Deadline VII Appendix 7 – Outline Method Statement on Horizontal Directional Drilling
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Introduction

Purpose of this document

1. This outline method statement provides a framework for a future method statement for works associated with horizontal directional drilling (HDD), to be completed as part of future detailed construction planning.
Outline Method Statement

Introduction

2 This document contains an outline method statement. The detailed method statement will be completed as part of the detailed construction planning phase, prior to commencing construction of the high voltage direct current (HVDC) and high voltage alternating current (HVAC) cable routes. The detailed method statement will be defined post-consent once the relevant contractors have been appointed.

3 All sections of this method statement will be produced in line with best practice and relevant legislation, and have regard to mitigation measures and commitments made as part of the consents and licenses for the project, including all those referenced as part of the Code of Construction Practice (CoCP) and Construction Environmental Management Plan (CEMP).

4 The contractor responsible for the installation of the onshore cable systems by horizontal directional drilling (HDD) techniques will establish temporary construction compounds for the location of equipment, storage areas, welfare facilities and etc at the launch and receive drill areas on the cable route wherever there is an HDD planned.

Why Do Horizontal Directional Drill

5 The preferred method of laying cables is by burying them in an open-cut trench. This is described in Chapter 5 Project Description, of the Environmental Statement (ref: 6.5).

6 There are obstacles on the route where it is not possible carry out open cut trenching such as rivers, large watercourses, Network Rail tracks and A-class roads. Also local authorities and Highways agencies may request that smaller roads are not open cut trenched. Other areas where open cut trenching would not be used to minimise the impact of trenching are SSI sites or as in the case at Figham Common.

7 In agricultural situations open cut methods are always preferred as these are the most efficient and economic means of crossing fields. At watercourses it depends on the width and depth of the watercourse and there are many where final decisions to HDD or open cut are made at detail design stage depending on several factors such plant availability, timing, costs and available resources.

Horizontal Directional Drill

8 HDD is the preferred method of cable installation to cross large obstacles such as watercourses, roads and sensitive areas such as Figham Common. It is a steerable trenchless method for installing underground ducts and cables in a shallow arc along a prescribed bore path by using a surface launched drilling rig.

9 HDD has the advantage of minimising impacts to surface areas and reducing the levels of reinstatement requirement. It is a well-established and appropriate technique for crossing difficult terrains and sensitive features.

10 HDD techniques can be undertaken through most soil types. Problems may arise in variable ground conditions where the drill will tend to follow the weakest strata layer. The drill can be driven off course by changes in soil stiffness from soft deposits to stiffer or
denser deposits. The drill can also be driven off course by boulders and large cobbles which may be encountered in boulder clay. However, close monitoring of the drilling operation can overcome most of these issues. Suitable methods for drilling rock are also available using HDD.

Working Areas

11 The working areas have been calculated on the basis of engineering studies conducted as part of the EIA work – details are shown in ES chapter 5 and its associated appendices. Depending upon the location and length of the HDD the working area will ranging in size from 2120m² to 1296m². The area is required for the drilling rig itself during operation, as well as a range of associated facilities, including storage for associated materials and equipment, welfare facilities and space for HGV tanker vehicles to provide lubrication water and removal of liquid slurry arising from the drilling operation. Should additives need to be introduced to the bore then area for a batching plant will be required. Likewise, should recycling of the waste slurry be required then an area should also be allowed for a recycling plant and / or a settlement lagoon. A working area will need to be allowed for excavators to remove slurry from the ground surface.

12 At the receiving pit where the drill exits the HDD operation, working space will be required to construct the proposed receiving duct. This needs to be constructed prior to the HDD operation commencing.

13 The working areas are set in a similar manner to that described in F-EXC-RW-DVII-App6, Method Statement on Temporary Working Compounds.

Method of Work/Sequence of Events

14 The typical activities which comprise an HDD operation are summarised below:

- Site survey and bore planning;
- Preparation of site for HDD operation;
- HDD Drilling operation;
- Demobilisation from site; and
- Preparation and submission of record documentation.

Work Phase 1: Site Survey and Bore Planning

15 A survey team will attend the site and map out the bore paths. The survey team will create an accurate plan and elevations of the proposed duct route. Geotechnical surveys by borehole will be undertaken as necessary to understand the subsoil strata. During the survey any buried services which are in close proximity to the route will be clearly marked and documented on the survey drawings and where possible also on site.

16 A bore plan and profile will be created from the results of the survey. The plan will provide final information on the proposed bore arc position including entrance and exit.
points and the radius of curvature required to sufficiently embed the duct. The plan will be used to determine the length of the bore. Information on all buried services close to the bore path will also be contained within the bore plan and where necessary the bore plan will be amended to avoid these services.

**Work Phase 2: Preparation of Site**

**Launch Pit Site**

17 To accommodate a typical HDD launch pit, a rectangular area would be prepared, sized to suit the scale of the HDD operation being undertaken.

18 The main access to the site would be, in the first instance, via public roads or an access road designed to accommodate heavily loaded vehicles and heavy plant. The HDD plant would then access the launch pit site via the haul road installed alongside the trench for the majority of the route, and including watercourse crossings via bailey bridges or similar.

19 A regular supply of fresh water will be required on site at all times either via a reliable pumped source or water tankers. If a continuous supply of water cannot be provided then storage tanks may be required on site for water and additional space may be required for these.

20 Storage of slurry in a settling pond or disposal of excess slurry from site may be required. Therefore, a pit/settling pond will be excavated at the launch site to contain the slurry arisings from the HDD bore. This excavation pit/settling pond must have a sufficient capacity to accommodate the drill arisings / slurry from the HDD operation being undertaken. Tankers will be required during the operation to control the levels of slurry and where necessary remove the slurry from the working area. Figure 1 shows the arrangement of a typical HDD launch pit site.

**Reception Pit Site**

21 For a typical reception pit site, a site access and working platform would be constructed in a similar manner to the launch area. A slurry pit/settling pond would also be required to collect any slurry discharged from the drill hole. Figure 2 shows the arrangement of a typical HDD reception pit site.

**Work Phase 3: HDD Drilling Operation**

22 The following sequence outlines a typical HDD drilling operation.

23 The surveyors will set out the launch and reception points and the HDD rig would then
be manoeuvred to the launch point. Prior to drilling, the HDD rig will be elevated to the correct entry angle which will conform to the angle on the bore plan. Once the correct angle is achieved the rig will be anchored into position. If necessary a sufficient counter weight will also be used as an anchor for the drill rig.

24 The HDD rig will first undertake a pilot bore using the drill head and involving the injection of drilling fluid. The bore is then carried out in intervals which will be determined by the contractor based on the specific HDD rig in use and the length of the bore to be installed.

25 The depth and direction of the pilot bore will be closely monitored by the operator to ensure that the bore follows the prescribed bore path. At each drill interval a locator operator will keep the drill operator informed of the location, pitch and roll of the drill head.

26 The continuous monitoring allows the drill operator to adjust the direction of the drill to maintain the correct drill path. If there is a major divergence from the drill path, the operator will draw back the drill head to the point where the correct path was lost and re-drill in the correct direction.

27 When the pilot bore emerges from the ground in the reception pit the drill head is removed and a reaming bit will be attached to the drill string. The reamer will be pulled back through the pilot hole, widening the bore. Dependant on the size of duct to be installed, several passes with the reamer may be necessary to gradually widen the bore. The reamed hole is pumped with drilling fluid down the stem of the drill string during reaming to maintain the integrity of the bore and prevent significant settlement or collapse.

28 When the bore hole has been reamed out to the correct diameter the back reamer is passed through the bore once or twice again to ensure that the hole is clear of any large objects and that the slurry in the hole is well mixed.

29 Prior to its installation in the hole, the duct itself must be constructed in a single length at the same length or longer than the bore and where necessary, hydrostatically tested.

30 When the driller is satisfied that the bore is ready for the duct installation a pull head is attached to the drill string at the reception pit via a swivel to prevent rotation of the duct. The duct is then attached to the pull head.

31 The duct is then pulled back through the bore toward the launch area by the drill rig. Once installed the cable can then be pulled through the constructed duct.
Work Phase 4: Demobilisation from Site

32 Following installation of the duct route and cable, the HDD equipment will be removed and the working areas reinstated to a similar condition as they were prior to the works.
Figure 1. Typical layout of an HDD launch site
Figure 2. Typical layout of an HDD reception site

1. Cuttings Settlement Pit
2. Exit Point Slurry Containment Pit
3. Pipeline Rollers
4. Product Pipeline
5. Construction Equipment
6. Drill Pipe
7. Spares Storage