hour. The trial pits will be backfilled with the original excavated materials in the sequence in which they are excavated.
- The bar probes on the beach and out to the 3m contour are simply to prove the depth of sand, gravel or soft material and are effectively non-intrusive.
- The site investigations in the area from the Low Water Line to the 15m contour will be undertaken from a small vessel having the appropriate draft.

### Nearshore

#### *Diver Swim Survey (Ross & Enniscrone)*

A Diver Swim Survey will extend from the low water line outward to the small boat survey limits in accordance with the defined overlaps. A diver swim rope with 25m gradations will be positioned along the route. The Diver Swim Survey will also investigate and identify any obstacles found during the Small Boat Survey up to safe diving limits (Table 2). Two spot dives will be considered part of the standard scope of work. The Diver Swim Survey will comply with the requirements of the Underwater Archaeology Unit of the Department of Arts, Heritage & the Gaeltacht.

**Table 2.** Diver Swim Survey Requirements

Survey Area	Depth Range	Corridor	Min. # of Lines
Diver Swim	0 (LAT) to 3m	250m	5

#### *Small Boat Survey (Ross Strand & Enniscrone)*

The area extending seaward from the 3m water depth contour and inshore of the safe working draft limits of the primary survey vessel will be accurately surveyed with a small craft using Multibeam Echosounder (MBES), sidescan sonar and sub-bottom profile equipment (Table 3). Sub-bottom profile equipment will be able to discern the nature and density of the upper 3 metres of seabed, and will be used on a non-interfering basis with other sounding systems. Tie lines will be performed to verify primary survey data and will have a nominal spacing of 10 times the primary line spacing with a minimum of two tie lines. A minimum of seven survey lines, based upon the Survey RPL, is required. Grabs and gravity core or cone penetration tests are also proposed to be carried out as outlined in Table 4.

**Table 3.** Small Boat Survey Requirements

Survey Area	Depth Range	Corridor	Min. # of Lines	Min. Overlap	Max. Speed
Small Boat	3m to 15m	500m	7	SSS: 100% MBES Bathy: 20%	4 knots



**Table 4.** Small Boat Survey Requirements

Survey	Survey Area	Depth	Type	Number
a	Marine	3-15m Water Depth	Grabs from 3m-15m	14 grabs
b	Marine	15m water depth to 12nm limit	Gravity Core or Cone penetration test.	7 Gravity Core or Cone penetration test.

Features such as shallow reefs, surge channels, debris fields, archaeological features or anything that could be a hazard to the cable or installation team will be noted. General reconnaissance of the survey corridor beyond the planned survey lines and tie lines may be necessary to describe the seabed as accurately as possible. A diver swim survey (spot dive) may be required to investigate and identify any obstacles or archaeological features found during the small boat survey up to safe diving limits.

The marine survey and site investigations will be undertaken along the route line shown on the Foreshore Licence Map Drawings. However, a 500m wide route corridor is shown to allow for local diversions in the event of obstructions or other routing considerations. The site investigations seaward of the 15m contour will be undertaken from a larger sea-going vessel. The marine survey and site investigations will be undertaken in compliance with best practice and having regard for the protection of marine mammals<sup>2</sup>.

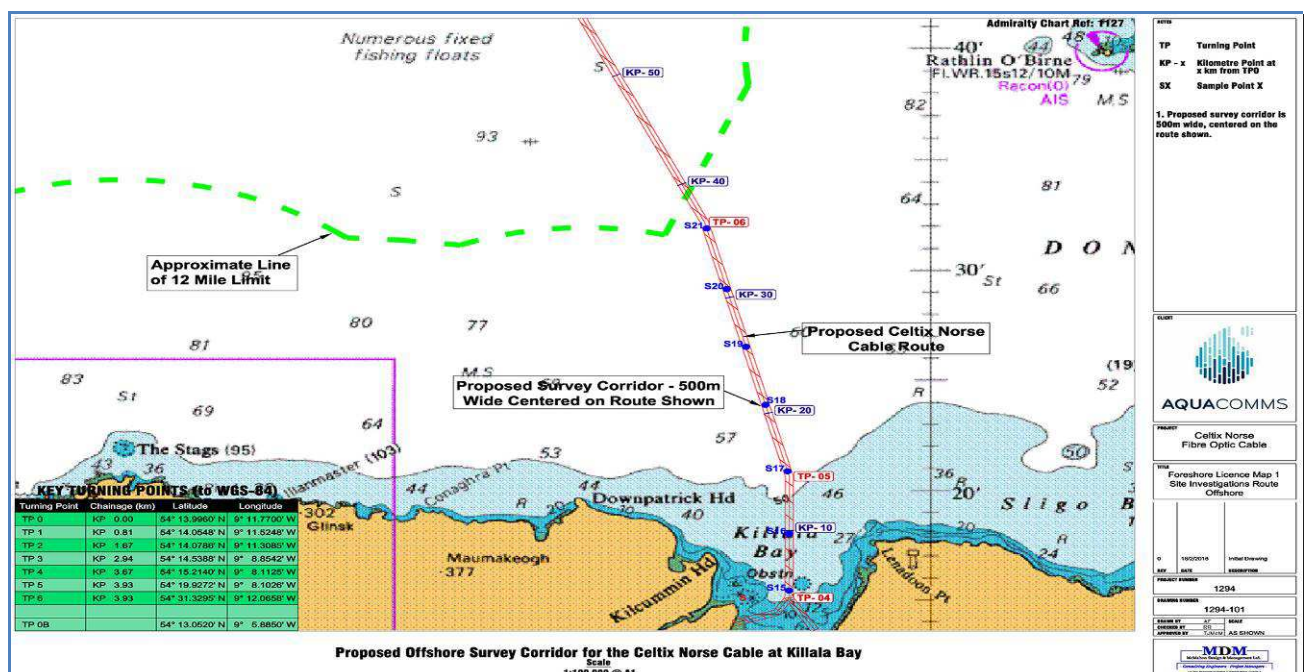
## Offshore Survey

### Seabed Sampling

Seabed sampling will be required at locations covered by the Small Boat and Shallow Water Surveys. The proposed sampling locations (21 No.) are shown on the Figure 7. A minimum of two attempts will be made at each sampling location to acquire a suitable seabed sample.

**Table 5.** Seabed Sampling Requirements

Survey Area	Depth	Type	Avg. Spacing	Min. # of Attempts
Small Boat	3 – 15 m	Grab Sampler	1 per 500 m	2
Offshore	> 15m	Gravity Corer (GC) or Cone Penetrometer (CPT) Grab Sampler (After GC/CPT Failure)	1 per 5km	2

**Figure 7.** Location of offshore samples in Irish waters.

<sup>2</sup> [http://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance\\_Jan%202014.pdf](http://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf)

### *Bathymetric and Side Scan Sonar Surveys*

A continuous bathymetric swathe (Multibeam Echosounder), along with side scan sonar imagery and sub-bottom profile will be obtained, centred on the preliminary route and along all wing lines needed to complete the corridor coverage. A minimum depth accuracy of 0.5% is required. Sub-bottom equipment will be able to discern the nature and density of upper 3m of seabed, and is to be used on a non-interfering basis with other sounding systems. Additional sounding lines may be necessary to develop any obstacles or archaeological features that may be encountered, and/or to meet the overlap and corridor requirements. A magnetometer will also be used during the surveys. The marine survey and site investigations will be undertaken in compliance with best practice and having regard for the protection of marine mammals<sup>3</sup> and with the General Requirements for a Geophysical Survey for Archaeological Purposes.

**Table 6.** Offshore Survey Requirements

Survey Area	Depth Range	Corridor	Min. # of Lines	Min. Overlap	Max. Speed
Offshore	> 15m	500m	3	SSS: 100% MBES Bathy:20%	4 knots

### **Equipment and Procedures**

In the case of the Small Boat Survey the survey line spacing will be set at 50m for the Side Scan Sonar. In deeper water the spacing will increase. The equipment to be used in all marine surveys is outlined in Table 7.

**Table 7.** Equipment to be used on all marine surveys for the project.

Equipment Type	Frequency (Energy level in dB re 1 µPa)
Dual Frequency Single Beam Echosounder – Reson Navisound 420	33 and 210kHz (168 – 174)
Dual Frequency Side Scan Sonar - Edgetech 4200 Sidescan Towfish	100 and 400kHz (226 effective)
Sub-bottom Profiler - Geoacoustics 4 x 4 Hull-mounted SBP Pinger System	3 – 7.5kHz (-225)

Specific soft-start procedures (to comply with the Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters) will be developed and incorporated in the project execution plan before mobilisation. The duration of noise-generating surveys will be reduced to the minimum necessary to collect results of sufficient quality. The survey will be undertaken by a specialist survey vessel having experience of marine survey and having approved appropriate survey equipment. Details of the survey vessel and of the survey equipment to be used will be made available prior to commencement of the survey. The data to be provided will include;

- Name of vessel
- Name of Captain
- Name of Client's Representative
- Contact details for the vessel
- Details of Multi-Beam Equipment including;
- The sound intensity, the frequency of pitch and the tone or bandwidth for the Echo Sounder, the Side Scan Sonar and the Sub-Bottom Profiler.

<sup>3</sup> [http://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance\\_Jan%202014.pdf](http://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf)

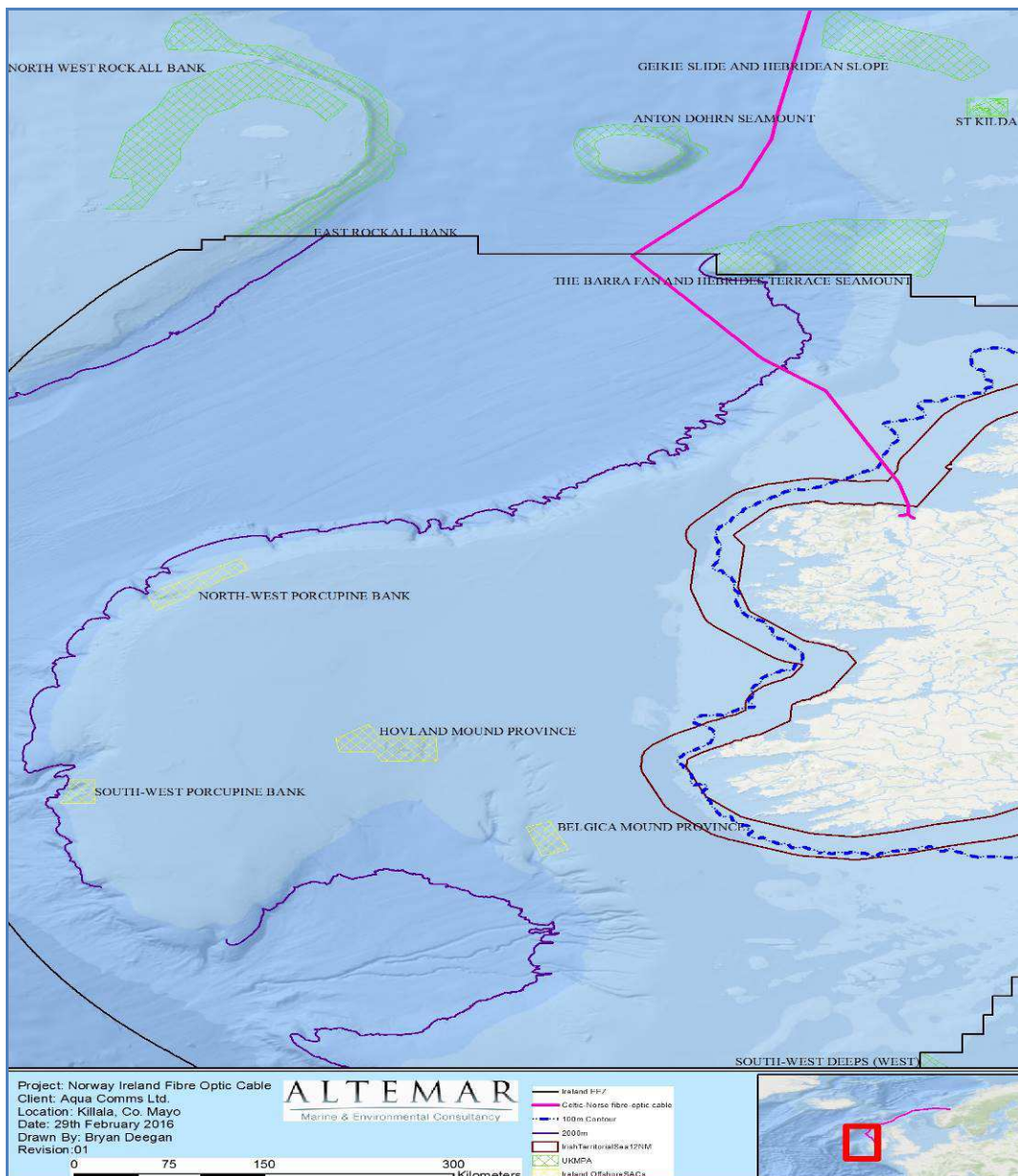
*d) Identification of NATURA 2000 sites/species potentially affected.*

The potential route for the fibre optic cable in relation to the Irish EEZ and Offshore SAC's are seen in Figure 8. Figures 9 and 10 show the near shore route with a 5, 10 & 15km buffer and the proximity to SPA's and SAC's respectively, in addition to continental shelf and Irish territorial waters (12nm). As can be seen from figures 9 to 11, the proposed route of the cable does not come within 15km of any Natura 2000 site, until it enters Killala Bay. The nearest offshore SAC in Irish waters (North West Porcupine Bank) is 315km from the proposed route.

The NATURA 2000 sites within 15km of the proposed route and landfall are:

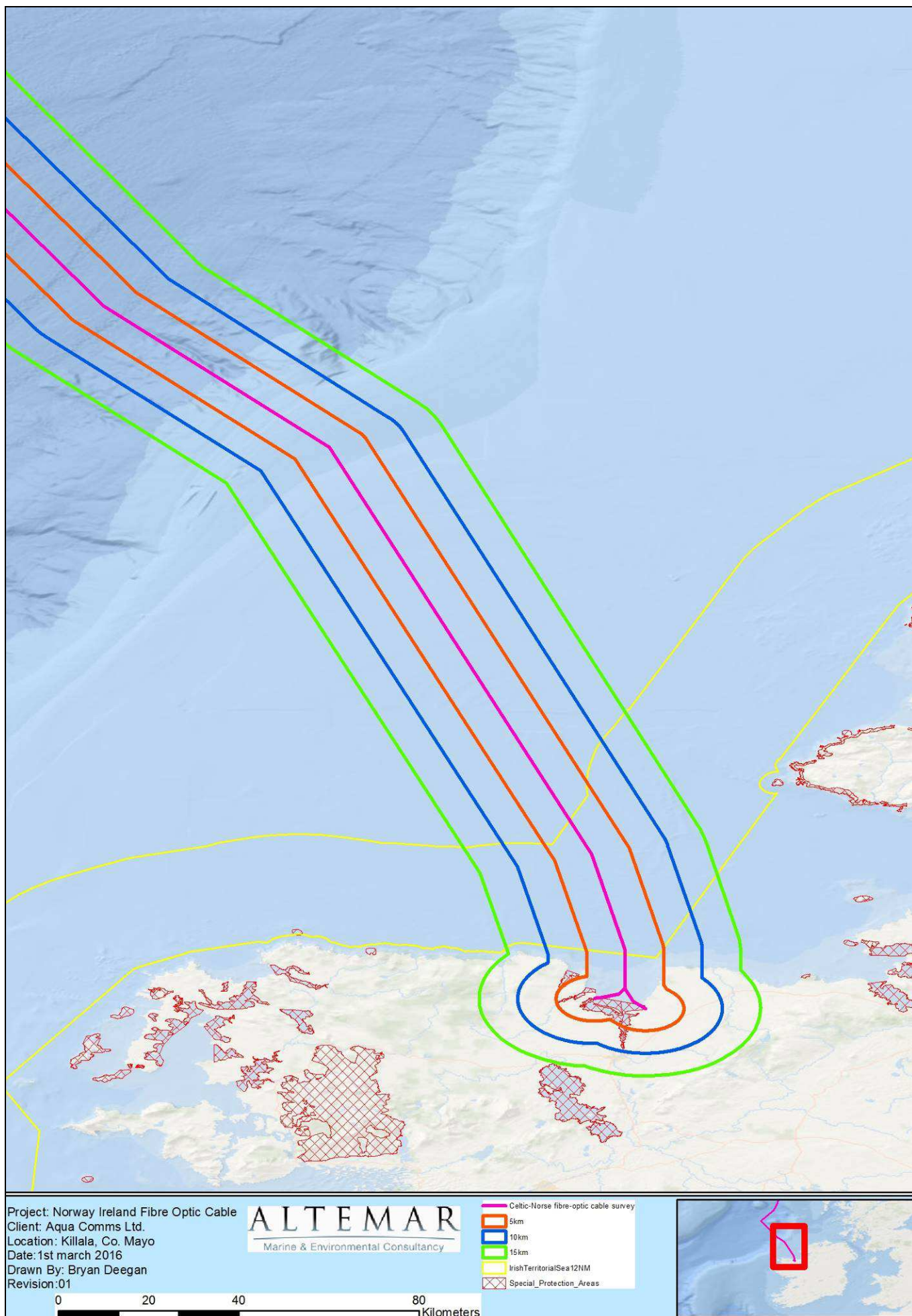
- 1) Lackan Saltmarsh and Kilcummin Head **SAC** (6 km from cable route)
- 2) Killala Bay/Moy Estuary **SAC** (Both landfalls are within SAC)
- 3) River Moy **SAC** (12 km from route)
- 4) Ox Mountain Bogs **SAC** (9 km from Enniscrone landfall)
- 5) Killala Bay/Moy Estuary **SPA** (Both landfalls are within SPA)

These NATURA 2000 sites can be seen in Figures 11 and 12. Initial screening of these sites can be seen in Table 8. The proposed landfalls are also within a proposed Natural Heritage Area (Killala Bay/Moy Estuary) (Appendix II) and a RAMSAR Site (Ross Beach only is in Killala Bay/Moy Estuary) (Appendix III).



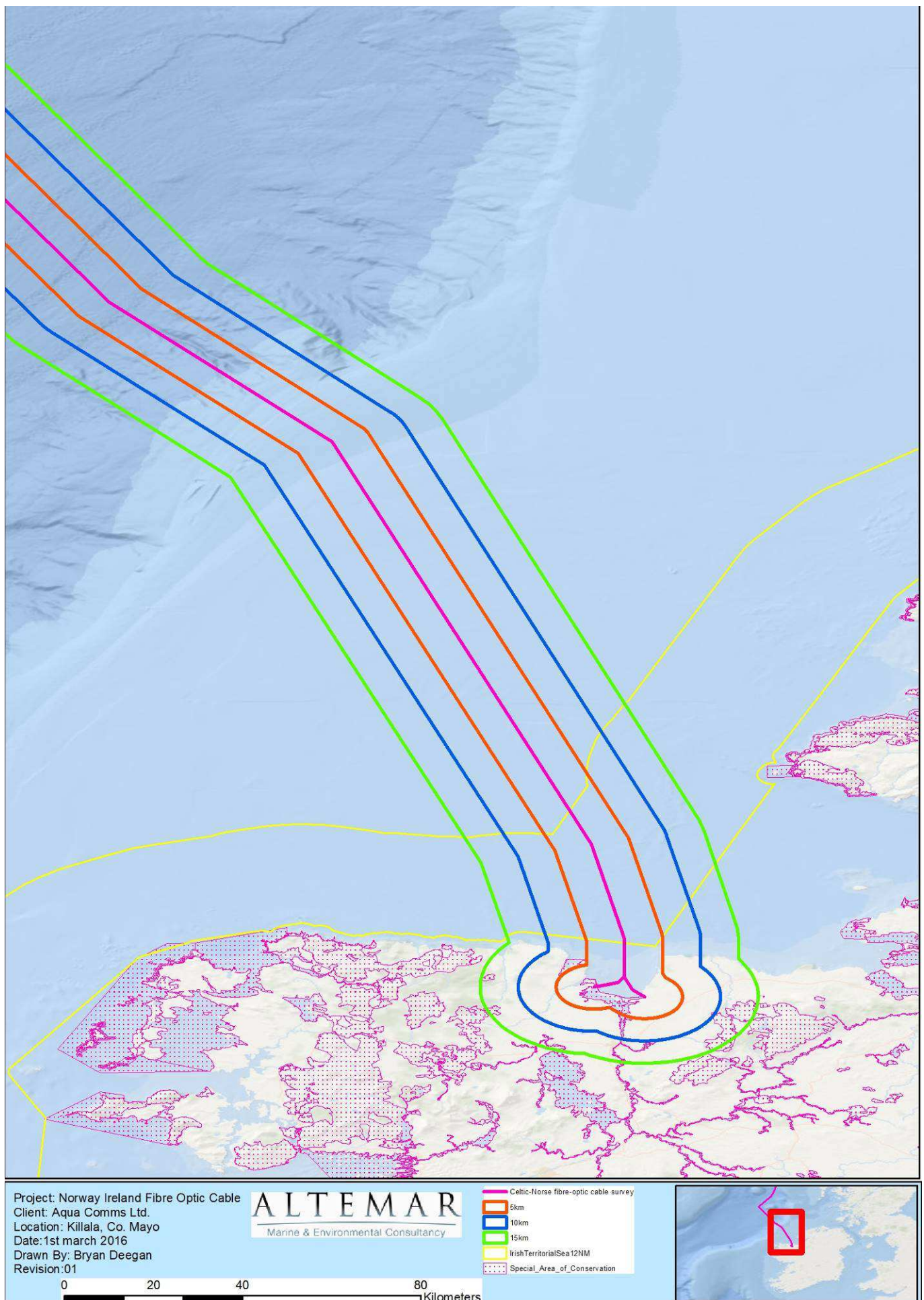
**Figure 8:** Offshore fibre-optic cable route in relation to the Irish EEZ and Offshore SAC's.





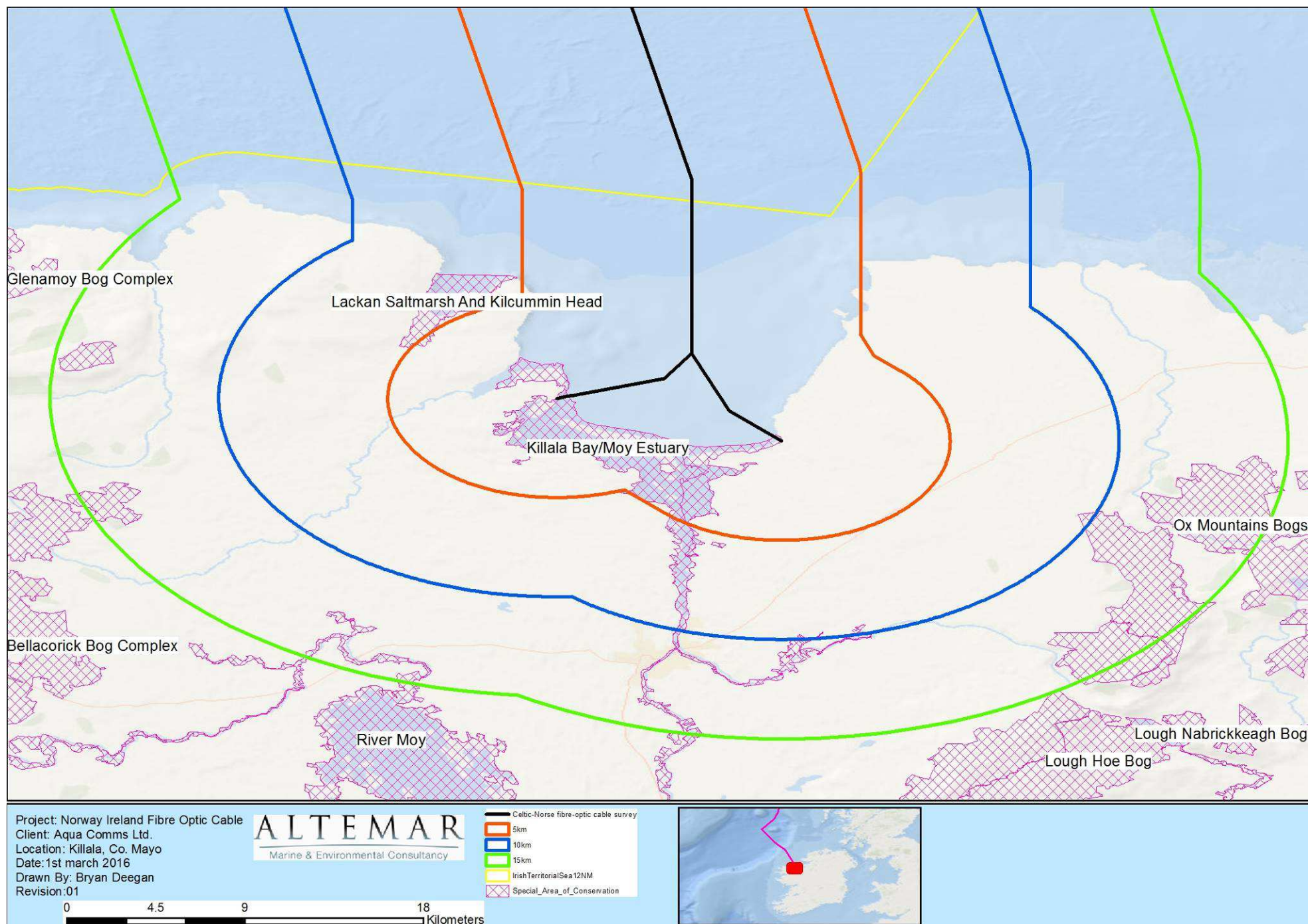
**Figure 9:** The near shore route with 15 km buffer with and location of SPA's.



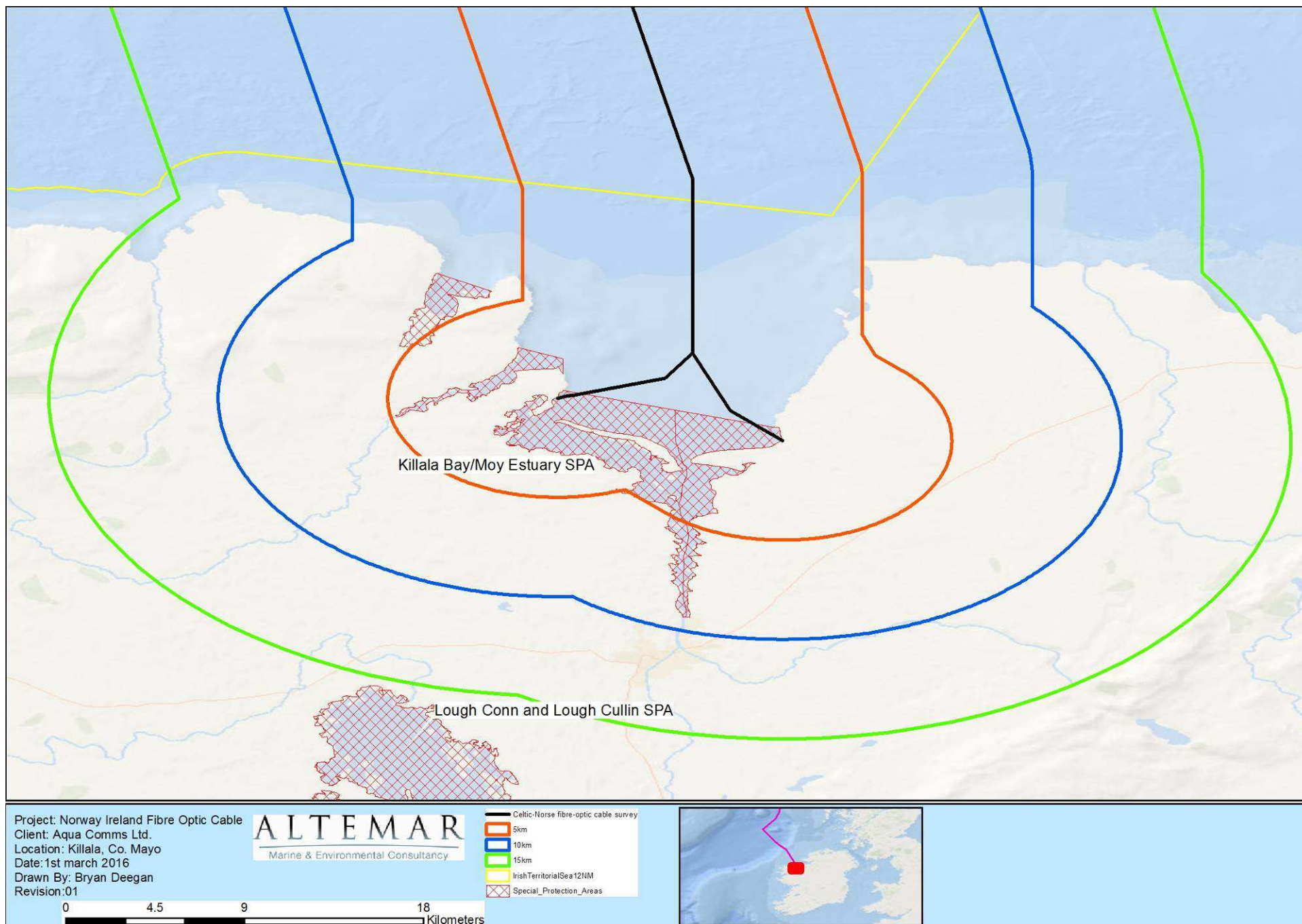


**Figure 10:** The near shore route with 15 km buffer with and location of SAC's.





**Figure 11:** Special Areas of Conservation within 5km, 10km and 15 km of the proposed route and landfall of the trans- Atlantic fibre optic Cable at Killala Bay.



**Figure 12:** Special Protection Areas within 5km, 10km and 15 km of the proposed route and landfall of the trans- Atlantic fibre optic Cable at Killala Bay.



**Table 8.** Initial screening of NATURA 2000 sites within 15km of the proposed route and landfall.

NATURA CODE	NAME	Screened In/Out	Conservation Interests and screening conclusion.
<b>Special Areas of Conservation</b>			
IE0000516	Lackan Saltmarsh and Kilcummin Head	Out	<p>Conservation interests in this SAC are:</p> <p>[1310] Salicornia and other annuals colonizing mud and sand.</p> <p>[1330] Atlantic salt meadows (<i>Glauco- Puccinellietalia maritima</i>).</p> <p>[1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>)</p> <p>[2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")</p> <p>[2130] Fixed coastal dunes with herbaceous vegetation ("grey dunes").</p> <p>No potential impact is foreseen. This site is over 5km from the proposed area of site investigations. The site investigations are limited in their extent and effects. As a result no impact on this SAC is foreseen.</p>
IE0000458	Killala Bay/Moy Estuary SAC	In	The landfall and cable route are within this SAC. Further assessment is required (Sections A & B below).
IE0002298	River Moy SAC	Out	<p>Conservation interests in this SAC are:</p> <p>[7110] Active raised bogs*</p> <p>[7120] Degraded raised bogs still capable of natural regeneration</p> <p>[7150] Depressions on peat substrates of the <i>Rhynchosporion</i></p> <p>[7230] Alkaline fens</p> <p>[91A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles</p> <p>[91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)*</p> <p>* denotes a priority habitat</p> <p>[1092] White-clawed Crayfish <i>Austropotamobius pallipes</i></p> <p>[1095] Sea Lamprey <i>Petromyzon marinus</i></p> <p>[1096] Brook Lamprey <i>Lampetra planeri</i></p> <p>[1106] Salmon <i>Salmo salar</i></p> <p>[1355] Otter <i>Lutra lutra</i></p> <p>The SAC is 12km from the proposed route. Two of the species of conservation interest in this SAC are migratory species (Atlantic salmon and Sea Lamprey) that use Killala Bay as a migration route. However, site investigations are of a limited nature and of short duration and would not have a significant impact on these species.</p>
IE0002006	Ox Mountains Bogs SAC	Out	<p>Conservation interests in this SAC are:</p> <p>[3110] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)</p> <p>[3160] Natural dystrophic lakes and ponds</p> <p>[4010] Northern Atlantic wet heaths with <i>Erica tetralix</i></p> <p>[7130] Blanket bogs (* if active bog)</p> <p>[7150] Depressions on peat substrates of the <i>Rhynchosporion</i></p> <p>* denotes a priority habitat</p> <p>[1013] Geyer's Whorl Snail (<i>Vertigo geyeri</i>)</p> <p>No potential impact is foreseen. This site is 9.6km from the proposed areas of site investigation. The site investigations are limited in their extent and effects. As a result no impact on this SAC is foreseen.</p>
<b>Special Protection Areas</b>			
IE 004036	Killala Bay/Moy Estuary SPA	In	The landfall and cable route are within this SAC. Further assessment is required. (Section C Below).



## Section A: Conservation Objectives and overall status of species and habitats

### Killala Bay/Moy Estuary SAC

As outlined in NPWS 2012 “Killala Bay/Moy Estuary SAC is a relatively large site, comprising the inner part of Killala Bay, including the estuary of the River Moy from downstream of Ballina. The towns of Enniscrone and Killala occur on the eastern and western shores respectively. Sand dune systems, estuaries and intertidal areas are the main habitats of the site. Bartragh Island, a sand bar on which a sand dune system has developed, stretches across most of the outer part of the site. A further dune system protrudes westwards from Enniscrone, while more dunes occur at the Ross peninsula in the north-west of the site. Other habitats present include saltmarshes, dry grassland, reedbeds and scrub.

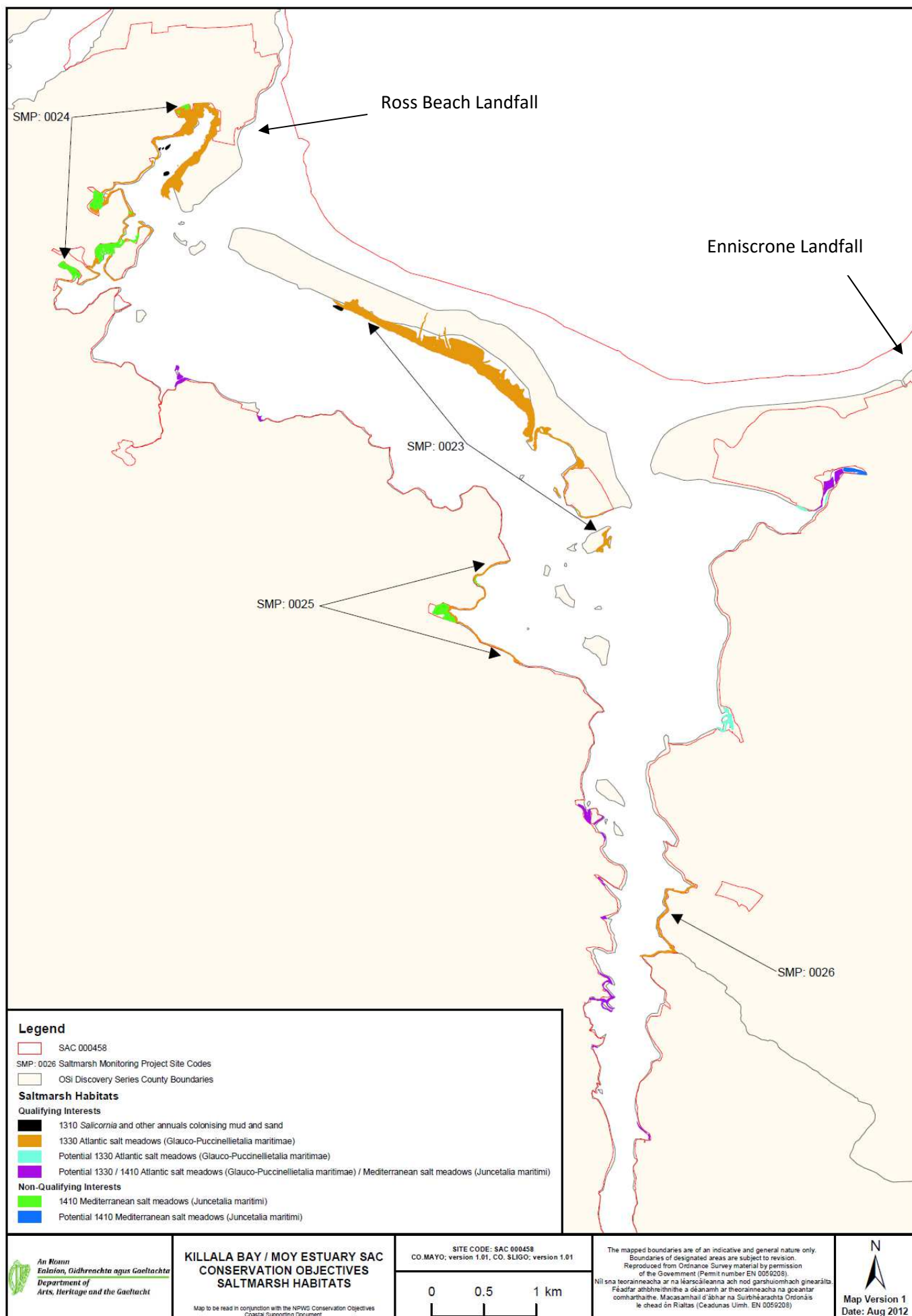
This large site displays an excellent diversity of dune types and Bartragh Island is recognised as one of the most important dune systems in the north-west region. A substantial area of fixed dune remains intact despite modifications for recreational and agricultural purposes. Some humid dune slacks also occur, and there are fairly extensive examples of shifting dunes with marram, embryonic shifting dunes and annual vegetation of driftlines. A significant area of fixed dune habitat remains at Enniscrone, although much of the area of dunes has been developed as a golf course. The Moy Estuary is an important example of an estuary and has extensive intertidal sand and mud flats. This SAC site is also important for the Annex II mollusc *Vertigo angustior*, which occurs in freshwater marsh habitat. The Red Data Book plant species, hoary whitlow grass (*Draba incana*) was recorded from sand dunes along the coast east of Killala town, and is predominantly distributed in the north-west of Ireland (Curtis & McGough, 1988).

Killala Bay/Moy Estuary SAC is designated for a range of coastal habitats including, saltmarsh and sand dunes. The following seven coastal habitats are included in the qualifying interests for the site (\* denotes a priority habitat):

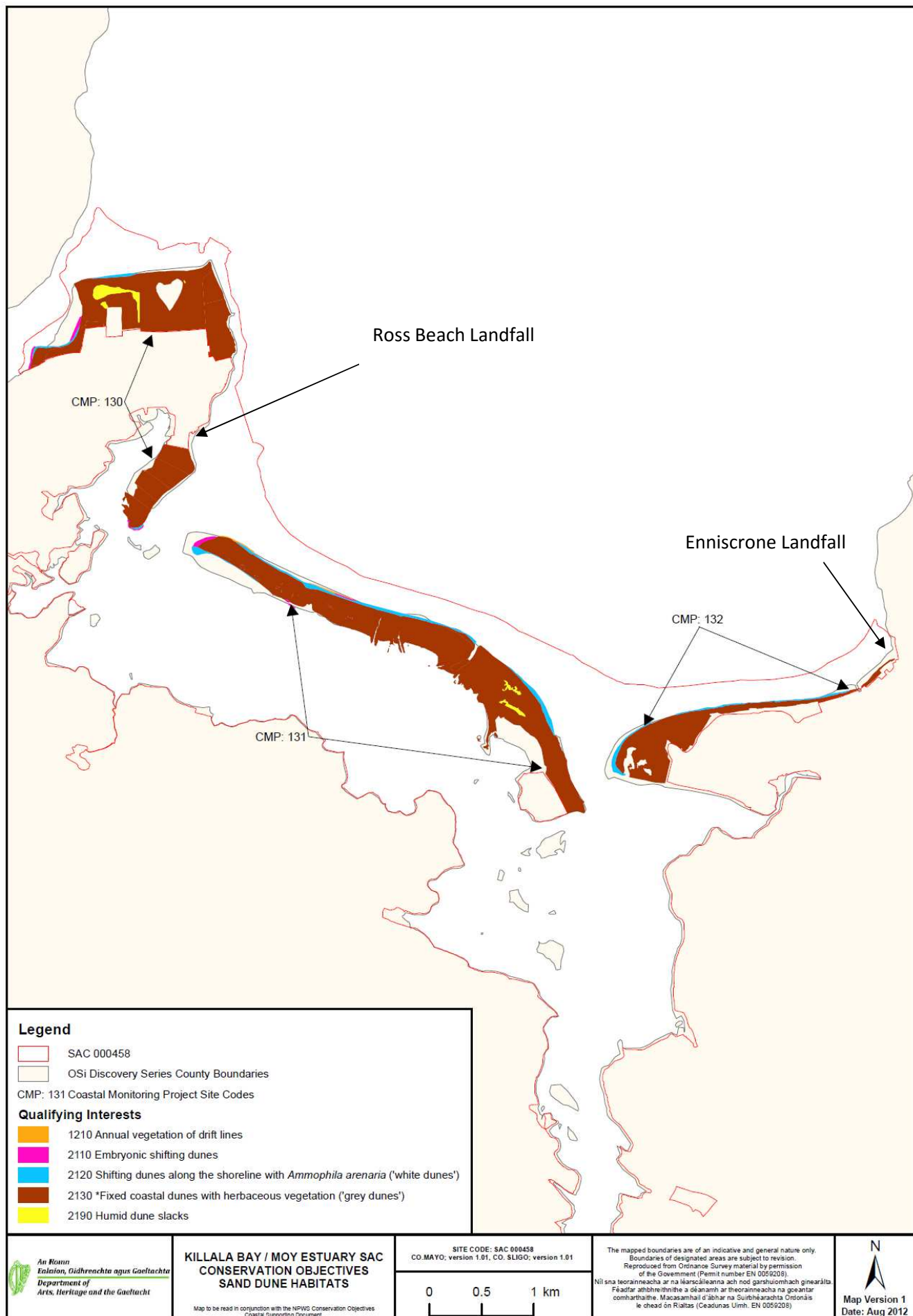
- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (*Glaucopuccinellietalia maritima*) (ASM) (1330)
- Annual vegetation of drift lines (1210)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)\*
- Humid dune slacks (2190)

The first two habitats are saltmarsh habitats and the last five are associated with sand dune systems, although all seven of these habitats are found in close association with each other. Mediterranean salt meadows were also recorded from three saltmarshes within the SAC during the Saltmarsh Monitoring Project (SMP) (McCorry, 2007). However, this habitat is not listed as a qualifying interest for this site.”

Distribution maps of the saltmarsh and sand dune habitats within Killala Bay/Moy Estuary SAC and the proposed landfall areas are seen in Figures 13 and 14. Neither of the proposed landfall sites is located in an area of saltmarsh or dune habitats.



**Figure 13:** Distribution map of saltmarsh habitats within Killala Bay/Moy Estuary SAC



**Figure 14:** Distribution map of sand dune habitats within Killala Bay/Moy Estuary SAC.

Annex II Species-Qualifying Interest	Overall Conservation Status	Conservation Objective and Details
[1130] Estuaries	Poor	<i>To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.</i> Potential threats include “impacts arising from aquaculture, fishing, coastal development and water pollution are considered the principal threats.”
[2190] Humid dune slacks	Bad	<i>The overall objective for ‘humid dune slacks’ in Killala Bay/Moy Estuary SAC is to ‘maintain the favourable conservation condition’.</i> This habitat is under serious threat from a range of impacts including overgrazing, undergrazing, over-stabilisation of dunes, water abstraction and drainage, golf course developments, forestry and coastal protection works. Although the total area of the habitat is considered stable, the range of ecological variation is not. The two extreme communities (pioneer slacks and very wet slacks) are poorly represented in Ireland.
[2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)	Bad	<i>The overall objective for ‘Fixed coastal dunes with herbaceous vegetation’ in Killala Bay/Moy Estuary SAC is to ‘restore the favourable conservation condition’.</i> “Perhaps the greatest impacts on fixed dunes today are overgrazing and undergrazing: overgrazing can lead to a reduction in species diversity, nutrient enrichment of the soil and destruction of the vegetation cover, while undergrazing can lead to development of species-poor grassland and eventual scrub encroachment. The introduction of non-native plant species, particularly sea buckthorn ( <i>Hippophae rhamnoides</i> ), also threatens fixed dune communities. In view of a number of recorded losses of habitat area, the poor quality of much of this habitat as a result of inappropriate grazing and recreation, as well as the continuing pressure for development.”
[2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)	Bad	<i>The overall objective for ‘Shifting dunes along the shoreline with <i>Ammophila arenaria</i>’ in Killala Bay/Moy Estuary SAC is to ‘restore the favourable conservation condition’.</i> Threats to this habitat include natural and man-made pressures. A regular supply of blown sand is essential to maintain the natural mobility of marram dunes and this can be depleted by removal of beach materials, construction of coastal protection works or by sand compaction caused by motorised vehicles on the beach. High visitor pressure on dunes causes trampling, which damages the plant cover. Interference with the supply of sand at a number of sites has negatively impacted on the natural functioning of this habitat, leading to a loss of area.
Embryonic shifting dunes [2110]	Poor	<i>The overall objective for ‘Embryonic shifting dunes’ in Killala Bay/Moy Estuary SAC is to ‘restore the favourable conservation condition’.</i> Many sites are subject to natural erosion processes and susceptible to removal by storms or high tides; human activities such as recreation and sand extraction can exacerbate this problem. Construction of coastal protection works can also cut off the supply of sand that is vital for the natural functioning of this habitat. In view of a number of recent recorded losses of habitat area and the on-going pressures of recreation and coastal stabilisation.
[1365] Common seal ( <i>Phoca</i>	Good	<i>Objective: To maintain or restore the favourable conservation status of the Common seal (<i>Phoca vitulina</i>).</i>

Annex II Species-Qualifying Interest	Overall Conservation Status	Conservation Objective and Details
vitulina)		The main threats to the species are continued by-catch in fishing gear, occasional illegal culling, competition for prey resources with fisheries and disturbance at key breeding and moulting haul-out sites. See section B
[1014] <i>Vertigo angustior</i>	Poor	<i>Objective: To maintain or restore the favourable conservation status of the Vertigo angustior.</i> In Ireland, the main loss of narrow-mouthed whorl snail sites appears to be a result of loss of riverside and canal-side habitat, exploitation of esker sites and drainage of wetlands, and sheep grazing and over-exploitation of dune sites.
[1140] Mudflats and sandflats not covered by seawater at low tide	Poor	<i>The overall objective for 'Mudflats and sandflats not covered by seawater at low tide' in Killala Bay/Moy Estuary SAC is to 'restore the favourable conservation condition'.</i> The most serious threats arise from aquaculture, fishing, bait digging, removal of fauna, reclamation of land, coastal protection works and invasive species, particularly cord-grass ( <i>Spartina</i> spp.). In addition, there is some concern at the potential impact that hard coastal defence structures may have, in combination with sea-level rise, for the long-term extent of this habitat.
[1310] <i>Salicornia</i> and other annuals colonizing mud and sand	Poor	<i>The overall objective for 'Salicornia and other annuals colonising mud and sand' in Killala Bay/ Moy Estuary SAC is to 'maintain the favourable conservation condition'.</i> Swards of glasswort ( <i>Salicornia</i> spp.) are pioneer saltmarsh communities and may occur on muddy sediment seaward of established saltmarsh. They may also form patches isolated from other saltmarsh on mudflats within a suitable elevation range. The main impact affecting this habitat is the spread of the invasive species common cord-grass ( <i>Spartina anglica</i> ). This habitat is short-lived in places, as it is so vulnerable to natural erosion and accretion cycles and storms.
[1330] Atlantic salt meadows ( <i>Glaucopuccinellietalia maritima</i> )	Poor	<i>The overall objective for 'Atlantic salt meadows' in Killala Bay/Moy Estuary SAC is to 'maintain the favourable conservation condition'.</i> As <i>Spartina</i> is considered to be an invasive alien species in Ireland, it is assessed in a different way to other habitats. Increases in the area and extent of <i>Spartina</i> swards are actually considered to be unfavourable and as future expansion is considered likely,
[1210] Annual vegetation of drift lines	Poor	<i>The overall objective for 'Annual vegetation of drift lines' in Killala Bay/Moy Estuary SAC is to 'maintain the favourable conservation condition'.</i> The main threats to this habitat arise from recreational uses, including trampling, horse riding, vehicle use and mechanised removal of tidal litter. Other threats arise from grazing, sand and gravel extraction, removal of beach materials and sea defence or coastal protection works.

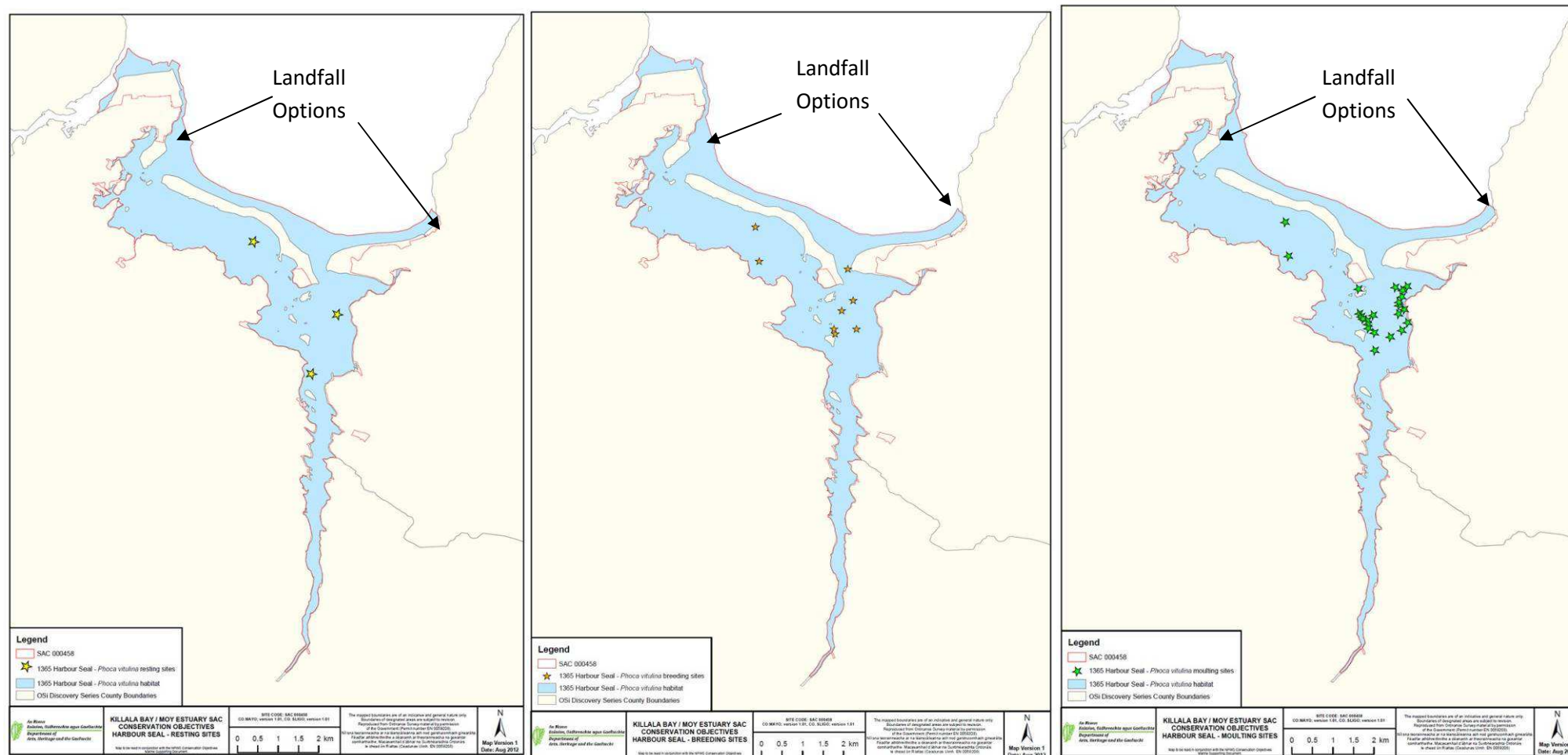
## Section B: Harbour Seals in Killala Bay/Moy Estuary SAC

Harbour seals in Killala Bay/Moy Estuary SAC occupy both aquatic habitats and intertidal shorelines that become exposed during the tidal cycle (NPWS 2012 a). “The species is present at the site throughout the year during all aspects of its annual life cycle which includes breeding (May to July approx.), moulting (August to September approx.) and non-breeding foraging and resting phases. Comparatively limited information is available at this site from the last period of the annual cycle spanning the months of October to May. In acknowledging the limited understanding of aquatic habitat use by the species within the site it should be noted that all suitable aquatic habitat is considered relevant to the species range and ecological requirements at the site and is therefore of potential use by harbour seals.

Harbour seals are vulnerable to disturbance during periods in which time is spent ashore or in shallow waters by individuals or groups of animals. This occurs immediately prior to and during the annual breeding season which takes place predominantly during the months of May to July. Pups are born on land, usually on sheltered shorelines, islets or skerries and uninhabited islands removed from the risk of predation and human interference. While there may be outliers in any year, specific established locations tend to be used annually for breeding-associated behaviour by adult males, adult females and their newborn pups. Such habitats are critical to the maintenance of the species within any site. Pups are able to swim soon after birth and may be observed accompanying their mother close to shore in the early days or weeks of life. They are nursed for a period of several weeks by the mother prior to weaning and abandonment. During this period adult females mate with adult males, an activity that takes place in the water. Current information on locations selected by harbour seals in Killala Bay/Moy Estuary SAC during the breeding season is comparatively limited.” Known and suitable habitats for the species in the SAC during the breeding season are indicated in figure 15. “Current breeding sites are broadly within the following areas: in the lower Moy estuary between Bartragh Island (south) and the mainland at Moyne/Barnasock Point, and on sandbanks to the south of Bartragh Island and west of Dooneen-Scurmore along the principal channels of the lower Moy estuary.”

The proposed location of the fibre optic cable site investigations or marine survey are not located near breeding, moult haul out or resting haul out sites for the Harbour Seal detailed in NPWS (2012a). Both of the proposed landfalls are in popular beach destinations with substantial human disturbance. As a result both of the proposed landfalls would not be expected to be important seal haulout, breeding or moulting areas.





**Figure 15.** Key Resting (yellow), Breeding (orange) and moulting (green) sites for Harbour seal in Killala Bay (Source: NPWS, 2012)



## Section C: Conservation Objectives and overall status of species and habitats in Killala Bay/Moy Estuary SPA

This SPA is very important for wintering waterbirds and provides excellent feeding grounds as well as sheltered and secure high-tide roosts. The Special Conservation Interests listed for Killala Bay/Moy Estuary SPA are as follows (NPWS 2013):-

1. During winter the site regularly supports 1% or more of the all-Ireland population of Ringed Plover (*Charadrius hiaticula*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 245 individuals.
2. During winter the site regularly supports 1% or more of the all-Ireland population of Golden Plover (*Pluvialis apricaria*). The mean peak number of this Annex I species within the SPA during the baseline period (1995/96 – 1999/00) was 2,361 individuals.
3. During winter the site regularly supports 1% or more of the all-Ireland population of Grey Plover (*Pluvialis squatarola*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 221 individuals.
4. During winter the site regularly supports 1% or more of the all-Ireland population of Sanderling (*Calidris alba*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 123 individuals.
5. During winter the site regularly supports 1% or more of the all-Ireland population of Dunlin (*Calidris alpina*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,073 individuals.
6. During winter the site regularly supports 1% or more of the all-Ireland population of Bar-tailed Godwit (*Limosa lapponica*). The mean peak number of this Annex I species within the SPA during the baseline period (1995/96 – 1999/00) was 366 individuals.
7. During winter the site regularly supports 1% or more of the all-Ireland population of Curlew (*Numenius arquata*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 731 individuals.
8. During winter the site regularly supports 1% or more of the all-Ireland population of Redshank (*Tringa totanus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 372 individuals.
9. The wetland habitats contained within Killala Bay/Moy Estuary SPA are identified of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore the wetland habitats are considered to be an additional Special Conservation Interest.

**Objective 1:** *To maintain the favourable conservation condition of the non-breeding waterbird Special Conservation Interest species listed for Killala Bay/Moy Estuary SPA.*

Factors that can adversely affect the achievement of Objective 1 include:

- Habitat modification: activities that modify discrete areas or the overall habitat(s) within the SPA in terms of how one or more of the listed species use the site (e.g. as a feeding resource) could result in the displacement of these species from areas within the SPA and/or a reduction in their numbers.
- Disturbance: anthropogenic disturbance that occurs in or near the site and is either singular or cumulative in nature could result in the displacement of one or more of the listed waterbird species from areas within the SPA, and/or a reduction in their numbers.

**Objective 2:** *To maintain the favourable conservation condition of the wetland habitat at Killala Bay/Moy Estuary SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.* The maintenance of the ‘quality’ of wetland habitat lies outside the scope of Objective 2. However, for the species of Special Conservation Interest, the scope of Objective 1 covers the need to maintain, or improve where appropriate, the different properties of the wetland habitats contained within the SPA.

### Ross Beach

In (NPWS 2013) Ross Beach is classed within Bartragh Island northwest (0D443). Of the 25 sites/subsites surveyed during this survey 0D443 did not rank in the top 10 of the Low Tide or High Tide ten ranked peak intertidal foraging densities for any of the selected species. However, roosting and other behaviour was deemed high for ringed plover, very high for sanderling and low for bar-tailed godwit. It was ranked 11 in the Supra tidal for total numbers (roosting/other behaviour) during high tide surveys for redshank. 0C455

### Enniscrone Beach

The landfall at Enniscrone beach is classed within “Inishcrone Beach” site 0C455 which comprises 301ha. It is indicated by NPWS 2013 that this site suffers from high disturbance, primarily relating to walking and horse riding. Nonetheless, it is an important area for many species of overwintering birds. The intertidal is ranked number one for ringed plover and sanderling intertidal roosting within the SPA, with very numbers of ringed plover and grey plover roosting during the low tide and ringed plover during high tide surveys. The ranking for ringed plover, sanderling and dunlin for foraging was 5, 6, and 10 within the SPA. Dot density maps in NPWS (2013) also indicated roosting activity by redshank, bar-tailed godwit, grey plover, ringed plover and dunlin. The latter two species are in decline both on site and nationally.

## Section D: Cetacean activity

Cetacean activity in the Mayo area during September, out to the EEZ, along the proposed survey route is seen in Figure 16, as recorded by Irish Whale and Dolphin Group sightings (2010-2014) and the European Seabirds at sea (1980-2003) schemes. Cetacean activity has been seen in the Killala Bay area and along the survey route. During the month of September within 15km of the survey route, sightings of bottlenose dolphin, have been recorded by IWDG. Other species in proximity of the survey route out to the 12 nm limit include Risso’s dolphin. Beyond the 12nm limit out to the EEZ cetacean sightings during September have been in the vicinity of the continental slope and were primarily sightings of Common Dolphin, Long-finned pilot whales and one sighting of a humpback whale 80km to the south west.

In addition to these sightings, a detailed marine mammal survey was recently carried out (2009-2011), 60km to the west of Killala Bay at the Atlantic Marine Energy Test Site as part of the EIS for the site. The survey involved monthly land-based watches, seasonal, dedicated boat-based transects and static acoustic monitoring using C-PODs. Common dolphin and harbour porpoise occurred at the site throughout the year with a peak in common dolphin abundance in the autumn and winter (Berrow and O’Brien, 2011) (Table 9).

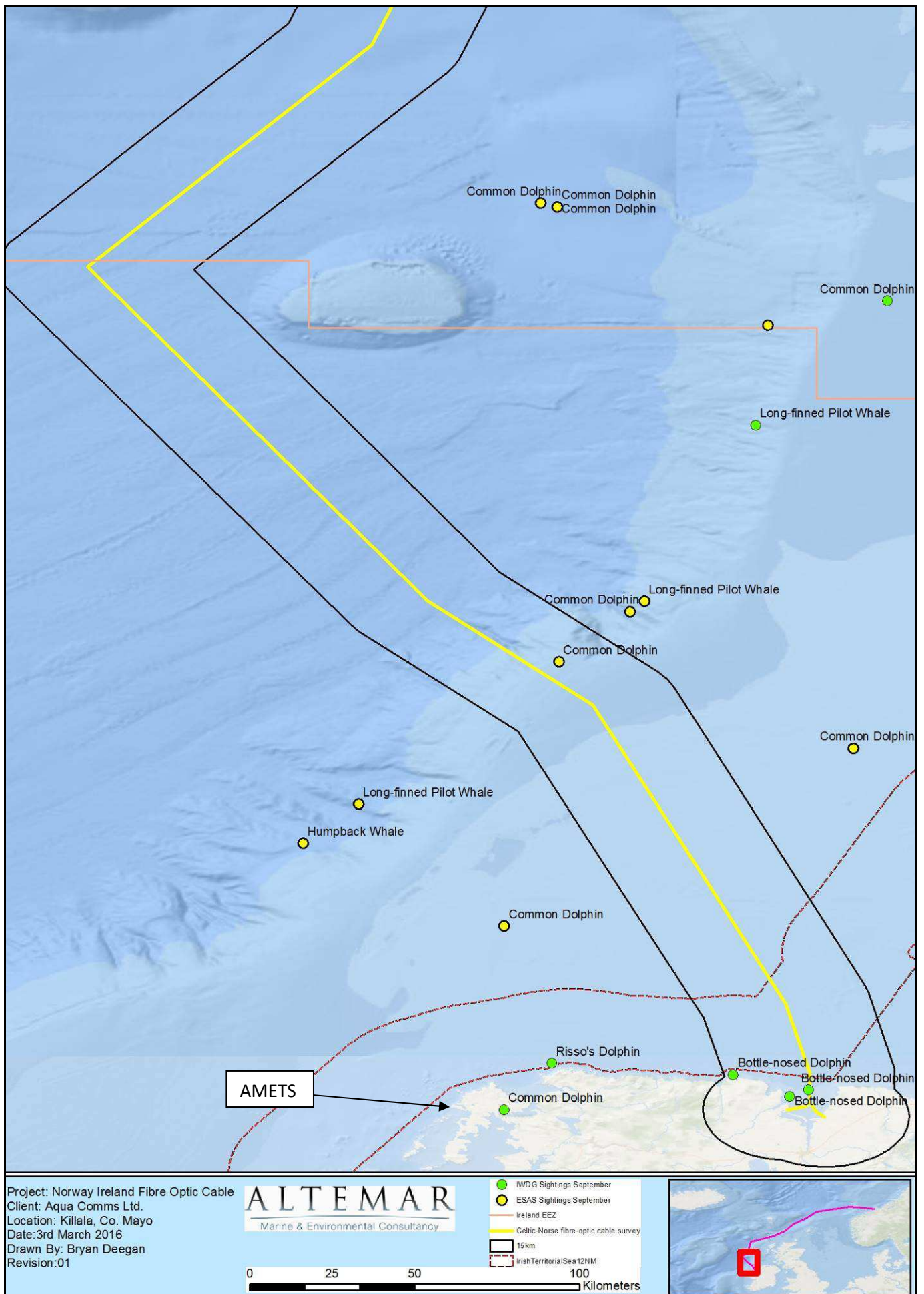
**Table 9.** Summary of marine mammal occurrence along the proposed landfall route (from Berrow and O’Brien 2011).

Species	Spring	Summer	Autumn	Winter	Comments
Harbour porpoise					Regular
Common dolphin					Regular/abundant
Bottlenose dolphin					Seasonally resident
Risso’s dolphin					Vagrant
White-sided dolphin					Rare
White-beaked dolphin					Rare
Striped dolphin					Rare
Killer whale					Infrequent visitor
Minke whale					Common/Seasonal
Humpback whale					Rare
Grey seal					Resident/abundant
Common seal					Resident/abundant

The cetacean distribution off the north west Mayo coast was summarised in the Corrib Gas Field Offshore EIS. “Of the 23 cetacean species recorded in Irish waters, at least 17 of these have been recorded off the north-west coast of Mayo (see Table 10) and are considered to inhabit the study area, at least on a seasonal basis.”

**Table 10.** Cetacean species recorded off north-west Mayo (adapted from Berrow, 2000)

Species	Relative abundance	Frequency of Sightings	Conservation Status	References
Harbour porpoise	Common inshore, see	Peak in Aug - Nov	Annex II species	3,5,6
White-beaked dolphin	Frequent	Most frequent late summer		3,5,8
White-sided dolphin	Abundant offshore	Most frequent in summer		3,4,6,8
Common dolphin	Abundant	Most frequent in summer		2,3,6,8
Bottlenose dolphin	Frequent	Most frequent in summer	Annex II species	5,6,8
Striped dolphin	Occasional	Most frequent in summer		3,8
Killer whale	Regular	Peak in May - Dec		3
Risso's dolphin	Common	Peak in April - Sept		2,3
Long-finned pilot whale	Abundant offshore	Peak in Oct - March		3,6, 7
Northern bottlenose whale	Unknown	Peak in April - Oct	Depleted	3,5
Cuvier's beaked whale	Unknown	All year		3,9
Sperm whale	Frequent offshore	All year, peak in July-Nov		1,3,9
Humpback whale	Rare	Peak Nov – April	Extremely depleted	1, 7
Blue whale	Rare	Peak Nov – Dec	Extremely depleted	1, 7
Fin whale	Common	Peak Oct – Jan		1,3, 7
Sei whale	Rare	Peak June-December		1,9
Minke whale	Frequent	Peak April - Oct		3,6, 7
1. Fairley (1981). 2. Berrow (1993). 3. Berrow & Rogan (1997). 4. Couperus (1997). 5. Evans (1991). 6. Gordon <i>et al.</i> (2000). 7. Clark & Charif (1998). 8. Seawatch Foundation (2000). 9. Biodiversity Library (2000).				



**Figure 16.** September Cetacean activity within the Irish EEZ in close proximity to the marine survey (Sources: European Seabirds at Sea surveys 1980-2003 and Irish Whale and Dolphin Group Sightings)



## e) **Field Observations**

### **Enniscrone, Co. Sligo**

A site visit was carried out on the 28<sup>th</sup> February 2016. The approximate location of the proposed fibre optic cable route is seen in Figures 17 and 18. During fieldwork, only those features relevant to the proposed site investigations for the fibre optic cable, that may have an adverse effect on the integrity of NATURA 2000 sites, have been considered. An adverse effect on integrity is likely to be one that prevents the site from making the same contribution to favourable conservation status for the relevant features as it did at the time of designation; 'integrity' being defined by the European Commission (2000) as relating to the reasons for the site's designation:

*"The integrity of a site is the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and / or populations of species for which the site is or will be classified"*



**Figure 17.** Approximate location of the proposed fibreoptic cable route on Enniscrone Beach.

During our field observations, we had particular regard to any sign of the above potential impacts on the SAC and SPA in which the landfall site and survey route are located. A walk over assessment of the proposed route in the intertidal was carried out by Bryan Deegan (Altamar Ltd.). The site visit was carried out on a sunny calm Sunday at low water. There was significant disturbance on the beach due to pedestrian activity and surfers (Figure 19).





**Figure 18.** Satellite image of the Enniscrone Beach area



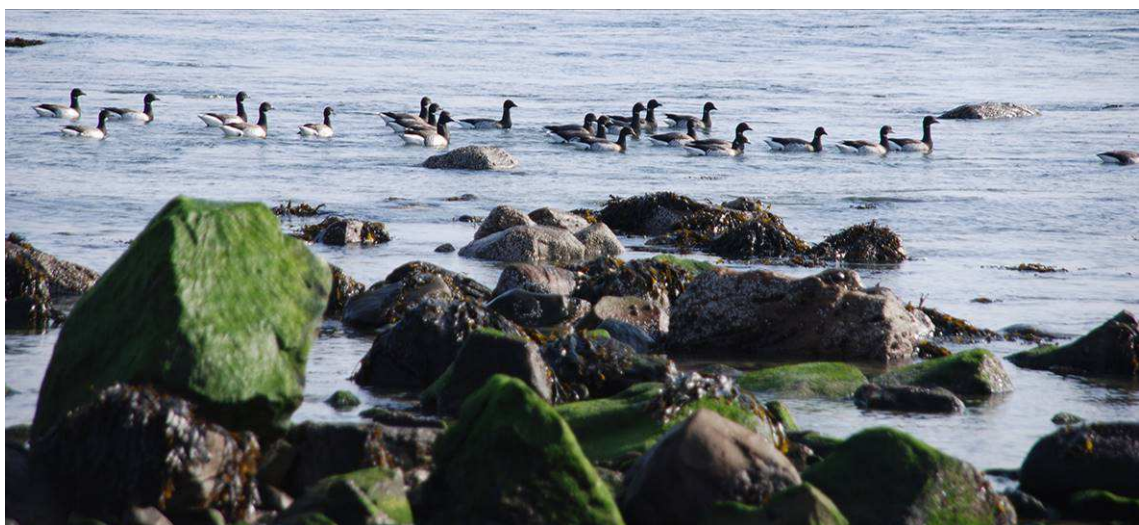


**Figure 19.** Pedestrian activity on Enniscrone Beach during the site visit (facing east).

The uppershore of the site is bounded by a concrete pathway with steps, a car park area and manmade boulder defences. Bedrock outcrops, which form part of the Ballina Limestone Formation (Source: GSI) were located on the eastern uppershore of the beach. The southern upper shore does not possess a storm beach, but did at the time of the survey have an occasional and patchy driftline, comprising primarily of kelp stipes and fronds. Clean compact hard sand predominated along the entire route from the upper shore to low water. No *Arenicola marina* casts or *Lanice conchilega* tubes or infaunal burrows were noted along the route. Towards low water depressions were noted in the sand, possible signs of bait digging. As observed by BioMar in 1996 “there was little surface evidence of life on the beach, just faint trails in places on the sand. Sampling showed the presence of polychaetes, Donax, cumaceans which were common in dig pools on lower shore. Eurydice was found at the water's edge.”

### **Ross Beach Co. Mayo.**

Although no intertidal site investigations are to be carried out at Ross Beach a site visit was carried out to observe the faunal activity in the vicinity of the route. A detailed assessment of the site and route for the ducting was carried out as part of the AEConnect cable EcIA and Appropriate Assessment (<http://www.environ.ie/planning/foreshore/applications/america-europe-connect-ltd>). Again disturbance due to pedestrian activity was observed at this site. Significantly more Light-bellied Brent Geese were observed on site than in previous site visits and up to 30 geese were observed feeding on the *Ulva* sp. in amongst the boulders in the lower intertidal (Figure 20). No other faunal activity of note was seen.



**Figure 20.** Light bellied Brent geese on the lower shore of Ross Beach



## f) Potential impact and the significance of the impact

### Special Areas of Conservation

The potential impact and the significance of the impact of the activity in combination with the other plans and projects for each of the conservation objectives in the NATURA 2000 sites within 15km are seen in the tables below Tables 11-13:

**Table 11.** *Lackan Saltmarsh and Kilcummin Head (IE0000516)*

Qualifying Interest	Impact and Significance
[1310] Salicornia and other annuals colonizing mud and sand	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[1330] Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> )	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[1410] Mediterranean salt meadows ( <i>Juncetalia maritimi</i> )	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[2130] Fixed coastal dunes with herbaceous vegetation ("grey dunes")	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>

**Table 12.** *Killala Bay/Moy Estuary SAC (IE0000516)*

Qualifying Interest	Impact and Significance
[1130] Estuaries	This habitat does occur in the vicinity of the proposed site investigations. The proposed site investigations will cause minor localised disturbance in the vicinity of Ross Strand. It will not impact on the integrity of this habitat within this SAC. <b>No Significant Impact Predicted.</b>
[2190] Humid dune slacks	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
Embryonic shifting dunes [2110]	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>

Qualifying Interest	Impact and Significance
[1365] Common seal ( <i>Phoca vitulina</i> )	This species does occur in the vicinity of the proposed site investigations. The proposed site investigations may cause temporary disturbance due to the presence of a small inshore boat and divers. It should be noted that these areas are popular beaches with significant human disturbance. They are not noted as a haul out/breeding areas and that vessels are in the vicinity going to and from Killala at Ross Strand. <b>No Significant Impact Predicted.</b>
[1014] <i>Vertigo angustior</i>	This species does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this terrestrial species. <b>No Significant Impact Predicted.</b>
[1140] Mudflats and sandflats not covered by seawater at low tide	This habitat does occur in the vicinity of the proposed site investigations at Enniscrone Beach. The beach is compact in nature and little evidence of infaunal activity was noted. A survey carried out by Biomar concluded a similar paucity of infauna. No significant impact is predicted on this habitat as a result of site investigations. The disturbance will be minor and temporary. However, certain mitigation measures should be put in place to maintain the integrity of this habitat. The driftline on site was poor and patchy. However, it is recommended that machinery on site avoid driftlines and limit access to the same route up and down the beach. <b>No Significant Impact Predicted.</b>
[1310] Salicornia and other annuals colonizing mud and sand	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[1330] Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> )	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
[1210] Annual vegetation of drift lines	This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>

**Table 13.** *River Moy SAC*

Qualifying Interest	Impact and Significance
White-clawed crayfish ( <i>Austropotamobius pallipes</i> ) [1092]	The River Moy SAC is 12km from the site investigations. This freshwater species does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this species. <b>No Significant Impact Predicted.</b>
Sea lamprey ( <i>Petromyzon marinus</i> ) [1095]	The River Moy SAC is 12km from the site investigations. This migratory species may occur in the vicinity of the proposed site investigations. Adults begin entering freshwater as early as April, but chiefly during late May and early June. Marine based works will be in September which is subsequent to spawning in freshwater. The use of divers and the taking of grab samples over the space of one to two days would not be expected to cause disturbance to this migratory species. <b>No Significant Impact Predicted.</b>

Qualifying Interest	Impact and Significance
Brook lamprey ( <i>Lampetra planeri</i> ) [1096]	The River Moy SAC is 12km from the site investigations. This freshwater species does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this species. <b>No Significant Impact Predicted.</b>
Salmon ( <i>Salmo salar</i> ) [1106]	The River Moy SAC is 12km from the site investigations. This migratory species may occur in the vicinity of the proposed site investigations. Migrations occur year round. Marine based works involve the use of divers and the taking of grab samples over the space of one to two days and as a result disturbance to this migratory species would not be expected. <b>No Significant Impact Predicted.</b>
Otter ( <i>Lutra lutra</i> ) [1355]	The River Moy SAC is 12km from the site investigations. This species was not observed, but may be present in the vicinity of the proposed site investigations. Disturbance in these areas due to pedestrian activity is high as outlined in NPWS 2013. The proposed site investigations will not impact on this species. <b>No Significant Impact Predicted.</b>
Active raised bogs [7110]	The River Moy SAC is 12km from the site investigations. This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
Degraded raised bogs still capable of natural regeneration [7120]	The River Moy SAC is 12km from the site investigations. This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
Depressions on peat substrates of the Rhynchosporion [7150]	The River Moy SAC is 12km from the site investigations. This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles [91A0]	The River Moy SAC is 12km from the site investigations. This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0]	The River Moy SAC is 12km from the site investigations. This habitat does not occur in the vicinity of the proposed site investigations. The proposed site investigations will not impact on this habitat. <b>No Significant Impact Predicted.</b>

**No Significant Impact on Special Areas of Conservation or their conservation objectives is predicted.**

## Special Protection Areas

### *Killala Bay/Moy Estuary SPA (Site Code 4036)*

As already outlined these sites are very important for over-wintering waterbirds. Ross Beach provides excellent feeding grounds as well as sheltered and secure high-tide roosts. Enniscrone provides for large areas of intertidal and high tide roosting. The carrying out of subtidal surveys should have minimal impact on overwintering birds as the site investigations will be carried out during September 2016, just prior to the overwintering period. In addition, as Ross Beach is located near Killala with the presence of boat traffic through the dredged channel and in addition to surfers on Enniscrone Beach, regular activity is seen in the shallow subtidal. The presence of divers and a boat in the subtidal would not be seen to have a significant impact. The process of digging the trial pits on Enniscrone Beach may cause short-duration temporary disturbance as vehicular traffic may be unusual on the beach.

As outlined in NPWS 2013 “Whilst the nature and the frequency of disturbance-causing activities are key factors when assessing likely impacts, many aspects of waterbird behaviour and ecology will influence a species response. Waterbird responses are likely to vary with each individual event and to be species-specific.

As the site investigations are non-destructive in nature their impact is primarily as a potential source of disturbance to the NATURA 2000 sites in question. Both sites where the site investigations are to be carried out suffer from relatively high disturbance levels (NPWS, 2013). Any disturbance caused by the site investigations will be short-lived (days) and very localised to the Ross Beach area and Enniscrone Beach.

Ross Beach was not deemed to be within the ranked top 10 subsite areas for bird species of conservation interest within the Killala Bay/Moy Estuary SPA at both high tide and low tide. However, Enniscrone Beach is ranked number 1 for intertidal roosting of Ringed Plover and Sanderling. As a result, it would be deemed important not to disturb roosting birds on the intertidal through the carrying out of site investigations. Overwintering birds would normally arrive in October. However, as a precaution it is recommended that mitigation measures are put in place to ensure roosting birds are not disturbed on Enniscrone Beach during site investigations even though site investigations are to be carried out in September. This is mainly due to the close proximity to the overwintering bird season and the fact that passage migrants may be present. A project ecologist should be onsite to initiate and monitor the site investigations and ensure there is no disturbance to roosting or foraging birds. The presence of an ecologist with permission to halt investigations, will ensure minimal impact on the conservation interests of these sites.

**No Significant Impact on Special Protection Areas or conservation objectives is predicted. An ecologist should be onsite to ensure site investigations do not disturb roosting and foraging birds.**

## Cetaceans

All cetaceans are listed under Annex IV of the Habitats Directive, which means that they are protected wherever they occur. Bottle-nosed Dolphin and Harbour Porpoise are also listed under Annex II of the Directive. Annex II species require that core areas of their habitat are designated as sites of Community importance i.e. SAC's.

Cetaceans have been recorded in Killala Bay and near the proposed survey out to and beyond the 12nm limit. Cetaceans are not listed as a conservation interest of Killala Bay/Moy Estuary SAC and despite bottlenose dolphins being recorded here, the lack of inclusion as a conservation interest would tent to indicate that it is not a core area of their habitat.

The proposed survey would be expected to impact on cetaceans primarily through the emission of noise due to the vessel and acoustics from survey equipment including multibeam. As noted previously, during September the species seen within the survey area include bottlenose dolphin, common dolphin, harbour porpoise, minke whale, with long-finned pilot whales and common dolphins occurring over the continental slope.

As outlined by O'Brien (2005), "sound travels 4.5 times faster in water than in air and low frequency sounds travel farther underwater than high frequency sounds. Multi-beam can be defined as Low frequency (<1 kHz), Mid-frequency (1-10 kHz) and High Frequency (>10 kHz). The hearing ranges and sensitivity of marine mammals differ from one species to another depending on their audiogram. For example, harbour porpoises are sensitive from 3 kHz to 130 kHz, with peak sensitivity at 125-130 kHz, and bottlenose dolphins from 5-110 kHz, with peak sensitivity at 40 and 60-116 kHz (Southall et al. 2007). Common seals are sensitive 4-45 kHz (peak sensitivity at 32 kHz) and grey seals 8-40 kHz. Humans are sensitive only to frequencies from 20 Hz to 16-18kHz but with peak sensitivity from 2-4 kHz. Most small cetaceans, excluding harbour porpoise, have an auditory bandwidth of 150 Hz to – 160 kHz, while harbour porpoise to frequencies within 200 Hz to 180 kHz. Pinnipeds in water are thought to have an auditory bandwidth of between of 75 Hz to 75 kHz and from 75 Hz to 30 kHz in air (Southall et al. 2007)."

The cetacean species observed along the route of the proposed marine survey are mainly mid-frequency cetaceans. Southall et al. (2007) outlined in their publication Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations that for discrete noise events such as multi-beam, for mid-frequency cetaceans maximum peak pressure level of **230 dB re 1 uPa** and a maximum received sound pressure level of **198 dB re 1 uPa<sup>2</sup>-s** (Table 14)

**Table 14.** Southall *et al.* (2007) Proposed injury criteria for individual marine mammals exposed to "discrete" noise events (either single or multiple exposures within a 24-h period).

Marine mammal group	Sound type		
	Single pulses	Multiple pulses	Nonpulses
Low-frequency cetaceans	Cell 1	Cell 2	Cell 3
Sound pressure level	230 dB re: 1 $\mu$ Pa (peak) (flat)	230 dB re: 1 $\mu$ Pa (peak) (flat)	230 dB re: 1 $\mu$ Pa (peak) (flat)
Sound exposure level	198 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )	198 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )	215 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )
Mid-frequency cetaceans	Cell 4	Cell 5	Cell 6
Sound pressure level	230 dB re: 1 $\mu$ Pa (peak) (flat)	230 dB re: 1 $\mu$ Pa (peak) (flat)	230 dB re: 1 $\mu$ Pa (peak) (flat)
Sound exposure level	198 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )	198 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )	215 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )
High-frequency cetaceans	Cell 7	Cell 8	Cell 9
Sound pressure level	230 dB re: 1 $\mu$ Pa (peak) (flat)	230 dB re: 1 $\mu$ Pa (peak) (flat)	230 dB re: 1 $\mu$ Pa (peak) (flat)
Sound exposure level	198 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )	198 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )	215 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{int}$ )
Pinnipeds (in water)	Cell 10	Cell 11	Cell 12
Sound pressure level	218 dB re: 1 $\mu$ Pa (peak) (flat)	218 dB re: 1 $\mu$ Pa (peak) (flat)	218 dB re: 1 $\mu$ Pa (peak) (flat)
Sound exposure level	186 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{pw}$ )	186 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{pw}$ )	203 dB re: 1 $\mu$ Pa <sup>2</sup> -s ( $M_{pw}$ )
Pinnipeds (in air)	Cell 13	Cell 14	Cell 15
Sound pressure level	149 dB re: 20 $\mu$ Pa (peak) (flat)	149 dB re: 20 $\mu$ Pa (peak) (flat)	149 dB re: 20 $\mu$ Pa (peak) (flat)
Sound exposure level	144 dB re: (20 $\mu$ Pa) <sup>2</sup> -s ( $M_{pa}$ )	144 dB re: (20 $\mu$ Pa) <sup>2</sup> -s ( $M_{pa}$ )	144.5 dB re: (20 $\mu$ Pa) <sup>2</sup> -s ( $M_{pa}$ )

**Note:** All criteria in the "Sound pressure level" lines are based on the peak pressure known or assumed to elicit TTS-onset, plus 6 dB. Criteria in the "Sound exposure level" lines are based on the SEL eliciting TTS-onset plus (1) 15 dB for any type of marine mammal exposed to single or multiple pulses, (2) 20 dB for cetaceans or pinnipeds in water exposed to nonpulses, or (3) 13.5 dB for pinnipeds in air exposed to nonpulses. See text for details and derivation.

The proposed survey equipment and the noise frequency emissions are seen in Table 15.

**Table 15.** Proposed survey equipment.

Equipment Type	Frequency (Energy level in dB re 1 $\mu$ Pa)
Dual Frequency Single Beam Echosounder – Reson Navisound 420	33 and 210kHz (168 – 174)
Dual Frequency Side Scan Sonar - Edgetech 4200 Sidescan Towfish	100 and 400kHz (226 effective)
Sub-bottom Profiler - Geoacoustics 4 x 4 Hull-mounted SBP Pinger System	3 – 7.5kHz (-225)

The high frequencies emitted from the equipment (210 kHz and 400 kHz) are above the auditory range of the species observed within Killala Bay and on the proposed cable route (Tables 15 & 16). The 100 kHz (Edgetech 4200 Sidescan towfish) and 33 kHz (Reson Navisound 420mid-frequencies of) emit mid-range frequencies within the hearing ranges of small cetaceans (and seals). The Geoacoustics 4x4 hull mounted sub-bottom profiler Pinger (3-7.5kHz) emits low frequency noise, within the auditory range of harbor porpoise and the lower detection range of dolphins. The Reson Navisound 420 (168-174 dB) emits noise below the acceptable received source level (db) and should not adversely affect cetaceans. As the Geoacoustics Sub-bottom Profiler and Edgetech 4200 Sidescan towfish emit noise of 225 dB (re 1  $\mu$ Pa<sup>2</sup>) at 4-7.5k Hz and 226 dB (re 1  $\mu$ Pa<sup>2</sup>) at 11 kHz, which is above the 198 (re 1  $\mu$ Pa<sup>2</sup>) proposed injury levels indicated by Southall et al (2007), negative impacts may be foreseen if cetaceans are close enough to the equipment to receive sound levels above this indicative threshold.

**Table 16.** Marine Mammal Functional Hearing Groups and Estimated Functional Hearing Ranges Proposed by Southall *et al.* (2007)

Functional Hearing Group	Estimated Auditory Bandwidth	Genera Represented (Number Species/Subspecies)	Frequency-Weighting Network
Low-frequency cetaceans	7 Hz to 22 kHz	<i>Balaena</i> , <i>Caperea</i> , <i>Eschrichtius</i> , <i>Megaptera</i> , <i>Balaenoptera</i> (13 species/subspecies)	M <sub>lf</sub> (lf: low-frequency cetaceans)
Mid-frequency cetaceans	150 Hz to 160 kHz	<i>Steno</i> , <i>Sousa</i> , <i>Sotalia</i> , <i>Tursiops</i> , <i>Stenella</i> , <i>Delphinus</i> , <i>Lagenodelphis</i> , <i>Lagenorhynchus</i> , <i>Lissodelphis</i> , <i>Grampus</i> , <i>Peponocephala</i> , <i>Feresa</i> , <i>Pseudorca</i> , <i>Orcinus</i> , <i>Globicephala</i> , <i>Orcacella</i> , <i>Physeter</i> , <i>Delphinapterus</i> , <i>Monodon</i> , <i>Ziphius</i> , <i>Berardius</i> , <i>Tasmacetus</i> , <i>Hyperoodon</i> , <i>Mesoplodon</i> (57 species/subspecies)	M <sub>mf</sub> (mf: mid-frequency cetaceans)
High-frequency cetaceans	200 Hz to 180 kHz	<i>Phocoena</i> , <i>Neophocaena</i> , <i>Phocoenoides</i> , <i>Platanista</i> , <i>Inia</i> , <i>Kogia</i> , <i>Lipotes</i> , <i>Pontoporia</i> , <i>Cephalorhynchus</i> (19 species/subspecies)	M <sub>hf</sub> (hf: high-frequency cetaceans)
Pinnipeds in water	75 Hz to 75 kHz	<i>Arctocephalus</i> , <i>Callorhinus</i> , <i>Zalophus</i> , <i>Eumetopias</i> , <i>Neophoca</i> , <i>Phocarcos</i> , <i>Otaria</i> , <i>Erignathus</i> , <i>Phoca</i> , <i>Pusa</i> , <i>Halichoerus</i> , <i>Histriophoca</i> , <i>Pagophilus</i> , <i>Cystophora</i> , <i>Monachus</i> , <i>Mirounga</i> , <i>Leptonychotes</i> , <i>Ommatophoca</i> , <i>Lobodon</i> , <i>Hydrurga</i> , <i>Odobenus</i> (41 species/subspecies)	M <sub>pw</sub> (pw: pinnipeds in water)
Pinnipeds in air	75 Hz to 30 kHz	Same species as pinnipeds in water (41 species/subspecies)	M <sub>pa</sub> (pa: pinnipeds in air)



Lurton (2016) modelled the sound field radiated by multibeam echosounders for acoustical impact assessment. He stated that “considering the injury criteria, the results illustrate that injury hazards are possible only at very short distances from the source: e.g. about 5 m for SPL and 12 m for SEL in the case of a 240-dB source level, considering cetaceans. For behavioural response criteria, the corresponding values are 9 m and 70 m.” The survey would comply with the DoEHLG’s Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters<sup>4</sup>. These guidelines require a 1000m distance which would be deemed adequate to mitigate the negative impacts of the proposed survey. In addition, cetaceans in the vicinity of the vessel during start up procedures would be given ample time to leave the site with the soft start procedures outlined in the guidelines.

### ***F) Cumulative Impacts***

Ross Beach and Enniscrone Beach are popular beaches used for swimming and watersports and achieved Blue Flag status in 2012. Shore angling occurs on Ross Beach and Scuba diving is deemed as a potential activity (NPWS, 2013). Horse riding and digging for lugworms are also recorded activities. While high levels of disturbance were noted at Enniscrone also. In 2015 a fibreoptic cable duct was laid on the beach at Ross Beach.

### ***G) Mitigation Measures***

1. Under no circumstance should seals hauled out in the area be disturbed such that they enter the water. This is unlikely, as this area is not recognised as a haul out area.
2. All site investigations should not take place if brent geese or other birds of conservation interest are present in the immediate area. If roosting birds are present on the uppershore or intertidal, the survey should be postponed until the birds depart, without provocation. Although the works are proposed to be carried out in September, an ecologist should be on site during excavations, due to the proximity of the overwintering bird season and possibility of passage migrants of conservation importance being on site.
3. Drift lines if present should be avoided by machinery.
4. The bucket of the digger should have teeth, so as to minimize scraping of metal against the cobble and boulders, if these are found to be present.
5. The trial pits should commence on a receding tide, as soon as practical to access the upper shore. This is to ensure all operations are done on one tide and should be completed before an incoming tide when many of the birds return to feed.
6. Images should be taken of the process and upon completion for inspection.

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<sup>4</sup> [http://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance\\_Jan%202014.pdf](http://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf)

### ***H) Finding of No Significant Effects Report***

Details of project	
Name and Location of the NATURA 2000 site	1)Lackan Saltmarsh and Kilcummin Head SAC (6 km from cable route) 2)Killala Bay/Moy Estuary SAC (Both landfalls are within SAC) 3)River Moy SAC (12 km from route) 4)Ox Mountain Bogs SAC (9 km from Enniscrone landfall) 5)Killala Bay/Moy Estuary SPA (Both landfalls are within SPA)
Description of the Project	Appropriate Assessment Screening for site investigations and marine survey (Foreshore Licence Application) for Aqua Comms Celtix-Norse fibre-optic cable landing in Killala Bay, Co. Mayo.
Is the Project directly connected with the management of the NATURA 2000 site?	No
Details of any other projects or plans that together with this project could affect the Natura 2000 site	None
The assessment of significant effects	
Describe how the project is likely to affect the NATURA 2000 site	The project has the potential to disturb overwintering birds in a localised area within; 1)Killala Bay/Moy Estuary SAC 2)Killala Bay/Moy Estuary SPA
Response to consultation	N/A
Data collected to carry out the assessment	
Who carried out the assessment	Altamar Ltd.
Sources of data	NPWS website, standard data form, conservation objectives data, field survey of the site and references outlined in the AA Screening Report.
Explain why the effects are not considered significant	Deemed to be not a significant effect due to the minor and limited temporal nature of the site investigations. Minor disturbance may occur but mitigation measures are proposed.
Level of assessment completed	Stage 1 Screening
Where can full results be accessed and reviewed	National Parks and Wildlife Service
Overall conclusions	
The site investigations and marine survey for the proposed fibre-optic cable landing at Ross Beach or Enniscrone Beach are minor in nature and local in extent. However, site investigations would occur within an SAC and SPA. In particular the digging of trial pits on Enniscrone Beach may cause minor disturbance of overwintering/ passage migrants bird populations. It is planned that the works will be carried out in September 2016 before overwintering populations are present. However, mitigation measures are proposed including having an ecologist present to initiate or halt site investigations based on the presence/absence of species of conservation importance. This is particularly important for roosting birds on the intertidal of Enniscrone Beach. <b>No significant impact on associated NATURA 2000 sites is foreseen.</b>	

## ***1) References***

The following references were used in the preparation of this AA screening report.

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2. Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government 2009;  
[http://www.npws.ie/publications/archive/NPWS\\_2009\\_AA\\_Guidance.pdf](http://www.npws.ie/publications/archive/NPWS_2009_AA_Guidance.pdf)
3. Managing NATURA 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC, European Commission 2000;  
[http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/provision\\_of\\_art6\\_en.pdf](http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/provision_of_art6_en.pdf)
4. Assessment of Plans and Projects Significantly Affecting NATURA 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC;  
[http://ec.europa.eu/environment/nature/Natura2000management/docs/art6/Natura\\_2000\\_assess\\_en.pdf](http://ec.europa.eu/environment/nature/Natura2000management/docs/art6/Natura_2000_assess_en.pdf)
5. Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission;  
[http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/guidance\\_art6\\_4\\_en.pdf](http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/guidance_art6_4_en.pdf)
6. Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging;  
[http://ec.europa.eu/environment/nature/Natura2000/management/docs/guidance\\_doc.pdf](http://ec.europa.eu/environment/nature/Natura2000/management/docs/guidance_doc.pdf)
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[http://www.npws.ie/publications/euconservationstatus/NPWS\\_2007\\_Conservation\\_Status\\_Report.pdf](http://www.npws.ie/publications/euconservationstatus/NPWS_2007_Conservation_Status_Report.pdf)
8. Killala Bay/Moy Estuary SAC (site code 458) Conservation objectives supporting document - coastal habitats NPWS Version 1 August 2012
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12. O'Connor William (2004) A survey of juvenile lamprey populations in the Moy catchment. Irish Wildlife Manuals, No. 15. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
13. *NPWS (2015) Conservation objectives for Ox Mountains Bogs SAC [002006]. Generic Version 4.0. Department of Arts, Heritage and the Gaeltacht.*

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15. Lurton, X (2016). Modelling of the sound field radiated by multibeam echosounders for acoustical impact assessment. *Applied Acoustics* 101 (2016) 201–221.
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**SITE NAME : LACKAN SALTMARSH AND KILCUMMIN HEAD (SITE CODE : 000516)**

Lackan Saltmarsh and Kilcummin Head are located at Lackan Bay, 8 km north-east of Killala, in County Mayo. Within this scenic and quite undisturbed area, there is an excellent diversity of coastal habitats including mature dunes, saltmarsh, rocky sea cliffs, dune grassland and estuarine sandflats. These areas provide a haven for many species of plant and animal. In addition to its value to wildlife, this area is also of historical significance, in that French soldiers landed near here during the 1798 Rising. An extensive area of fixed sand dunes, dune grassland and dry grassland on Kilcummin headland supports a good diversity of grasses and herbs such as Smooth Meadow-grass ( *Poa pratensis* ), Crested Hair-grass ( *Koeleria macrantha* ), Wild Thyme ( *Thymus praecox* ), Lady's Bedstraw ( *Galium verum* ), Yarrow ( *Achillea millefolium* ), Oxeye Daisy ( *Leucanthemum vulgare* ) and Common Centaury ( *Centaureum erythraea* ). Patches of the parasitic plant, Dodder ( *Cuscuta epithymum* ), occur in these habitats, and also Mountain Everlasting ( *Antennaria dioica* ), Field Gentian ( *Gentianella campestris* ) and Pyramidal Orchid ( *Anacamptis pyramidalis* ). The maritime influence is shown by the presence in the sward of Sea Pansy ( *Viola tricolor* ). Small areas of Marram dunes also occur. Within Lackan Bay estuary, and along the margins of the Cloonalaghan River, sediments originating from the river have built up to form an extensive saltmarsh. The vegetation is comprised of a closely-cropped turf of Common Saltmarsh-grass ( *Puccinellia maritima* ), Sea Pink ( *Armeria maritima* ), Annual Sea-blite ( *Suaeda maritima* ), Sea Milkwort ( *Glaux maritima* ) and Sea Plantain ( *Plantago maritima* ), with prostrate forms of Glasswort ( *Salicornia* sp.) and Saltmarsh Rush ( *Juncus gerardi* ). Sea Rush ( *Juncus maritimus* ) occurs on slightly elevated sites and its sharp stems protect two succulent plants, Scurvy Grass ( *Cochlearia officinalis* ) and Sea Aster ( *Aster tripolium* ). Shallow pools or pans occur on the surface. West of the Cloonalaghan River, the vegetation is taller and more luxuriant.

Freshwater streams flow down from the hillside, occupying ditches amid the grassland. Sea Club-rush ( *Scirpus maritimus* ) and Common Reed ( *Phragmites australis* ) are present in the ditches. Sea Rush is dominant in the sward, along with the grasses Red Fescue ( *Festuca rubra* ) and Creeping Bent ( *Agrostis stolonifera* ). There is a good selection of other plants scattered through this stand, reflecting both the fresh- and salt-water influences. These include Spurrey ( *Spergularia* sp.), Parsley Water-dropwort ( *Oenanthe lachenalii* ) and Arrow Grass ( *Triglochin maritima* ).

The rich flora of grassland and dunes supports a great diversity of butterflies and other insects. The butterflies noted here include the Six-spotted Burnet Moth, Cinnabar Moth, Meadow Brown, Small Heath, Dark-green Fritillary and Common Blue. The rocky sea-cliffs at Kilcummin Head are formed from marine sandstones and carbonate rocks with interesting sedimentary structures and trace fossils. Both Lackan Bay and the estuary are important sites for wintering waterfowl and support part of the large populations which winter in Killala Bay. Lapwing, Golden Plover, Redshank, Dunlin, Wigeon, Snipe, Teal, Mallard and Curlew are known to frequent the site. Up to 2,200 Golden Plover have been seen in early winter roosting and feeding on this site. This species is listed on Annex I of the European Birds Directive. Both Little Tern and Common Tern have nested here in the past. This coastal site is of considerable ecological importance for the range, quality and floristic richness of its coastal habitats, in particular the fixed dunes which are a priority habitat on Annex I of the EU Habitats Directive.

## **SITE NAME: KILLALA BAY/MOY ESTUARY SPA (SITE CODE: 004036)**

This large site comprises the estuary of the River Moy and the inner part of Killala Bay, Cos Mayo and Sligo. It is a funnel-shaped estuary, c. 7 km wide at its outer limit. It is very well sheltered by a sandy island, Bartragh Island, that extends across much of the outer part, and by a sandy peninsula that extends from Enniscrone on the eastern side. Extensive intertidal sand and mud flats are exposed at low tide. For the most part, these flats are unvegetated, but mats of Eelgrass (*Zostera spp.*), Beaked Tasselweed (*Ruppia maritima*) and green algae (*Enteromorpha spp.*) occur, which provide important feeding material for waterfowl species. Opposite-leaved Pondweed (*Groenlandia densa*), a species protected under the Flora (Protection) Order, 1999, has been recorded in the River Moy estuary. Salt marshes are present in sheltered parts of the site and supports a variety of plant species including Sea Plantain (*Plantago maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*) and Red Fescue (*Festuca rubra*). On the lower marshes, and extending out onto the most sheltered parts of the open mud flats, typical pioneering species such as Glasswort (*Salicornia spp.*) and Seablite (*Suaeda maritima*) occur.

The site is very important for wintering waterfowl and supports an excellent diversity of species. It provides excellent feeding grounds for the birds, as well as high-tide roosts. Six species have populations of national importance: Ringed Plover (185), Grey Plover (183), Knot (329), Sanderling (118), Dunlin (1,741) and Bar-tailed Godwit (335) (figures given are average peaks for the 5 winters 1995/96-1999/00). A range of other species have populations of regional or local importance, including Red-throated Diver (11), Brent Goose (157), Shelduck (63), Wigeon (234), Teal (173), Red-breasted Merganser (33), Oystercatcher (450), Golden Plover (1,396), Lapwing (1,386), Curlew (561), Redshank (300) and Greenshank (15). The site is also used by Mallard (58), Turnstone (32), Grey Heron (11) and Cormorant (22). At times, the numbers of Brent Geese exceed the threshold for International Importance (>200). Substantial numbers of gulls are present in the site during winter, including Black-headed Gull (283), Common Gull (260), Herring Gull (292) and Great Blackbacked Gull (101).

There are no serious imminent threats to the wintering birds. There may be some disturbance from walkers, free-running dogs and sailing activities. While pollutants enter the system from the nearby towns, these do not appear to be adversely affecting the wintering birds.

This is one of the most important coastal sites in the region for wintering waterfowl. It supports six species that have populations of national importance, including a very substantial population of Grey Plover (2.4% of national total). The presence of Redthroated Diver, Golden Plover and Bar-tailed Godwit is of particular note as these species are listed on Annex I of the E.U. Birds Directive. The wintering birds are monitored annually as part of the I-WeBS scheme.

1.4.2005



## **SITE NAME: KILLALA BAY/MOY ESTUARY (SITE CODE: 000458)**

North of Ballina town, the River Moy flows to the sea via a long, narrow estuarine channel. After approximately 8 km, the estuary widens to form a north-facing triangular bay, with the towns of Inishcrone (Co. Sligo) and Killala (Co. Mayo) situated on the eastern and western shores, respectively. The estuary itself forms the county boundary along its northern part. A long sandy island (Bartragh Island) separates the south-western side of the bay from the open water. Much of the inner part of the bay is intertidal. The northern part shelves to approximately -10 m. Extensive sandflats and mudflats are exposed in the estuary and bay at low tide. For the most part, these flats are unvegetated, but mats of Eelgrass (*Zostera spp.*), Beaked Tasselweed (*Ruppia maritima*) and green algae (*Enteromorpha spp.*) occur which provide important feeding material for birds. The estuary is generally in a natural state and is considered to be one of the best examples of a largely unpolluted system in Ireland.

The dune systems at Bartragh Island, Inishcrone and Ross, to the north-west, are well developed and constitute good examples of dunes with a rich and diverse flora. Shifting dunes dominated by Marram (*Ammophila arenaria*) are located at all three sub-sites. At Enniscrone they stretch the length of the strand and are particularly well developed towards the western end. They are found along the northern stretch of Ross and also run the length of Bartragh Island. Other species found growing in this habitat include Cat's-ear (*Hypochoeris radicata*), Sow Thistle (*Sonchus oleraceus*) and Groundsel (*Senecio vulgaris*). Associated with the marram dunes are embryonic foredunes and these are particularly well represented at Enniscrone. The most commonly encountered species in the foredunes include Couch Grass (*Elymus farctus*), Sea Sandwort (*Honkenya peploides*), Sea Rocket (*Cakile maritima*) and Lyme Grass (*Leymus arenarius*).

Although much of the fixed dune area has been developed as golf course or improved for agriculture, the site still contains a relatively large area of intact fixed dunes, a priority habitat listed on Annex I of the EU Habitats Directive. Species recorded include Red Fescue (*Festuca rubra*), Lady's Bedstraw (*Galium verum*), Kidney Vetch (*Anthyllis vulneraria*), Common Centaury (*Centaureum erythraea*), Sand Sedge (*Carex arenaria*), Harebell (*Campanula rotundifolia*), Wild Thyme (*Thymus praecox*), Fairy Flax (*Linum catharticum*), Common Bird's-foot-trefoil (*Lotus corniculatus*) and Pyramidal Orchid (*Anacamptis pyramidalis*). Bryophyte communities are well represented, with such species as *Brachythecium rutabulum*, *Homalothecium lutescens* and *Tortula ruraliformis*. Lichens (*Peltigera spp.*) are also frequent. Humid dune slacks occur at Ross. Species present include Jointed Rush (*Juncus articulatus*), Common Spike Rush (*Eleocharis palustris*), Water Mint (*Mentha aquatica*), Meadowsweet (*Filipendula ulmaria*), Creeping Willow (*Salix repens*), Silverweed (*Potentilla anserina*), Marsh Orchids (*Dactylorhiza spp.*), Common Twayblade (*Listera ovata*) and the moss *Calliargon cuspidatum*. A similar species complement is found in the wet hollows at Enniscrone and there also appears to be some large slack-like areas to the rear of Bartragh Island. Salt marshes are present in sheltered parts of the site, some of which occur in association with the dune systems. Species typical of Atlantic salt meadows commonly observed include Sea Plantain (*Puccinellia maritima*), Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*) and Red Fescue (*Festuca rubra*). Occasionally Lax-flowered Sea-lavender (*Limonium humile*) and Saltmarsh Flat-sedge (*Blysmus rufus*) are present, along with some stands of Sea Rush (*Juncus maritimus*). On the lower marshes, and extending out onto the most sheltered parts of the open mud flats, typical pioneering species such as Glasswort (*Salicornia spp.*) and Seablite (*Suaeda maritima*) occur.

Elsewhere along the coastline are sandy beaches, shingle beaches and some bedrock shores which are occasionally backed by clay sea-cliffs. Southeast of Killala town, Lough Meelick adds habitat diversity to the site. It is significant for the presence of the Thin-lipped Mullet, a fish which is only occasionally found in the region.

A number of rare plants have been found in the site. The Opposite-leaved Pondweed (*Groenlandia densa*), a species protected under the Flora (Protection) Order, 1999, has been recorded in the Moy Estuary and Hoary Whitlowgrass (*Draba incana*), a Red Data Book species has been recorded from sand dunes along the coast east of Killala town.

The rare snail *Vertigo angustior* has been known at this site for over 100 years. It occurs in an area of wet marsh and this site represents one of the few remaining examples of *Vertigo angustior* in its marsh

“phase”. This species is listed on Annex II of the EU Habitats Directive as it is considered vulnerable in Europe and has been declining throughout much of its range due to loss of habitat, in particular, drainage of wetlands.

The site is very important for wintering waterfowl, with eight species having populations of national importance. These are as follows, with numbers referring to the average peaks over winters 1994/95 - 1997/98: Red-breasted Merganser (38), Ringed Plover (207), Grey Plover (200), Knot (429), Sanderling (135), Dunlin (1816), Bar-tailed Godwit (309) and Greenshank (19). Other notable populations include Golden Plover (1303) and Brent Goose (166). At times Brent Geese occur in numbers of International Importance (>200). The presence of Golden Plover and Bar-tailed Godwit is of particular note as these species are listed on Annex I of the EU Birds Directive.

This composite site has an excellent range of good quality coastal habitats, including a number listed on Annex I of the EU Habitats Directive. In particular, the dune complex at Bartragh Island is relatively undisturbed and is considered to be one of the best in the country in terms of its naturalness and intact state. The presence of the Annex II snail, *Vertigo angustior*, and the importance of the area for wintering waterfowl, including two Annex I Birds Directive species, add further significance to this area. The site is extremely scenic and is a significant regional amenity area for its beaches and for fishing.

24.10.2006

## SITE NAME: RIVER MOY SAC (SITE CODE: 002298)

This site comprises almost the entire freshwater element of the Moy and its tributaries including both Loughs Conn and Cullin. The system drains a catchment area of 805 sq. km. Most of the site is in Co. Mayo though parts are in west Sligo and north Roscommon. Apart from the Moy itself, other rivers included within the site are the Deel, Bar Deela, Castlehill, Addergoole, Clydagh and Manulla on the west side and the Glenree, Yellow, Strade, Gweestion, Trimogue, Sonnagh, Mullaghanoe, Owengarve, Eighnagh and Owenaher on the east side. The underlying geology is Carboniferous Limestone for the most part though Carboniferous Sandstone is present at the extreme west of the site with Dalradian Quartzites and schists at the south west. Some of the tributaries at the east, the south of Lough Conn and all Lough Cullin are underlain by granite. There are many towns adjacent to but not within the site. These include Ballina, Crossmolina, Foxford, Swinford, Kiltimagh and Charlestown.

The site is a candidate SAC selected for alluvial wet woodlands and raised bog, both priority habitats on Annex I of the E.U. Habitats Directive. The site is also a candidate SAC selected for old oak woodlands, alkaline fens, degraded raised bog and Rhynchosporion, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Atlantic Salmon, Otter, Sea and Brook Lamprey and White-clawed Crayfish.

On the slopes and rising ground around the southern shores of Loughs Conn and Cullin, Oak woodlands are seen. Sessile Oak (*Quercus petraea*) is the dominant tree with an understorey of Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*) and Birch (*Betula pubescens*) with some Ash (*Fraxinus excelsior*). Additional species are associated with the lakeshore such as the whitebeam (*Sorbus rupicola*), Aspen (*Populus tremula*), Silver Birch (*B. pendula*) and the shrubs Guelder Rose (*Viburnum opulus*), Buckthorn (*Rhamnus catharticus*) and Spindle Tree (*Euonymus europaeus*). The ground flora is usually composed of Bilberry (*Vaccinium myrtillus*), Wood Rush (*Luzula sylvatica*), Wood Sorrel (*Oxalis acetosella*), Buckler Ferns (*Dryopteris aemula* and *D. dilatata*), Hard Fern (*Blechnum spicant*), Cow-wheat (*Melampyrum spp.*) and Bracken (*Pteridium aquilinum*). The rare Narrow-leaved Helleborine (*Cephalanthera longifolia*), protected under the Flora Protection Order, 1999, occurs in association with the woodlands. Also found in these woodlands is the snail (*Acanthinula lamellata*), associated with old natural woodlands.

Alluvial woodland occurs at several locations along the shores of the lakes but is particularly well developed along the river at Coryosla Bridge. Principal tree species are Willows (*Salix cinerea*) and Alder (*Alnus glutinosa*). Herbaceous species include Royal Fern (*Osmunda regalis*), Meadowsweet (*Filipendula ulmaria*) and Reed Canary-grass (*Phalaris arundinacea*). The woods are flooded by seasonal fluctuations in lake level.

On higher ground adjacent to the woodlands is blanket bog with scattered shrubs and trees on the drier areas. The rocky knolls often bear Juniper (*Juniperus communis*) or Gorse (*Ulex europaeus*), with some unusual rare herb species such as Intermediate Wintergreen (*Pyrola media*) and Lesser Twayblade (*Listera cordata*).

Within the site are a number of raised bogs including those at Kilgarraiff, Gowlaun, Derrynabrock, Tawnaghbeg and Cloongoonagh. These are examples of raised bogs at the north-western edge of the spectrum and possesses many of the species typical of such in Ireland, including an abundance of Bog Asphodel (*Narthecium ossifragum*), Carnation Sedge (*Carex panicea*) and the moss *Campylopus atrovirens*. Some of the bogs include significant areas of active raised bog habitat. Well developed pool and hummock systems with quaking mats of bog mosses (*Sphagnum spp.*), Bog Asphodel (*Narthecium ossifragum*) and White Beaked-sedge (*Rhynchospora alba*) are present. Many of the pools contain a diversity of plant species, including Bogbean (*Menyanthes trifoliata*), the bog moss *Sphagnum cuspidatum*, *Campylopus atrovirens*, Common Cottongrass (*Eriophorum angustifolium*), Great Sundew (*Drosera anglica*) and occasional Lesser Bladderwort (*Utricularia minor*). Several of the hummock-forming mosses (*Sphagnum fuscum* and *S. imbricatum*) which occur here are quite rare in this region and add to the scientific interest of the bogs within the overall site.

Depressions on the bogs, pool edges and erosion channels, where the vegetation is dominated by White Beaked-sedge (*Rhynchospora alba*) comprise the habitat Rhynchosporion. Associated species in this habitat at the site include Bog Asphodel, Sundews, Deergrass (*Scirpus cespitosus*) and Carnation

Sedge.

Degraded raised bog is present where the hydrology of the uncut bogs, has been affected by peat cutting and other land use activities in the surrounding area such as afforestation and associated drainage and also by the Moy arterial drainage. Species typical of the active raised bog habitat are still present but the relative abundance of them is different. A typical example of the degraded habitat, where drying has occurred at the edge of the high bog, contains an abundance and more uniform cover of Ling Heather (*Calluna vulgaris*), Carnation Sedge, Deergrass and sometimes Bog-myrtle (*Myrica gale*). Occurring in association with the uncut high bog are areas of wet regenerating cutover bog with species such as Common Cottongrass, bog mosses and Sundew, while on the drier areas, the vegetation is mostly dominated by Purple Moor-grass (*Molinia caerulea*). Natural regeneration with peat-forming capability will be possible over time with some restorative measures.

Alkaline fen is considered to be well developed within the site. An extensive stand occurs as part of a wetland complex at Mannin and Island Lakes on the Glenties River. Key diagnostic species of the Schoenus association characteristic of rich fens include the bryophytes *Campylium stellatum*, *Aneura pinguis*, *Scorpidium scorpioides*, and the herbaceous species Long-stalked Yellow-sedge (*Carex lepidocarpa*), Grass-of-Parnassus (*Parnassia palustris*) and Common Butterwort (*Pinguicula vulgaris*). Other fen species include Black Bog-rush (*Schoenus nigricans*), Purple Moor-grass (*Molinia caerulea*), Marsh Helleborine (*Epipactis palustris*), Meadow Thistle (*Cirsium dissectum*) and Blunt-flowered Rush (*Juncus subnodulosus*). The rare moss *Bryum uliginosum* occurs on exposed marl at a ditch to the east of Island Lake.

The open water of Loughs Conn and Cullin is moderately hard with relatively low colour and good transparency. The phytoplankton of the lake is dominated by diatoms and blue-green algae and there is evidence that the latter group is more common now than in former years. This indicates that nutrient inflow is occurring. Arctic Charr (*Salvelinus alpinus*) appear to have disappeared from the lake over the same period of time. The changes in Lough Conn appear to represent an early phase in the eutrophication process. Stoneworts still present include *Chara aspera*, *C. delicatula* and *Nitella cf. opaca*. Other plants found in the shallower portions are the pondweeds. Where there is a peat influence Intermediate Bladderwort (*Utricularia intermedia*) is characteristic while Water Lobelia (*Lobelia dortmanna*) often grows in sand. Narrow reedbeds and patches of Yellow Water-lily (*Nuphar lutea*) occur in some of the bays.

Drainage of the Moy in the 60s lowered the level of the lakes, exposing wide areas of stony shoreline and wet grassland, which are liable to flooding in winter. This increased the habitat diversity of the shoreline and created a number of marginal wetlands, including fens and marshes. Plant species of note in the lake-margin include Heath Cudweed (*Omalotheca sylvatica*), Great Burnet (*Sanguisorba officinalis*) and Irish Lady's-tresses (*Spiranthes romanoffiana*). These three species are listed on the Irish Red Data list and are protected under the Flora Protection Order 1999.

Other habitats present within the site include wet grassland dominated by Rushes (*Juncus spp.*) grading into species-rich marsh in which sedges are common. Among the other species found in this habitat are Yellow Iris (*Iris pseudacorus*), Water Mint (*Mentha aquatica*), Purple Loosestrife (*Lythrum salicaria*) and Soft Rush (*Juncus effusus*).

Grey Willow (*Salix cinerea*) scrub and pockets of wet woodland dominated by Alder (*Alnus glutinosa*) have become established in places throughout the site. Ash (*Fraxinus excelsior*) and Birch (*Betula pubescens*) are common in the latter and the ground flora is typical of wet woodland with Meadowsweet (*Filipendula ulmaria*), Angelica (*Angelica sylvestris*), Yellow Iris, Horsetail (*Equisetum spp.*) and occasional tussocks of Greater Tussock-sedge (*Carex paniculata*). Small pockets of conifer plantation, close to the lakes and along the strip both sides of the rivers, are included in the site.

The Moy system is one of Ireland's premier salmon waters and it also encompasses two of Ireland's best lake trout fisheries in Loughs Conn and Cullin. Although the Atlantic Salmon (*Salmo salar*) is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. The Moy is a most productive catchment in salmon terms and this can be attributed to its being a fingered system with a multiplicity of 1st to 5th order tributaries which are large enough to support salmonids < 2 years of age while at the same time

being too small to support significant adult trout numbers and are therefore highly productive in salmonid nursery terms.

Salmon run the Moy every month of the year. Both multi-sea-winter fish and grilse are present. The salmon fishing season is 1st February to 30th September. The peak of the spring fishing is in April and the grilse begin running in early May. The average weight of the spring fish is 9 lb and the grilse range from about 3-7 lb. In general spring fish are found more frequently in the rivers at the western extent of the Moy system.

The Arctic Char (*Salvelinus alpinus*), an interesting relict species from the last ice age, which is listed as threatened in the Irish Red Data Book has been recorded from Lough Conn and in only a few other lakes in Ireland. The latest reports suggest that it may now have disappeared from the site.

The site is also important for the presence of three other species listed on Annex II of the E.U. Habitats Directive, namely Sea Lamprey (*Petromyzon marinus*), Otter (*Lutra lutra*) and White-clawed Crayfish (*Austropotamobius pallipes*). The Sea Lamprey is regularly encountered in the lower stretches of the river around Ballina, while the otter and crayfish are widespread throughout the system. In addition, the site also supports many more of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger, Irish Hare and Daubenton's Bat. Common Frog, another Red Data Book species, also occurs within the site.

Loughs Conn and Cullin support important concentrations of wintering waterfowl and both are designated Special Protection Areas. A nationally important population of the Annex I species Greenland White-fronted Geese (average 113 over 6 winters 1994/95 to 1999/00) is centred on Lough Conn. Whooper Swans also occur (numbers range between 25 to 50), along with nationally important populations of Tufted Duck 635, Goldeneye 189 and Coot 464. A range of other species occur on the lakes in regionally important concentrations, notably Wigeon 303, teal 154, Mallard 225, Pochard 182, Lapwing (>1,000) and Curlew 464. Golden Plover also frequent the lakes, with numbers ranging between 700 and 1,000.

Loughs Conn and Cullin are one of the few breeding sites for Common Scoter in Ireland. Breeding has occurred on Lough Conn since about the 1940s when about 20-30 pairs were known. A census in 1983 recorded 29 pairs. Breeding was first proved on Lough Cullin in 1983 when 24 pairs were recorded. In 1995, 24-26 pairs were recorded at Lough Conn and 5 pairs at Lough Cullin. The latest survey in 1999 gives a total of 30 birds for both lakes, comprising only 5 pairs, 18 unpaired males and 2 unpaired females. The reason for the decline is not known but may be due to predation by mink, possible changes in food supply and/or redistribution to other sites. The Common Scoter is a Red listed species.

Agriculture, with particular emphasis on grazing, is the main landuse along the Moy. Much of the grassland is unimproved but improved grassland and silage are also present. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the large lakes. Fishing is a main tourist attraction on the Moy and there are a large number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The North Western Regional Fishery Board have erected fencing along selected stretches of the river as part of their salmonid enhancement programme. Other aspects of tourism are concentrated around Loughs Conn and Cullin.

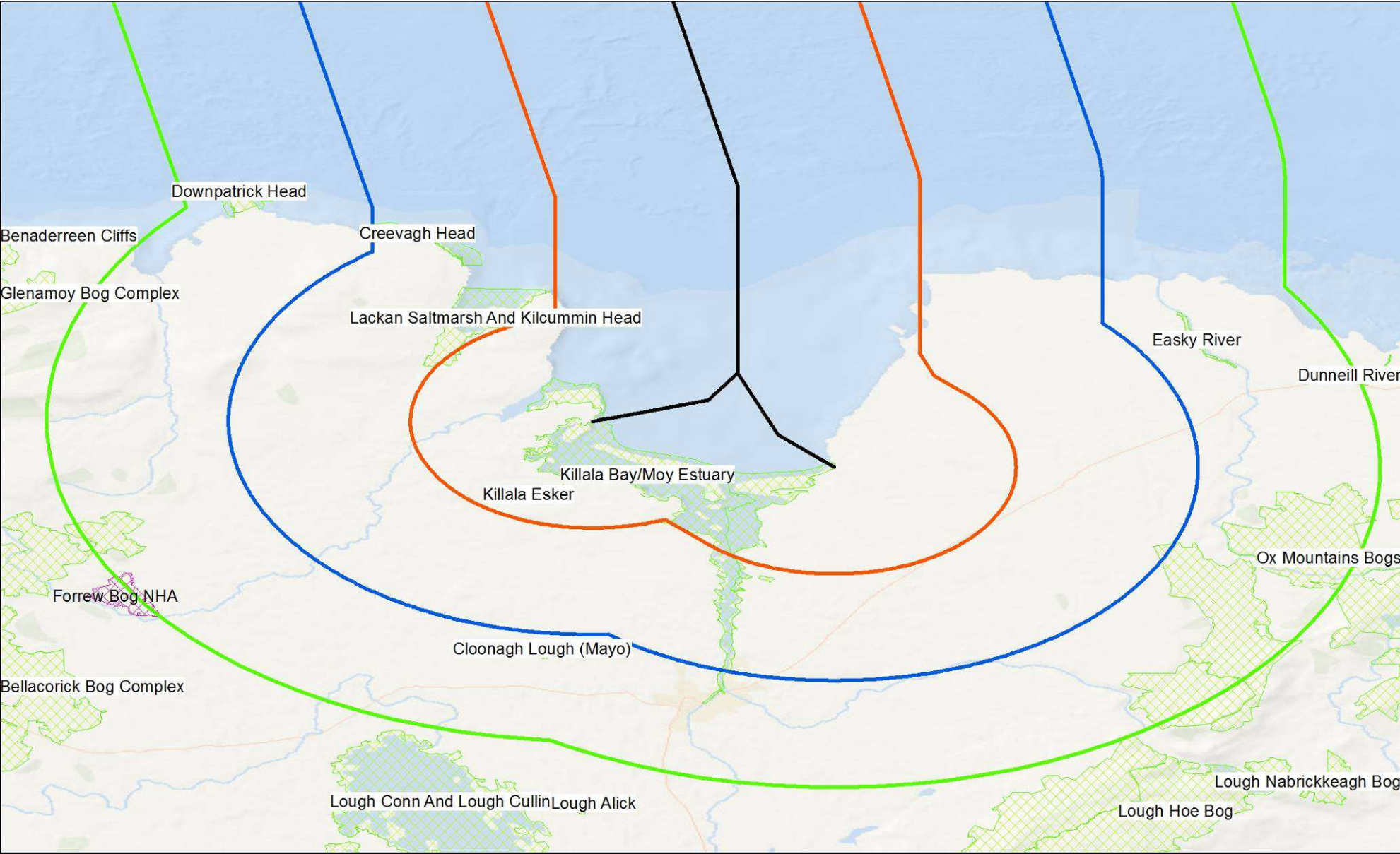
Afforestation has occurred in the past around the shores of Loughs Conn and Cullin. The coniferous trees are due for harvesting shortly. It is proposed to replant with native tree species in this area. Forestry is also present along many of the tributaries and in particular along the headwaters of the Deel. Forestry poses a threat in that sedimentation and acidification occurs. Sedimentation can cover the gravel beds resulting in a loss of suitable spawning grounds. The Moy has been arterially dredged in the 60s. Water levels have been reduced since that time. This is particularly evident along the shores of Loughs Conn and Cullin and in the canal-like appearance of some river stretches. Ongoing maintenance dredging is carried out along stretches of the river system where the gradient is low. This is extremely destructive to salmonid habitat in the area.



The site supports populations of several species listed on Annex II of the EU Habitats Directive, and habitats listed on Annex I of this directive, as well as examples of other important habitats. The presence of a fine example of broad-leaved woodland in this part of the country increases the overall habitat diversity and adds to the ecological value of the site as does the presence of the range of nationally rare and Red Data Book plant and animal species.

29.9.2010

Appendix II: Proposed Natural Heritage Areas within 15km of the proposed route.



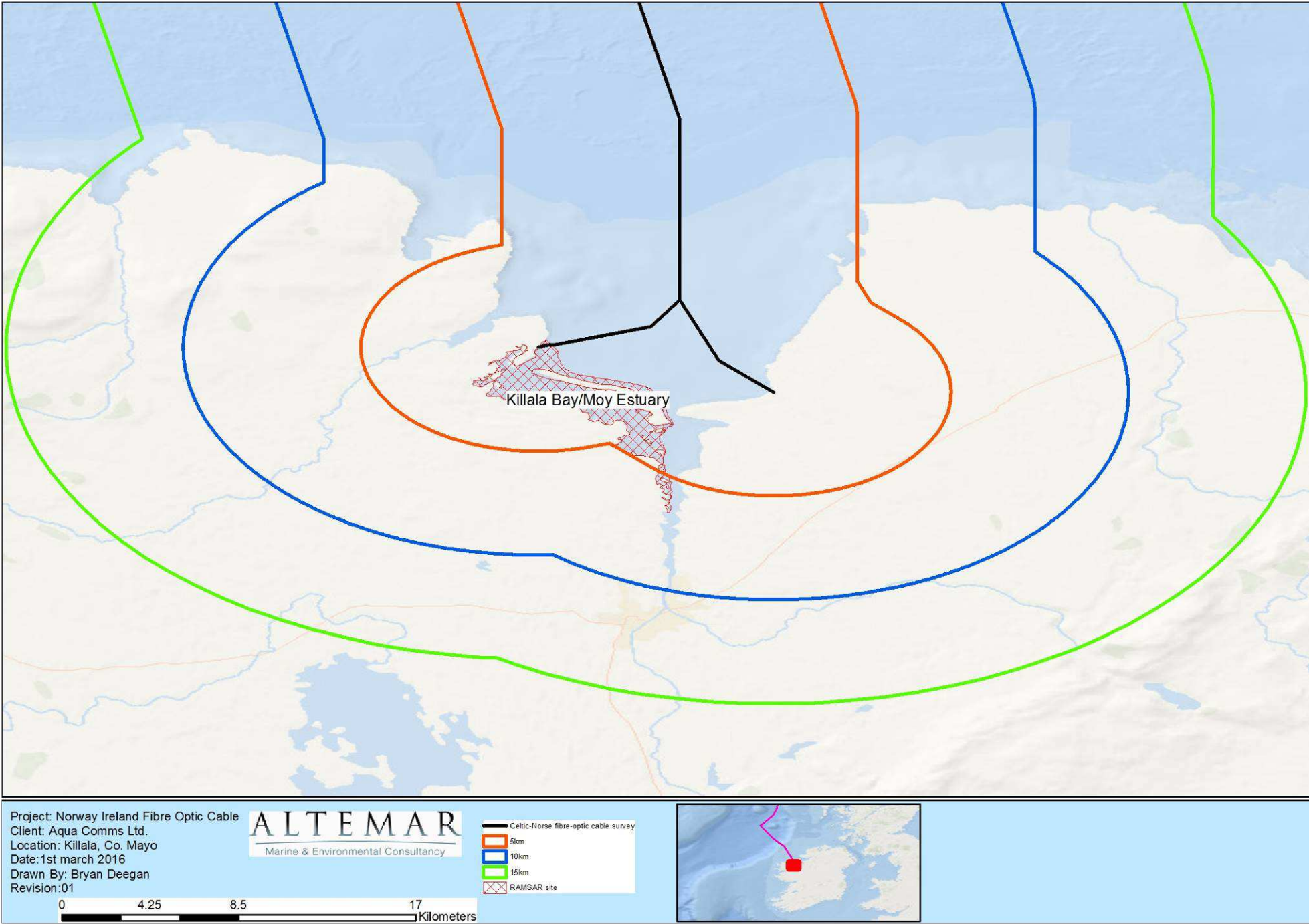
Project: Norway Ireland Fibre Optic Cable  
 Client: Aqua Comms Ltd.  
 Location: Killala, Co. Mayo  
 Date: 1st march 2016  
 Drawn By: Bryan Deegan  
 Revision: 01

**ALTEMAR**  
 Marine & Environmental Consultancy

Celtic-Norse fibre-optic cable survey  
 5km  
 10km  
 15km  
 NHA  
 pNHA

0 4.5 9 18 Kilometers

Appendix III Ramsar Sites within 15km of the proposed route.



## **APPENDIX 2**

### **ROUTE POSITION LIST**



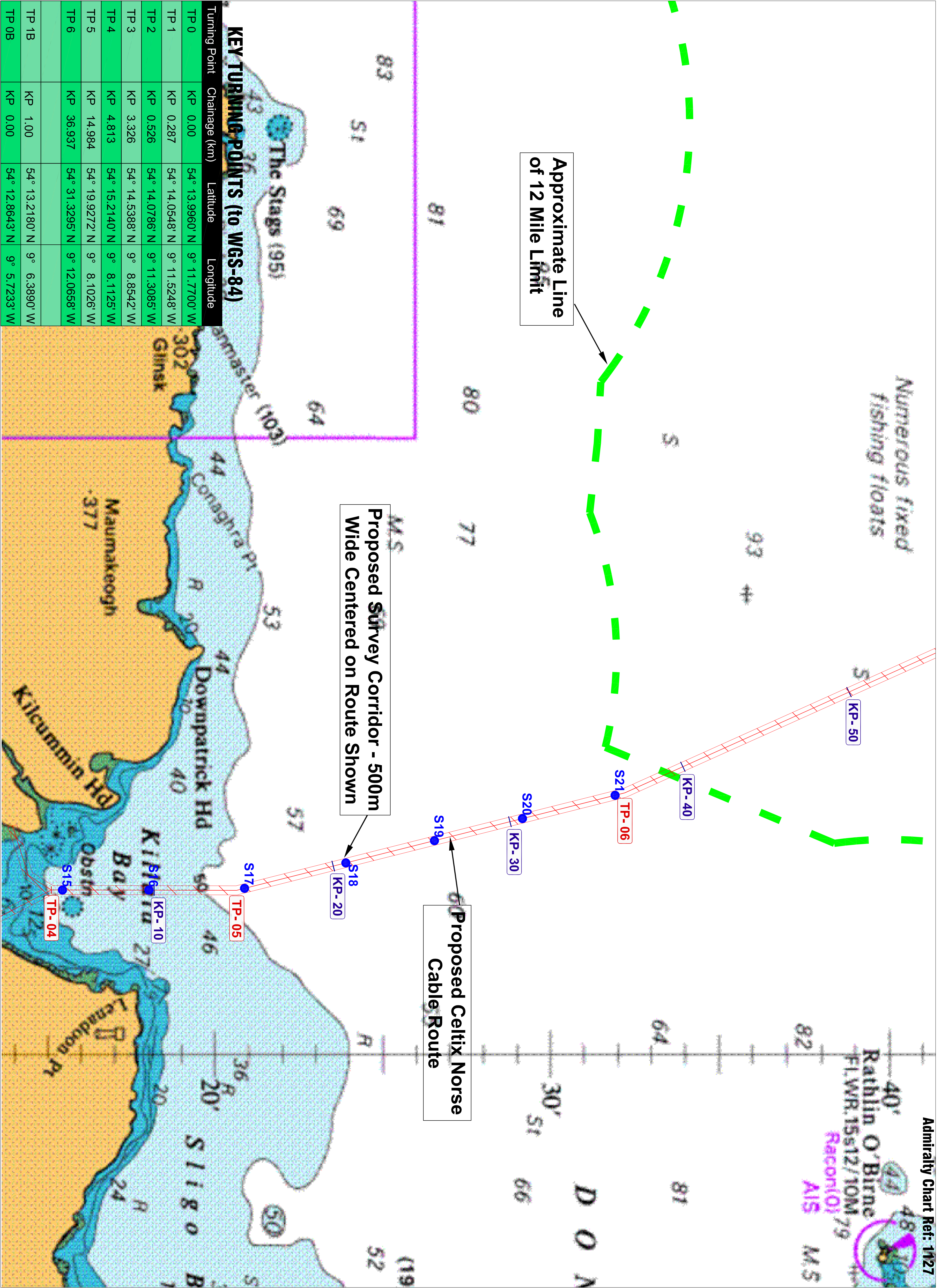
# KEY TURNING POINTS (to WGS-84)

Turning Point	Chainage (km)	Latitude	Longitude
TP 0	KP 0.00	54° 13.9960' N	9° 11.7700' W
TP 1	KP 0.287	54° 14.0548' N	9° 11.5248' W
TP 2	KP 0.526	54° 14.0786' N	9° 11.3085' W
TP 3	KP 3.326	54° 14.5388' N	9° 8.8542' W
TP 4	KP 4.813	54° 15.2140' N	9° 8.1125' W
TP 5	KP 14.984	54° 19.9272' N	9° 8.1026' W
TP 6	KP 36.937	54° 31.3295' N	9° 12.0658' W
TP 1B	KP 1.00	54° 13.2180' N	9° 6.3890' W
TP 0B	KP 0.00	54° 12.8643' N	9° 5.7233' W

## **APPENDIX 3**

### **DRAWINGS**

- 1294-101    FORESHORE LICENCE MAP 1**  
**SITE INVESTIGATIONS ROUTE – OFFSHORE**
  
- 1294-102    FORESHORE LICENCE MAP 2**  
**SITE INVESTIGATIONS ROUTE – INSHORE**
  
- 1294-103    SITE LOCATION MAP 1**  
**LANDFALL OPTION AT ROSS BEACH KILLALA**
  
- 1294-104    SITE LOCATION MAP 2**  
**LANDFALL OPTION AT ENNISCRONE BEACH**



Proposed Offshore Survey Corridor for the Celtix Norse Cable at Killalua Bay

Scale

1:100,000 @ A1

1:200,000 @ A3

NOTES

- TP Turning Point
- KP - x Kilometer Point at x km from TP0
- SX Sample Point X

1. Proposed survey corridor is 500m wide, centered on the route shown.

CLIENT



AQUACOMMS

PROJECT

Celtix Norse  
Fibre Optic Cable

TITLE

Foreshore Licence Map 1  
Site Investigations Route  
Offshore

0	15/03/2016	Initial Drawing
REV	DATE	DESCRIPTION

PROJECT NUMBER	1294
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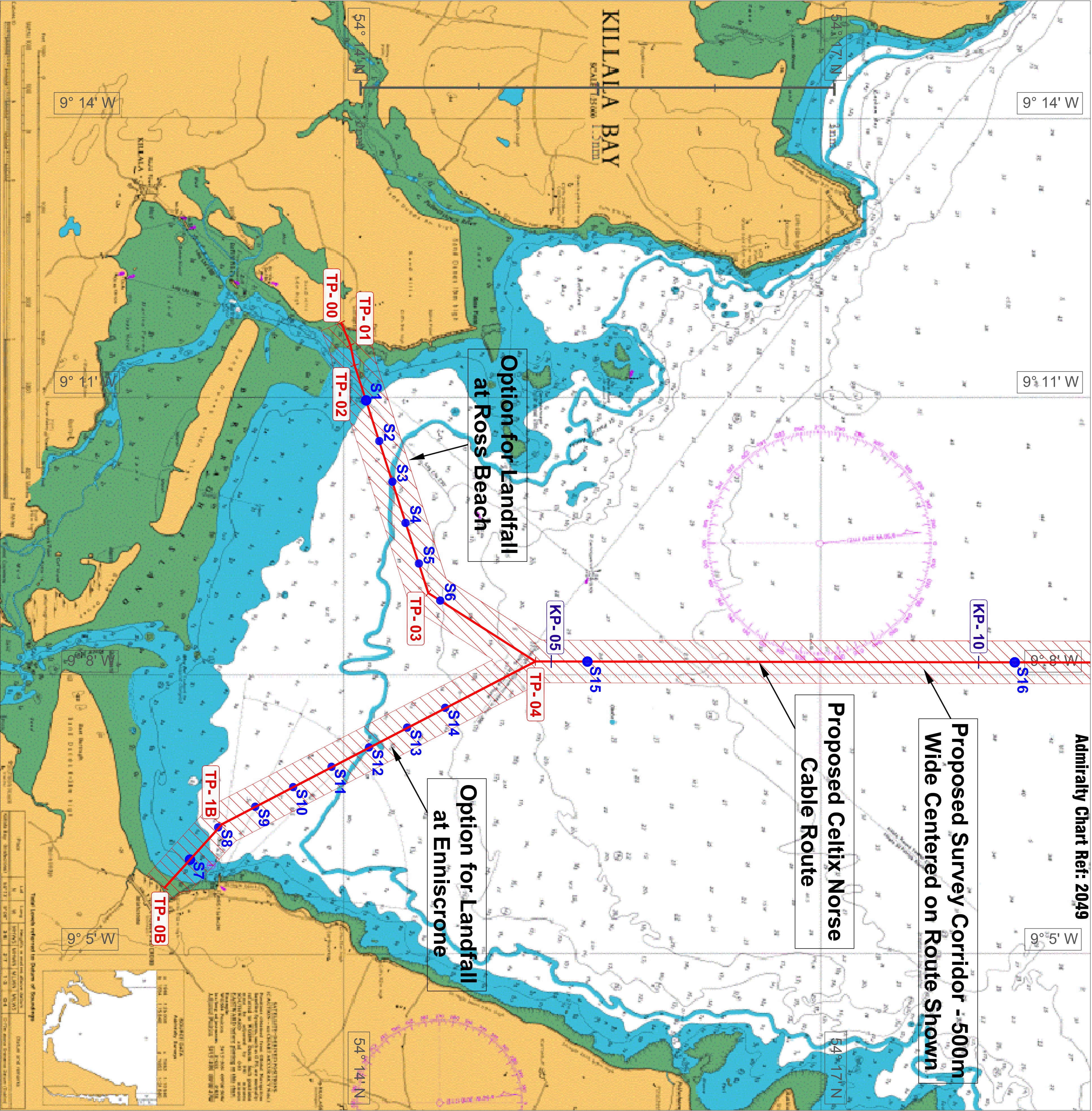
DRAWING NUMBER	1294-101
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DRAWN BY	AE	SCALE
CHECKED BY	RR	
APPROVED BY	TJMcM	AS SHOWN



Turning Point	Chainage (km)	Latitude	Longitude
TP 0	KP 0.00	54° 13.9960' N	9° 11.7700' W
TP 1	KP 0.287	54° 14.0548' N	9° 11.5248' W
TP 2	KP 0.526	54° 14.0786' N	9° 11.3085' W
TP 3	KP 3.326	54° 14.5388' N	9° 8.8542' W
TP 4	KP 4.813	54° 15.2140' N	9° 8.1125' W
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TP 6	KP 36.937	54° 31.3295' N	9° 12.0658' W
TP 1B	KP 1.00	54° 13.2180' N	9° 6.3890' W
TP 0B	KP 0.00	54° 12.8643' N	9° 5.7233' W

KEY TURNING POINTS (to WGS-84)



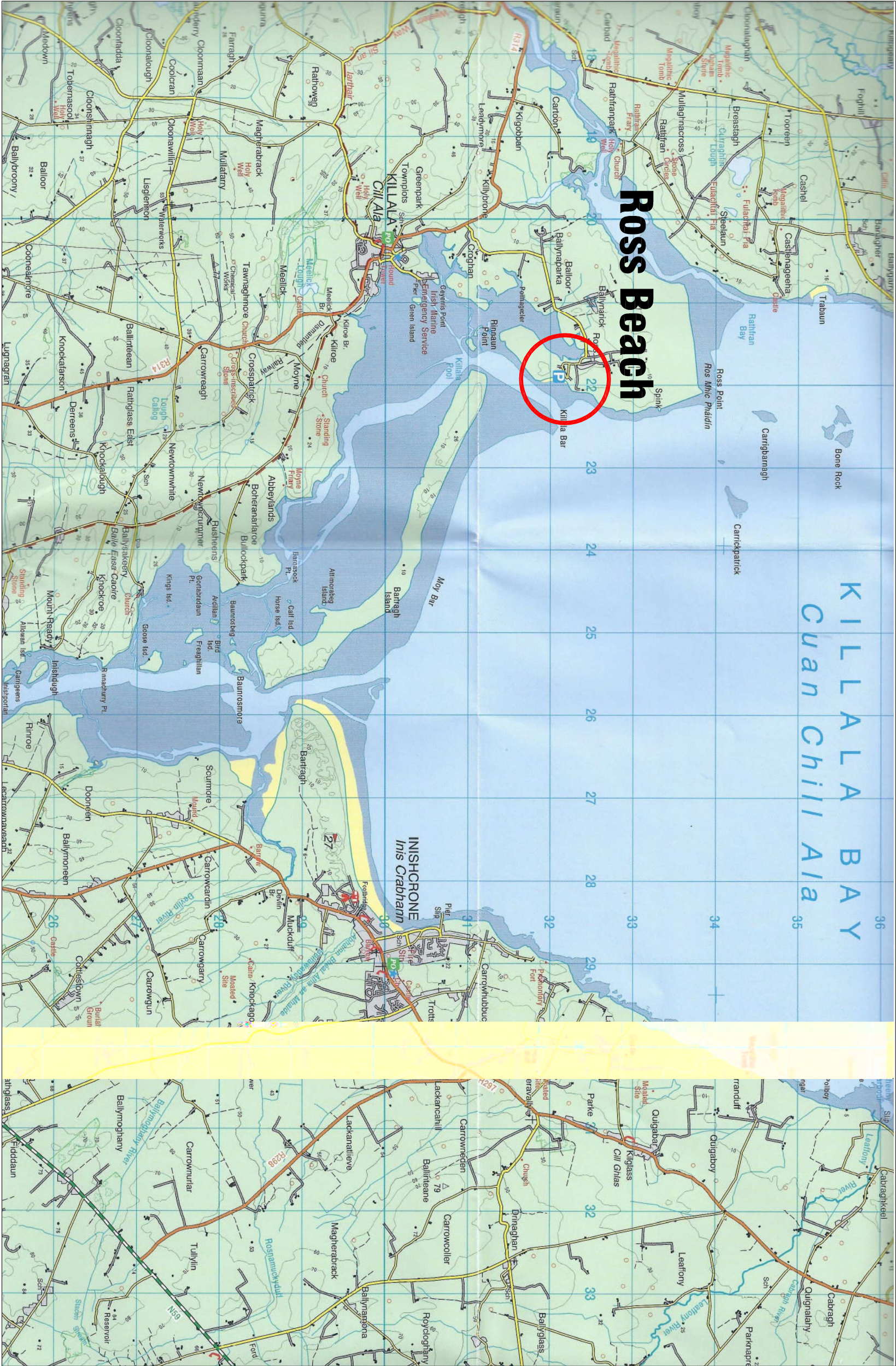
Proposed Inshore Survey Corridor for the Celtix Norse Cable at Killalua Bay

Scale  
1:25,000 @ A1  
1:50,000 @ A3

NOTES	
TP	Turning Point
KP - x	Kilometre Point at x km from TP0
SX	Sample Point X
1. Proposed survey corridor is 500m wide, centered on the route shown.	
CLIENT	
PROJECT Celtix Norse Fibre Optic Cable	
TITLE Foreshore Licence Map 2 Site Investigations Route Inshore	
REV	DATE
0	15/03/2016
PROJECT NUMBER 1294	
DRAWING NUMBER 1294-102	
DRAWN BY	AC
CHECKED BY	RR
APPROVED BY	TJMcGW
SCALE As Shown	
MDM McMahon Design & Management Ltd. Consulting Engineers - Project Managers - 15 The Square Building, Queen's Road, Dublin 3 Tel: 01 509 0000 Fax: 01 509 0000 Email: info@mdm.ie	

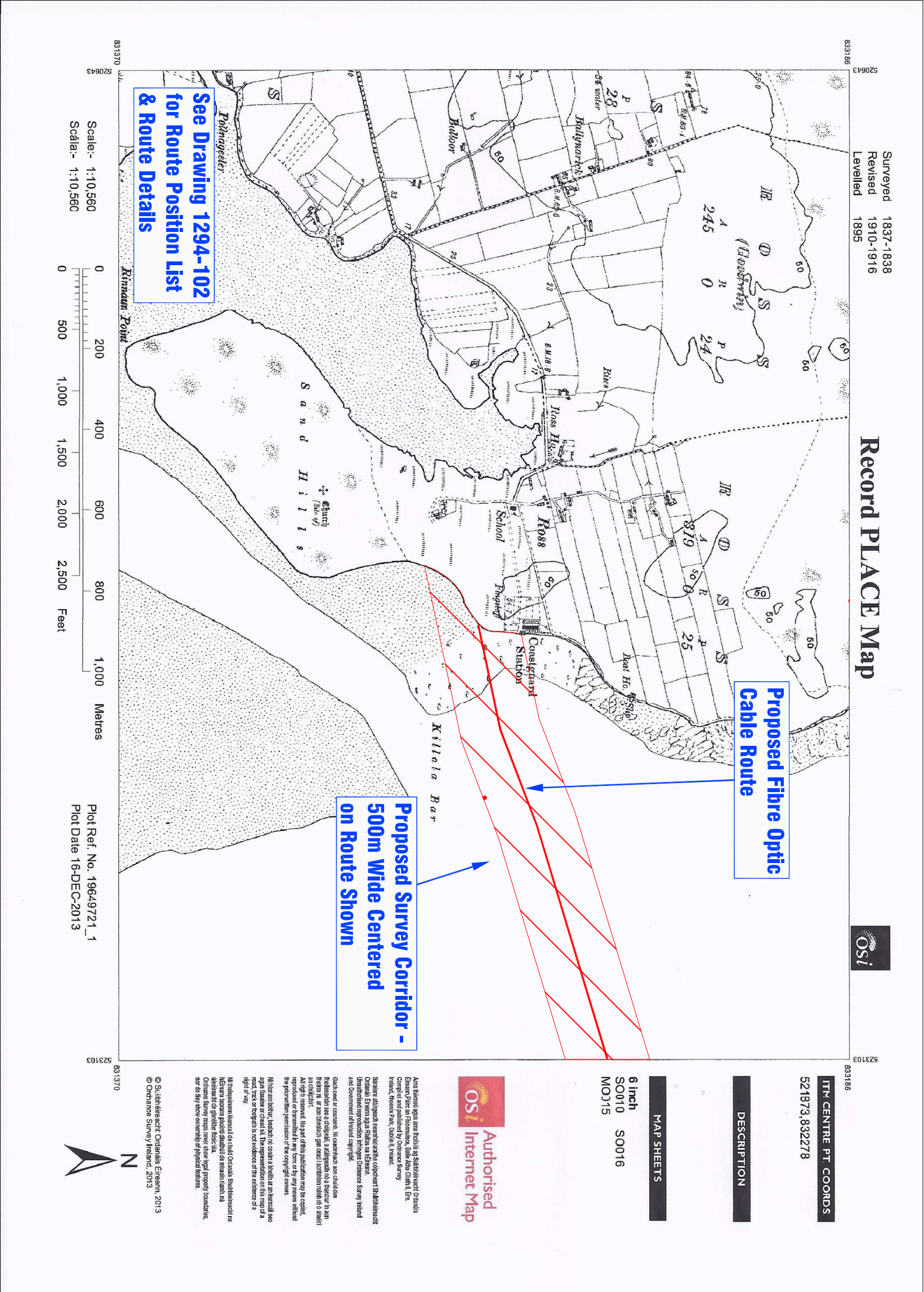


Landfall Option  
at Ross Beach



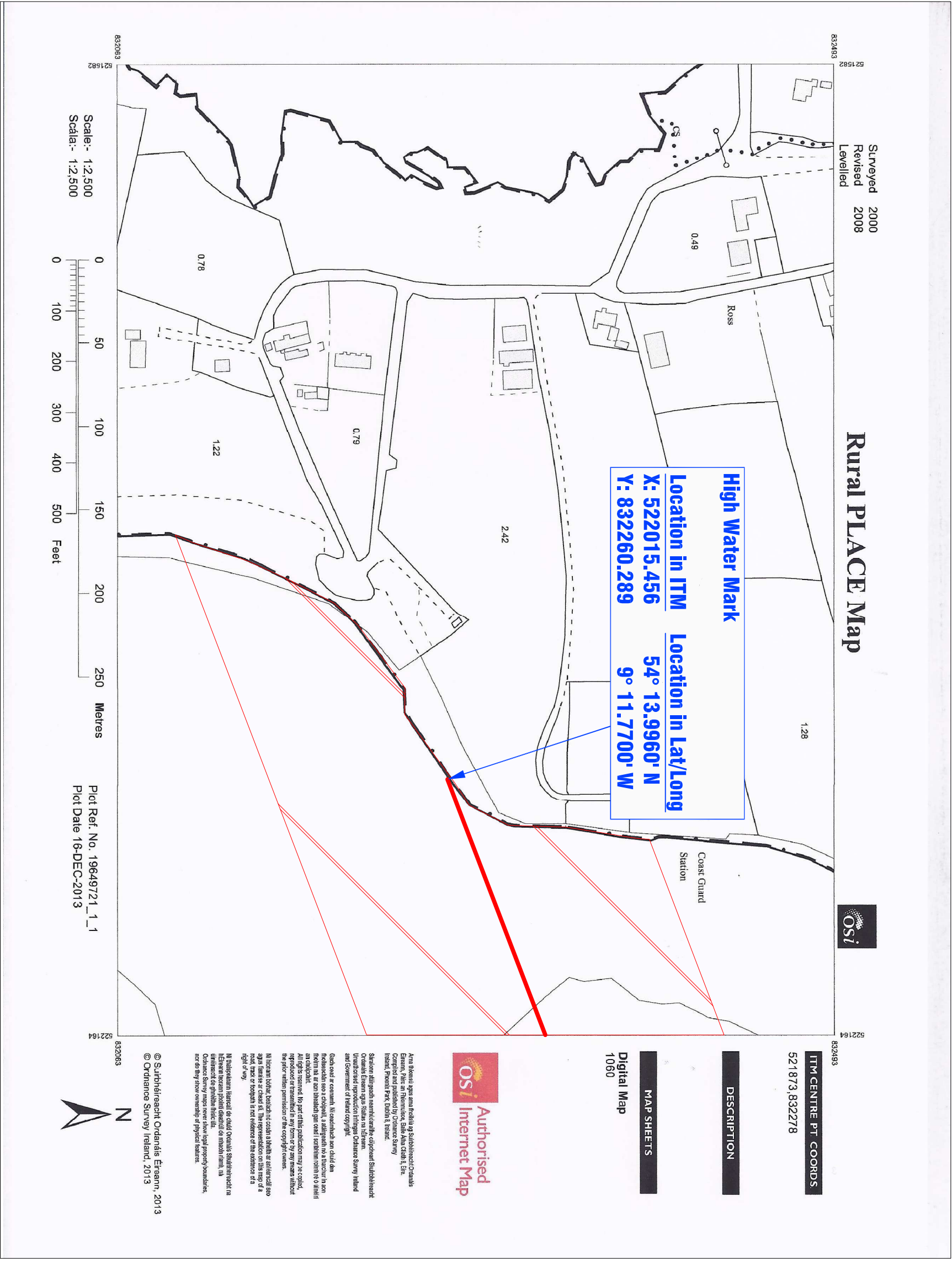
Discovery Map with National Grid Co-ordinates

1:50,000 @ A1  
Scale  
1:100,000 @ A3



6" OS Map - ITM Co-ordinates

1:10,560 @ A1  
Scale  
1:21,120 @ A3



1:2,500 OS Map - ITM Co-ordinates

1:2,500 @ A1  
Scale  
1:5,000 @ A3

NOTES

KP - x Kilometre Point at  
x km from BMH

1. Survey corridor is 500m wide,  
centered on the route shown.

CLIENT



AQUACOMMS

PROJECT

Celtix Norse  
Fibre Optic Cable

TITLE

Site Location Map 1  
Landfall Option at Ross Beach  
Killala

REV	DATE	DESCRIPTION
0	15/03/2016	Initial Drawing

PROJECT NUMBER  
1294

DRAWING NUMBER  
1294-103

DRAWN BY	RC	SCALE
CHECKED BY	TJMCW	
APPROVED BY	TJMCW	AS SHOWN

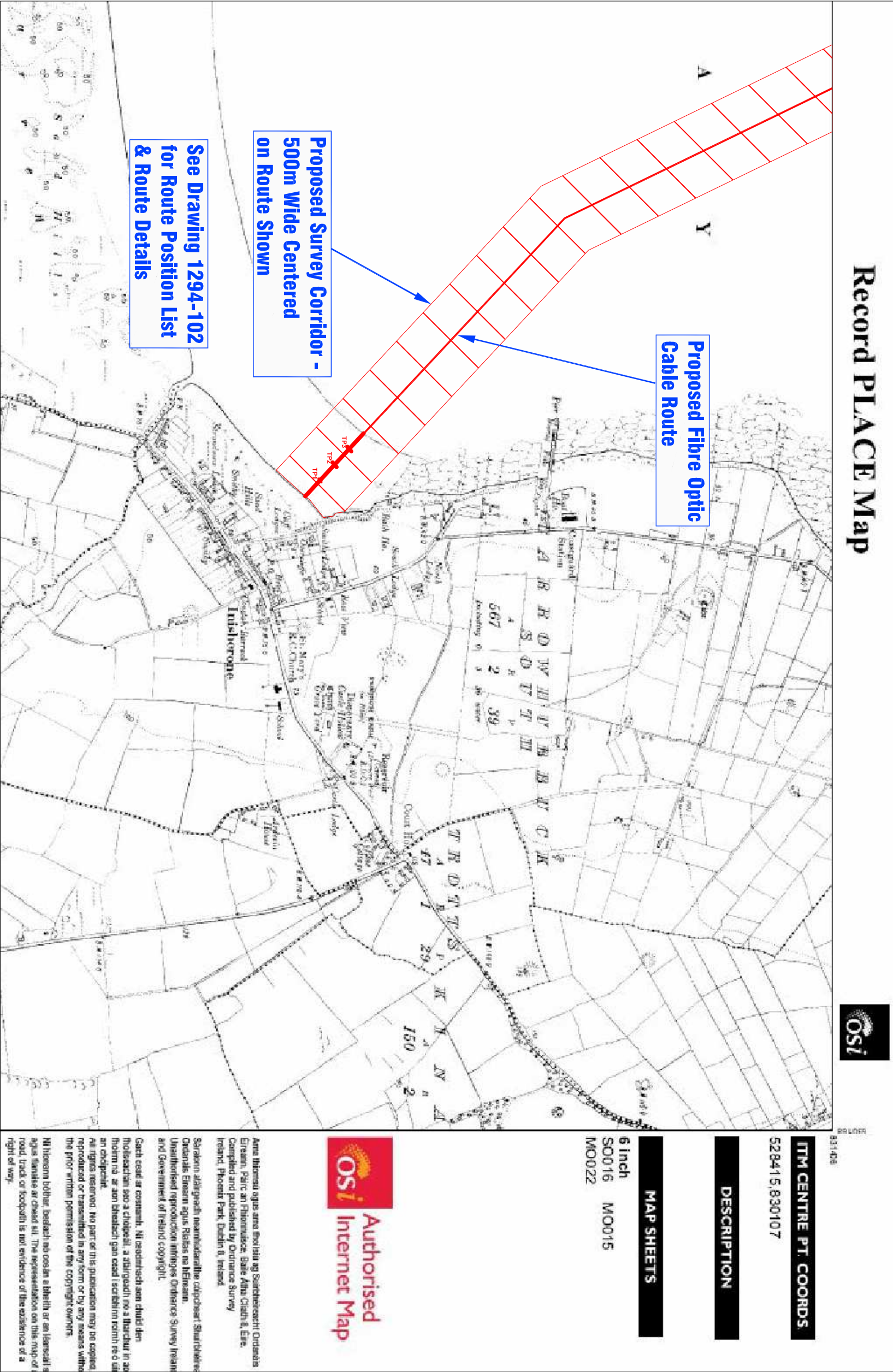


Landfall Option  
at Enniscrone



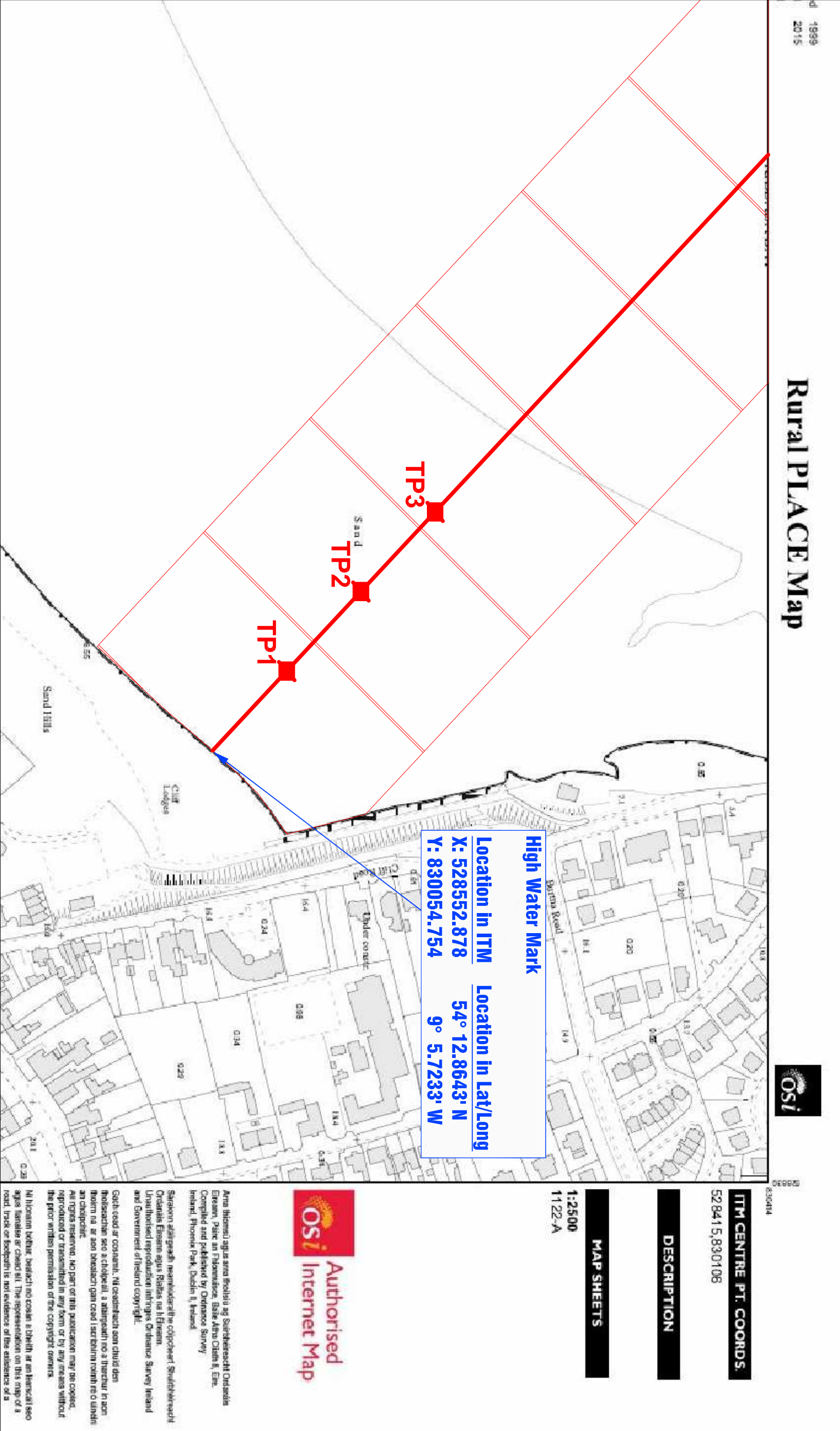
Discovery Map with National Grid Co-ordinates

1:50,000 @ A1  
Scale  
1:100,000 @ A3



6" OS Map - ITM Co-ordinates

1:10,560 @ A1  
Scale  
1:21,120 @ A3



1:2,500 OS Map - ITM Co-ordinates

1:2,500 @ A1  
Scale  
1:5,000 @ A3

NOTES

KP - x Kilometre Point at  
x km from BMH  
TPx Trial Pit x

1. Survey corridor is 500m wide,  
centered on the route shown.

CLIENT



AQUACOMMS

PROJECT

Celtix Norse  
Fibre Optic Cable

TITLE

Site Location Map 2  
Landfall Option at Enniscrone

REV	DATE	DESCRIPTION
0	15/03/2016	Initial Drawing

PROJECT NUMBER  
1294

DRAWING NUMBER  
1294-104

DRAWN BY	RC	SCALE
CHECKED BY	TJ/MCM	AS SHOWN
APPROVED BY	TJ/MCM	AS SHOWN