III

FIVE ESTUARIES OFFSHORE WIND FARM

10.20.10 TECHNICAL NOTE - MINIMUM ONSHORE CABLE BURIAL DEPTH

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CONTENTS

Relevant Documents	
REP5-034	9.21 Code of Construction Practice
AS-042	6.3.1 Onshore Project Description
APP-235	9.5 Mineral Resources
ESQCR 2002	The Electricity Safety, Quality and Continuity Regulations 2002

1. OVERVIEW

1.1 REQUEST FOR TECHNICAL NOTE

1.1.1 This technical note is provided in response to ISH6 action point 10:

> 1. *Submission of reasoning as to why the proposed onshore cable could not be installed at a minimum level of 1.2 metres in all locations, including examples of how the Applicant would approach immovable obstacles.*

1.2 CONTEXT OF THE REQUEST

1.2.1 As shown in Table 1.3 of the 6.3.1 Onshore Project Description – Revision C [AS-041], the project aims to install with a minimum soil cover to the warning tape of 0.9m, which is recognised as the industry standard. Typically this minimum cover will result in a depth of burial of at least 1.05m, due to the protection tiles and cement bound sand surrounding the cable ducts. 1.2m is provide as an indicative depth in figure 1.11 within of the 6.3.1 Onshore Project Description – Revision C [AS-041].

1.2.2 The Applicant will endeavour to reach a depth of burial of 1.2m although in certain ground conditions, for example presence of large rocks, this may not be possible.

1.2.3 A second consideration with regards to depth of burial is the depth of any existing land drainage or other utilities. The depth of existing drainage will vary along the cable corridor, it is expected that the majority of drainage systems will be located above the installed cables due to the typical depth that drainage is buried at along the cable route, but this may not be possible in all locations, as it is understood some drainage may be buried closer to 3m depth.

1.2.4 Flexibility is required to deal with a range of possible situations across the cable route, this technical note provides further description for cases where the 1.2m depth to the top of the cable duct may not be possible.

1.2.5 Geological conditions detailed in section 4 of the 9.5 Minerals Resource Assessment [APP-235] does not indicate that the geology along the cable route presents any notable challenge to the Applicant for installing the cables. It is considered that the presence of large rocks is unlikely / uncommon, however these have been noted anecdotally to be present on occasion. The Applicant must ensure there is sufficient flexibility to cover this risk.

2. CABLE BURIAL SCENARIOS

2.1.1 To comply with the Electricity, Safety, Quality and Continuity Regulations Act 2002 the cables have to be buried deep enough, so far as is reasonably practicable, to protect it from any damage or danger by reason of such uses of the land which can be reasonably expected.

2.1.2 Considering the majority of the cable route is farmland, the project must make reasonably practicable efforts to bury the cables at a depth that will not restrict farming.

2.1.3 To this end the project has adopted the target burial depths that are consistent with industry standards for agricultural land.

2.1.4 There are scenarios where the project cannot achieve these depths. This is allowed for within the regulations as the legislation requirement is “as far as reasonably practicable”.

2.1.5 Some scenarios are outlined below to give examples where reasonably practicable efforts can be made to meet this criteria, and where it may not be possible.

2.2 ROUTE AROUND THE OBJECT

2.2.1 In the case that an object is blocking all or part of the planned cable route, the primary plan would be to alter the cable route to go around the object.

2.2.2 Figure 1 provides an indicative view of the solution that could be taken to route the cable around an object.

2.2.3 Whether this approach is feasible will be dependent on a number of factors such as:

- Ensuring the cable minimum bend radius is maintained
- Size of the rock and depth
- Position of the cable within the cable corridor
- Existing infrastructure and constraints (e.g. archaeological features, protected habitats, watercourses and other environmental constraints).

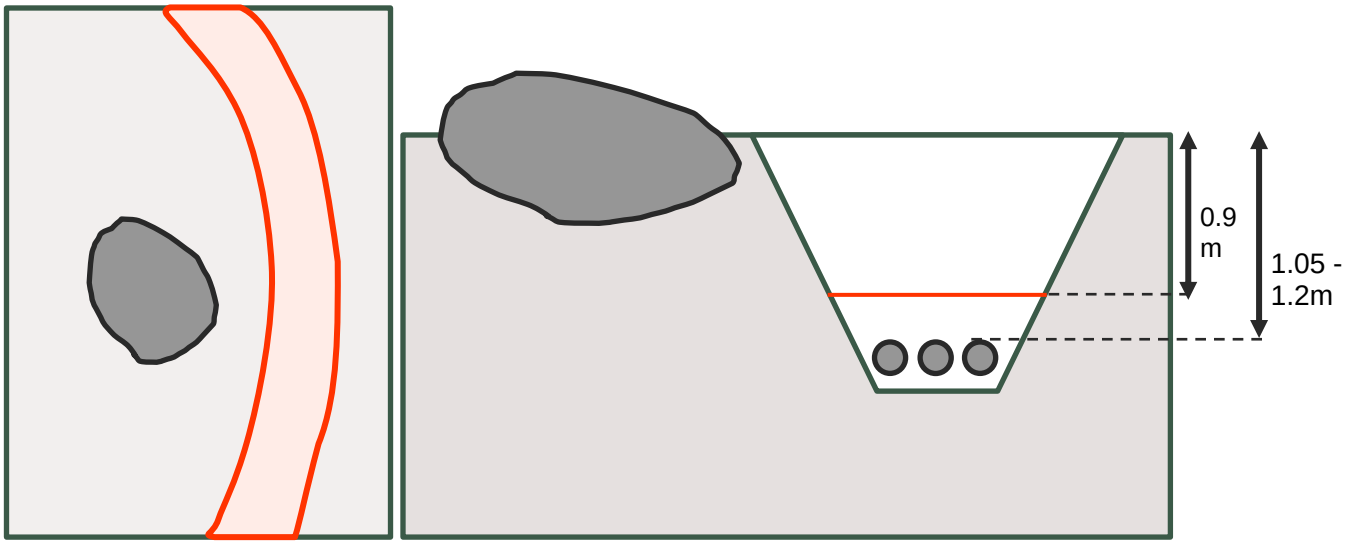

Figure 1: Overhead View and Cross section of a cable routed around an object

2.3 REMOVE THE OBJECT

2.3.1 In the case that it is not possible to route the cable around the object due to the limitations stated in 2.2.3, the possibility of remove/breaking out the rock or part of the rock would be evaluated.

2.3.2 This is sketched in Figure 2 and 3.

2.3.3 The approach taken to removal / excavation of the rock depends on the depth, size, strength and shape of the rock. Some rocks may be removed in their entirety; and others may be excavated using rock ripping tools. The most suitable removal tool would be defined after the type of rock or obstruction is determined.

2.3.4 In both of these scenarios the minimum cover of 1.05 to 1.2m is achieved.

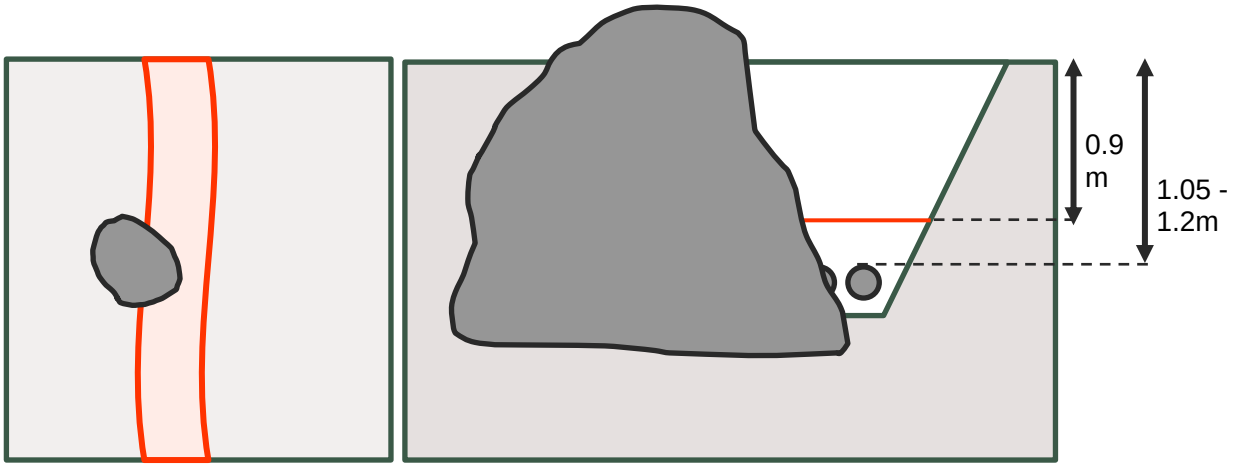

Figure 2: Overhead View and Cross section of an example of large rock which can be broken or removed (pre-removal).

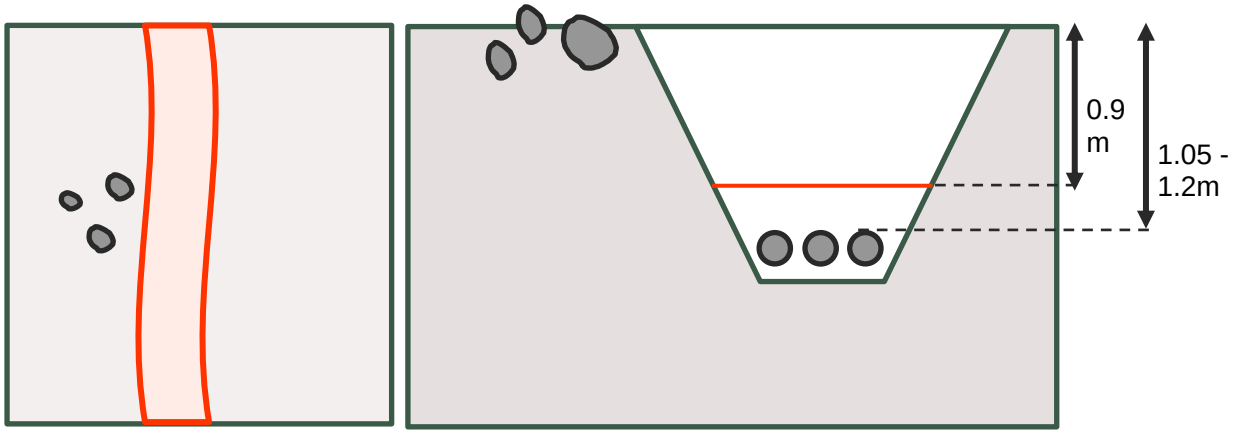

Figure 1: Overhead View and Cross section of an example of large rock which can be broken or removed (post removal).

2.4 LARGE ROCK – MOVE CABLE HIGHER UP

2.4.1 Where it is not possible to route around or remove the rock, the only option to bury the cable shallower than the 1.2m depth.

2.4.2 An example scenario is shown in Figure 4 where constraints such as archeology, tree root protection zones, and third-party infrastructure zones, and third-party infrastructure mean that the rock cannot be routed around and still maintain the cable's minimum bend radius.

2.4.3 If this situation occurred and an assessment of the rock strength indicates that rock excavation is not possible then the cable may have to be buried shallower than 1.2m to the top of the duct.

2.4.4 In this scenario there will be a discussion with the landowner to discuss the options available, and any post installation mitigations that may need to be in place to ensure safety of future operations.

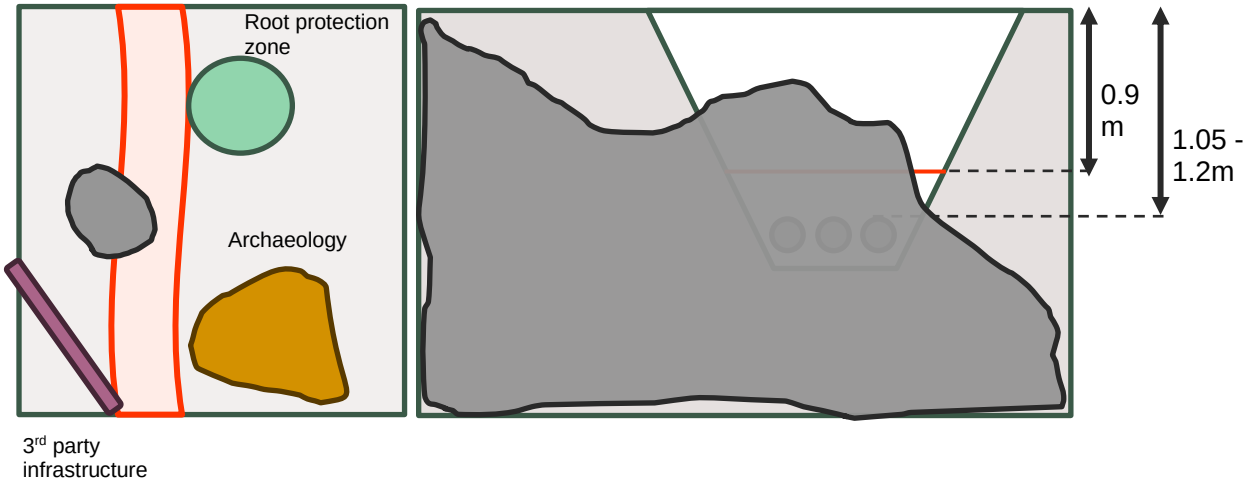

Figure 4: Overhead View and Cross section of an example of large rock which cannot be broken or removed.

FIVE ESTUARIES
OFFSHORE WIND FARM

PHONE 0333 880 5306
EMAIL fiveestuaries@rwe.com
WEBSITE www.fiveestuaries.co.uk
ADDRESS Five Estuaries Offshore Wind Farm Ltd
Windmill Hill Business Park
Whitehill Way, Swindon, SN5 6PB
COMPANY NO Registered in England and Wales
company number 12292474