13. Material Assets

Introduction

13.1 Chapter 17 'Material Assets' of the original ES (March 2014) provides an assessment of a broad range of features of the physical and non-physical sectors of the environment said to have material value including utility infrastructure (i.e. electricity, gas and water).

13.2 This Chapter identified a requirement for a new connection from the existing electricity grid to the proposed site. A proposed route and connection point was identified at that time to comprise of the laying of 33kV underground cabling within the public highway from the site to the existing substation at Glengormley.

13.3 As this work will be undertaken by NIE and/or its appointed contractor, mitigation measures cannot be confirmed however it is anticipated that NIE and/or its appointed contractor will employ standard construction methodologies in relation to trench excavation in an urban environment. To manage potential disturbance to traffic movement during the excavation and cable laying works, traffic management measures are also likely to be required.

13.4 In advance of the PAC hearing held in October 2016, further environmental information in relation to grid connection formed part of the applicant's Statement of Case. As a result of discussions with NIE, an alternative connection route was identified that required further consideration.

13.5 The alternative route comprised the laying of 33kV underground cabling within the public highway from the site to a new 33kV switchboard at Mallusk. A site walkover was undertaken and it was confirmed that no ecological impact would arise as a consequence of either grid connection route being implemented. No additional mitigation measures were considered necessary in relation to the alternative route.

13.6 This updated Chapter considers a further (third) connection option.

Connection Route

13.7 The alternative connection option is presented at Figure 13.3. This proposes to connect to the existing substation at Glengormley as per the 2014 route but does not propose to utilise the overbridge to cross the M2. A trenchless crossing of the motorway is anticipated including installation of underground cabling from Mallusk Road to Derry Road/Burney's Lane (on the opposite side of the M2).

Consideration of Feasibility

13.8 An assessment of this alternative connection route has been made. As before, this work will be undertaken by NIE and/or its appointed contractor and will be subject to a separate planning application.

13.9 It is considered highly unlikely that DfI Roads of the Design Build Finance Operate (DBFO) maintenance company (who maintain and operate the M2) would agree to an open cut crossing of the M2 to install the necessary cabling. Therefore a trenchless crossing is the appropriate methodology.

Trenchless Crossing Technology

13.10 Trenchless technology covers a range of techniques commonly used for construction crossings beneath motorways and trunk roads without the requirement for excavation of the carriageway.

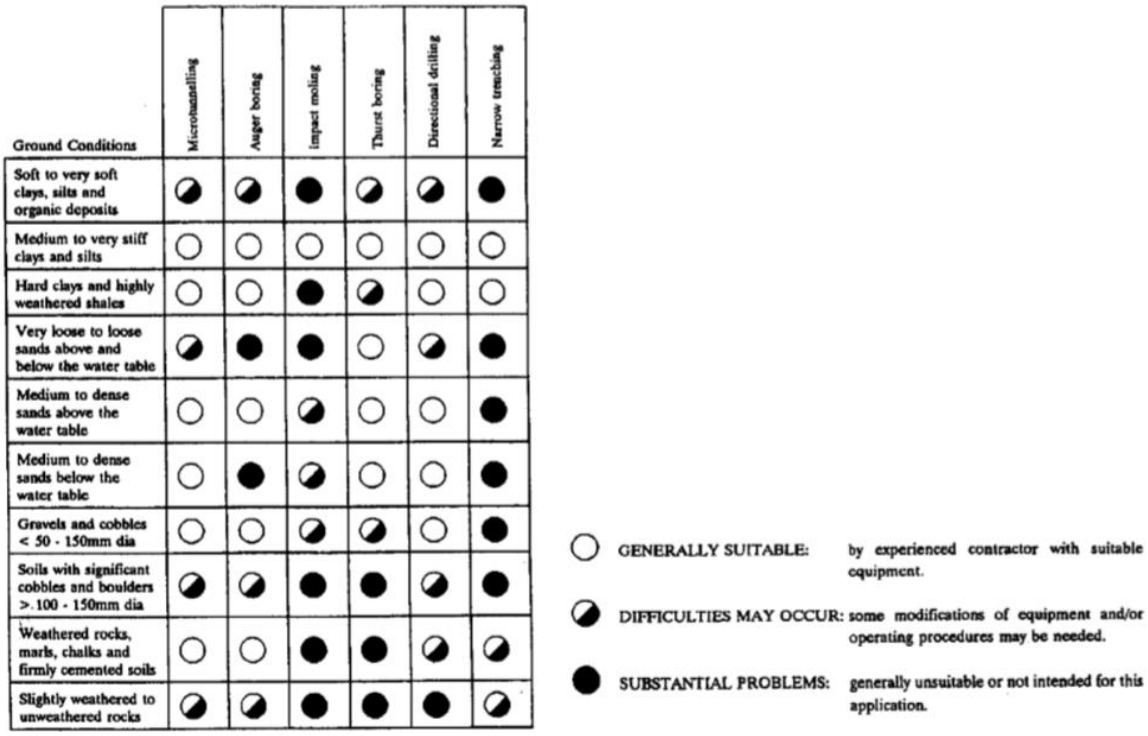
13.11 The trenchless technique to be used for the crossing in this instance will be selected based on:

- Existing ground conditions;
- Proposed diameter of the duct(s) to be installed subject to confirmation from NIE;
- Existing constraints at either end of the proposed crossing for temporary working areas;
- Proposed length of the crossing (which will be influenced by constraints on the working areas); and
- Depth of existing services within the M2 corridor and verges of the adjacent roads.

Ground Conditions

13.12 Determining the existing ground conditions are of importance when considering the suitability of trenchless techniques. CIRIA Special Publication 147 discusses the various techniques and indicates their suitability for different ground conditions – see extract below.

Figure 13.1 Extract from CIRIA Special Publication 147



13.13 A review of the Geological Survey of Northern Ireland GeoIndex indicates that the bedrock geology is basalt overlain by superficial deposits of glacial till material. The M2 sits above the level of the roads on either side which suggests that there will be made ground above the glacial till material to form the highway embankment.

13.14 Ground conditions will however be determined by way of boreholes and/or trial pits along with laboratory testing as required prior to commencement of construction.

13.15 The proposed crossing will also be subject to the Geotechnical Certification procedures as detailed in DMRB HD22/08. This process sets out all of the geotechnical information available for the site to allow preparation of the detailed design and selection of the appropriate construction techniques to be used.

Suitable Techniques

13.16 Pipe ramming, guide drilling / directional drilling and guided auger boring are considered to be suitable construction techniques assuming the crossing will be in the glacial till material and the boulder content will not be high that substantial problems will occur during installation:

- Pipe ramming and thrust boring involve driving a steel casing through the ground by pneumatic hammer (pipe ramming) or a straight hydraulic push (thrust boring). For smaller diameters the casing may be closed but in larger sizes, spoil is removed from the open-ended casing by compressed air and water or using an auger system. The cables would be pulled through the casing;

- Guided drilling involves using small diameter jets, mechanised cutting tools or displacement heads attached to a flexible drill string positioned to form a bore as the head is thrust forward. The drilling head is launched from the surface at an inclined angle. Steering is achieved by controlling the rotation of the eccentric face of the head. Monitoring of the alignment is by a hand-held detector on the surface above the head. Back-reaming equipment is drawn through the pilot hole so that the duct or cable can be installed.

- Auger boring uses a boring machine with a rotating cutting head to excavate the soil. The soil is transported back to the launch/drive pit by auger flights operating within a steel casing.

Pit Requirements

13.17 Launch and reception pits will be required at either end of the crossing along with a sufficient compound area for the ancillary equipment, duct strings, construction vehicles and welfare facilities. A working compound of approximately 75m^2 at each end will likely be required).

Figure 13.2 Launch Pit Dimensions

Technique	Minimum size	Maximum size
Pipe ramming & thrust boring	3m x 1m	9m x 2m
Auger boring	2m x 2m	5m x 2m

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13.18 Reception pits are typically smaller than launch pits. Permanent chambers can be constructed at the launch and reception pit locations to allow for future maintenance of the cables.

Existing Constraints on Working Areas

13.19 At Derry Road/Burney's Lane sufficient space appears to be available to undertake the crossing installation. There is an existing landscaped area which could be utilised for a launch pit. Alternatively, the pit could be located in Derry Road to reduce the length of the crossing and move the installation equipment further away from existing properties, as there is a very localised diversion route available to the front of the existing residential properties.

13.20 Any landscaping that would be disturbed by the trenchless crossing installation would be reinstated upon completion. The road level of the M2 is approximately 1m above Derry Road at the proposed crossing location so this is favourable for reducing the required excavation depth of the entry/exit pit.

13.21 At Mallusk Road there is a wide verge (at least 5m) on the southern side of the road which, based on the information in Table 13.2 above, will provide sufficient space for installation (although some temporary traffic management in the form of a lane closure is likely to be necessary to facilitate the movement of construction plant).

13.22 The selected trenchless technique will influence how much space is required for the pit and the orientation of the crossing may need to be skewed rather than perpendicular to the road depending on the size of the plant and to provide sufficient length for stringing out continuous pipe or cable lengths.

13.23 The remainder of this alternative route option to the junction of Mallusk Road and Hightown Road can be constructed using open cut methods (as per the 2014 and 2016 route options) and will likely be located in the southern verge (the exact routing will be dependent on the existing services present along this corridor).

Consideration of Ecology

13.24 A site walkover of the three potential grid connection routes was undertaken by Ecology Solutions on 6th February 2019.

13.25 No change in baseline was identified in the 2014 and 2016 routes from that previously assessed and the grid routes remain ecologically insignificant as previously reported in 2016.

13.26 In relation to the new possible route identified, the area from Hightown Road to the proposed crossing point from the south of Mallusk Road and across the M2 comprises of short grass road side verge of little ecological significance (similar to the other routes).

13.27 Any impacts would be only temporary in nature and restored post construction, with the possible exception of access panel to the cable where it crosses the road. It is considered that this habitat loss would be, again, insignificant.

Summary

13.28 As a result of discussions with NIE, a third potential grid connection route option has been identified requiring the crossing of the M2 to an existing substation at Glengormley.

13.29 Through the employment of a suitable trenchless crossing technique (to be determined by NIE following detailed ground investigations), this crossing is considered to be feasible and does not require any mitigation beyond that previously identified as part of the 2014 and 2016 routes i.e. temporary traffic management and the reinstatement of any affected landscaping may be necessary.

Figure 13.3 2019 Grid Connection Route