NATIONAL GRID VIKING LINK COMPULSORY PURCHASE ORDER 2019

PROOF OF EVIDENCE

IMPACT ON SOILS AND LAND DRAINAGE

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5.51 Subsoil storage along the cable corridor(s) will be in stockpiles laid parallel to the trench excavation.

5.52 The duration of subsoil storage will be minimised and, wherever possible, immediate restoration maximised i.e. material replaced into the excavation trench as soon as reasonably practicable following cable or duct installation.

5.53 Trench arisings are to be carefully sited and take account of the proximity of ditches/watercourses and the capacity to generate surface water flows along the working area, particularly on sloping land. The location of the heaps in relation to the construction and levels both outside and within the working area carefully planned to avoid excessive diversion of surface water flows to low areas. The use of intermittent spaces/gaps in the trench excavations will require consideration on all sloping land to facilitate drainage and minimise erosion risk.

5.54 In the event that excavated soils are to be stored for a period of more than one winter the outer batters of the excavated trench arisings they will be shaped and lightly consolidated using an excavator bucket to provide stability and minimise rainwater ingress into the excavated soils.

5.55 If subsoil or excavation arisings, from deeper excavations, are stored adjacent to, or on, topsoil or subsoil the period of storage will be minimised and an appropriate geotextile separator used.

5.56 Trench excavations are not to be moved between ownership boundaries and must not be removed from the site unless this is set out in the CEMP.

Soil erosion and siltation

5.57 The construction of water stops, soakaways, surface water grips and temporary lagoons to interrupt the flow of water might be necessary in sensitive areas. Careful positioning/construction of soil storage mounds is recommended where a significant erosion risk is identified. Progressive restoration will be maximised wherever possible to reduce the exposure of the subsoil to rainfall events.

Soil importation

5.58 If trench excavations are to be removed from site, for instance due to incompatible engineering or thermal properties, imported soils will be compatible with the existing subsoil and shown to be free from potential contamination. The imported subsoil is to be of a demonstrably similar quality to the existing.

5.59 No subsoil or topsoil will be imported to site unless the source has been approved; the landowner/occupier and their agents are consulted and given prior written approval for the importation.

5.60 Imported topsoil and subsoil is to be accompanied by an appropriate declaration of analysis which will include the following:

- Justification for the import as a like for like subsoil replacement;
- A written agreement with the landowner;
- A comprehensive analysis of soil physical and chemical properties including the following analytical parameters:
    - pH, extractable phosphorus, potassium, magnesium, total nitrogen, particle size distribution and stone content; and
    - Analysis for total arsenic, boron (hot water soluble), cadmium, chromium, copper, fluoride, lead, mercury, molybdenum, nickel, selenium, zinc, sulphate, cyanides, phenol, Polycyclic Aromatic Hydrocarbons (PAH) and Extractable Petroleum Hydrocarbons (EPH).

Trench re-instatement

5.61 All close shore boarding and/or trench supports are to be removed prior to re-instatement.

5.62 Replacement of arisings into the trench will be in the reverse order of extraction i.e. material from the lower layers of the excavation replaced first. Provided that the excavated material has been stripped and stored appropriately this will mean that the upper layers of the heap will be replaced first followed by the remainder.

5.63 For agricultural re-instatement the aim will be to provide a minimum restored soil profile of at least 1,200mm from the field surface (i.e. including both topsoil and subsoil). In most situations, this will require 800-900mm of lightly consolidated subsoil overlain with 250-300mm of topsoil.

5.64 For deeper excavations the aim will be to provide a compacted and stable material below 900mm depth with voids removed. It will be acceptable to provide mechanical compaction of the lower soil layers greater than 700-800mm from the subsoil surface prior to topsoil placement. This will minimise the risk of surface settlement and potential settlement of restoration drainage.

5.65 Compaction in deeper layers (>1,000mm) could be achieved mechanically though the use of a compactor roller e.g. sheep's foot or vibrating roller. Depending on the characteristics and depth of material over the cable this might also be achieved via consolidation with an excavator bucket, but care will be required so as not to disturb the integrity of the cable surround, safety tiles or marker tape.

5.66 For subsoil layers (600-700mm from surface) replacement of soils into the excavation trench will be in the reverse order of extraction. The key issues to avoid will be over compaction of the subsoil, excessive mixing of sands and clays and/or bringing up substantial amounts of harder, larger stones from depth.

5.67 It will be unnecessary for mechanical compaction (e.g. vibrating rollers, sheep foot etc.) within 700-800mm of the subsoil surface as these layers are proposed to be loosened/de-compacted at restoration stage. A small amount of compaction or consolidation with the excavator bucket during replacement will be acceptable if the material is cloddy and/or dry i.e. for clays. Finely divided soils e.g. sands/sandstone are unlikely to require consolidation.

5.68 If the excavated trench is to remain for a period (6-8 weeks) prior to re-instatement it is recommended that the excavation arisings are placed over the cable trench and used as surcharge. This will encourage settlement and natural consolidation. Following the settlement period any remaining surcharge can be respread evenly across the full working width during re-instatement.

Re-instatement

5.69 The following section provides recommendations for site re-instatement and some of the key aspects to consider in order to promote soil structural rehabilitation and land drainage in the medium term.

Timing and flexibility

5.70 The soil types within the Order Land, combined with the moderately high rainfall (Defra RB209), will mean that re-instatement will be restricted to the drier periods of the year, notionally April-October. Opportunities for re-instatement outside of this period will need to be given careful consideration and only be undertaken following discussion and agreement with the landowner.

Site clearance and working width preparation

5.71 Topsoil mounds are to be sprayed off using a total kill or broad-spectrum herbicide at least 2 weeks prior to topsoil replacement. This will be important where current weed budgets and seed banks in the topsoil mounds are high. Spraying must be carried out by a suitably qualified (e.g. BASIS) and registered spray contractor. Issues such as organic status and herbicide type will be discussed with the landowner prior to spraying.

5.72 Areas of standing water are to be drained to a suitable outfall (e.g. surface water grip) prior to re-instatement.

5.73 Haul roads are to be retained until such time as all construction activity has ceased and no further vehicular access is required.

5.74 Permeable fill for re-instatement drainage will be imported and stockpiled at suitable locations before the haul road is removed. This will minimise trafficking by drainage machinery when post construction drainage is installed.

5.75 Prior to re-instatement all extraneous materials such as geotextile, hardstandings, and timber or construction debris will be removed from site.

5.76 Subsoils relocated during construction are to be replaced in their original location and to the required depth.

5.77 Haul road removal will normally commence working back from the furthermost point to the section access and all stone recovery is recommended to be made from the road surface.

5.78 Haul road excavation will be undertaken using 360° excavator and a toothed bucket for the upper layers and smooth ditching bucket for the lower 100mm. Full clearance of stone and terram, from the advance face of the haul road may need to be supported by hand work (e.g. spade and brush) as required. The peeling back of terram (anchored to the excavator) to aid stone recovery is recommended.

5.79 Cable installation may have led to an excess of subsoil through soil bulking and surcharge. Surcharge in this context is the additional volume of subsoil/excavated strata occupied by the cables, joint bays and bedding. This surplus can either be removed from site or spread within the working area prior to drainage. If the latter is considered, the potential change in subsoil characteristics, levels and thermal properties are likely to require careful consideration. Surcharge will only be spread within the working areas if:

- It is of a similar texture and stone content to the existing subsoil; and
- The quantity spread will not affect, or significantly raise, final re-instatement levels (*c. 75mm*).

5.80 Rutting and compaction, or depressions below the haul road, are to be levelled into an even surface following subsoil clearance using either a 360° excavator or low ground pressure dozer. Soils which are wet will be avoided accordingly until such a time that they are suitable for trafficking and/or an appropriate weather window exists. The need for additional cultivations and/or incremental soil loosening to facilitate drying will be assessed at restoration stage.

5.81 Leveling will take full account of topsoil re-instatement depths and on the fall of land across the working width. It will be important to ensure that subsoil levels are married in with the existing level to either side of the working area to avoid creating a step on the edge of the site when topsoil is replaced.

Post construction underdrainage

5.82 Cable laying and soil trafficking will damage the subsoil and reduce its natural hydraulic conductivity and drainage. Depending on the severity of the compaction caused this will lead to a need for post construction underdrainage, frequently where none currently exists. Post construction underdrainage is likely to be required on most of this route, except for chalk or sandy areas, and drainage may be required where piped outfalls are currently not available. The need for this type of drainage will be dependent on the degree of trafficking and soil structural damage during construction. Post construction under drainage is to be installed into subsoil as the final operation prior to topsoil re-instatement. This will be undertaken in one pass (where feasible) to minimise tracking of the exposed subsoil. Recommendations for post construction underdrainage are included below.

5.83 Surcharge from drain excavations will be re-spread evenly across the width of the working area and care taken to avoid contaminating the permeable fill over the drains. Vehicular access to the drained working area will be restricted thereafter.

Subsoil loosening

5.84 All subsoils subject to trafficking and compaction are to be loosened using a winged tine cultivator to a maximum depth of 500mm and a tine spacing of one and a half times the depth of working (i.e. 750mm). The exact depth of loosening will be determined by the soil type, soil moisture status, degree of trafficking throughout construction and the presence of shallow services/drains at restoration stage. Where practicable the subsoiling operation will be undertaken from one access and to one exit point with sufficient turning space so as not to re-compact the ripped subsoil. In areas of this route there may be a requirement for incremental ripping to facilitate drying of the working area.

5.85 The moisture content of the subsoil during the loosening operation is crucial to its success. If the soil is excessively wet and the subsoil is plastic in consistency, then there will be a limited beneficial effect. If the subsoil is too dry, then the operation will cause excessive ground heave and surface disruption. The use of straight tines, as opposed to winged, may be preferred on shallow stony profiles occupied by soil types 3 and 4. Due to the site-specific nature of this operation, the exact procedure and subsoiler configuration is to be agreed in consultation with the site engineer at restoration stage.

5.86 It will be important to ensure that subsoiling is undertaken parallel to the direction of any underdrains and that minimal disruption of the permeable fill takes place. It is recommended that a 300-400mm standoff be maintained between the outer subsoil leg and drain trench. If necessary, any capping or contamination of the

upper layers of permeable fill may need to be removed or cleaned off prior to topsoil replacement.

Subsoil stonepicking

5.87 Where appropriate, and following loosening, the subsoil may have to be manually stonepicked. Large stones and very large stones, greater 150mm in any dimension, unrepresentative of those occurring naturally in the upper layers of the subsoil, will be removed. In the case of naturally stony subsoils the site engineer is to be consulted. This will be particularly relevant at this site as soil Types 2, 3, 4 and 5 might locally contain larger gravels, chalks, flints, limestone and ironstone at the proposed depth.

Subsoil grading

5.88 In the event of an uneven soil surface following loosening and stonepicking the subsoil surface will be lightly graded using a 360° excavator or LGP dozer to provide an even surface for topsoil placement.

5.89 Final grading must take account of the fall of adjacent off-site land to allow accurate marrying in of topsoil levels and to avoid the drainage fill. It will be important to ensure drainage stone is visible and clean before spreading the topsoil.

Subsoil trafficking

5.90 Trafficking of the ripped, drained and stonepicked subsoil with anything other than topsoiling machinery is to be avoided.

5.91 Trafficking of the subsoil for access prior to topsoiling will be to dedicated routes and any wheeling's decompacted using an excavator bucket or subsoiler.

Subsoil approval

5.92 Appropriate subsoil preparation is critical to the success of the re-instatement. It is good practice to assess and approve the suitability of the subsoil surface, prior to topsoil replacement, with the landowner, occupier or their representatives and to make a photographic record of its condition prior to topsoil being replaced.

Topsoil re-instatement

5.93 Topsoil will be replaced in all agricultural enclosures to the depths detailed in the pre-entry soil survey. It is recommended that profiling pegs be set out across the working area to the depths identified by this survey. In the event of doubt as to topsoil depths these can be further assessed in undisturbed adjacent land or using the pre-entry stripping log.

5.94 If surplus topsoil is accrued, for instance from permanent development platforms or roads, it will be acceptable to spread this in the working area or, subject to landowner approval, in adjacent agricultural land with appropriate permissions. If surplus topsoil is generated, it is good practice to retain a small amount on site for minor re-instatement works such as filling fence post holes and localised settlement which can occur over drainage trenches/junctions after re-instatement.

5.95 Topsoil will be replaced using a 360° tracked excavator with a wide ditching bucket assisted by low ground pressure dozer (if required). The operation will be completed in one pass working from one access and exiting via a separate access to avoid trafficking of the newly laid topsoil. Topsoil will be spread evenly to 'feather' into existing levels at the edges of the site. It will be important to ensure that no 'step' is created between the working area and undisturbed soils on the edge of the site. A written and photographic record of re-instated topsoil depth will be made in all enclosures.

Secondary loosening

5.96 Following topsoil replacement all soils are to be subsoiled using a winged tine subsoiler to below the topsoil/subsoil interface (400-500mm from surface) and at an oblique angle to the underdrains. This will relieve residual subsoil compaction caused during topsoiling and provide interconnectivity between the topsoil, ripped subsoil and permeable fill over the drains. The precise depth, tine spacing and subsoiler configuration will be decided at restoration stage.

Topsoil stonepicking

5.97 Where appropriate, and following loosening, the topsoil may require a superficial stonepick. Large stones and very large stones, greater than 100mm in any dimension, unrepresentative of those occurring naturally in the upper layers of the adjacent topsoil will be removed. In the case of naturally stony topsoil (e.g. Soil Types 3 and 4) the appointed site engineer will be consulted on the specification.

Cultivations and seeding

5.98 The re-instated topsoil will be cultivated using agricultural equipment and a crop established at the earliest opportunity. The type of cultivations required will be determined by soil and weather conditions during re-instatement and are likely to include a combination of:

- Plough;
- Disc;
- Power Harrow;
- Combination drill; and
- Roll

5.99 Topsoil structure is likely to be weak following replacement and multiple passes are not recommended. If the re-instated topsoil is cloddy then it may be appropriate to compensate by increasing the seed rate rather than over-cultivating.

5.100 In the case of naturally stony topsoil, which is to be returned to permanent grassland, site specific cultivations such as a stone burier, or additional rolling prior to seeding, may be appropriate. This will minimise the potential impact of excessive levels of harder flints at the surface on cutting machinery.

5.101 In certain circumstances, and subject to NGVL approval, cultivations and seeding may be completed by the landowner.

Consultation

5.102 Consultation with affected landowners and occupiers will be undertaken to ensure the best practicable restoration is achieved.

Cropping and aftercare

5.103 Early cropping of the restored areas will be encouraged to help bind the soils and start the process of soil structural regeneration through crop rooting. The potential to crop will depend on time of year of re-instatement and the proposed crop.

5.104 In some situations, a 'sacrificial' crop may be appropriate as opposed to no crop. Bare soils will be avoided for any extended periods especially over-winter or on sloping ground when susceptibility to damage and erosion is potentially greater.

5.105 The landowner(s) will be advised and encouraged to manage the land sympathetically and, for the first two-three years after re-instatement, made aware that re-instated land will farm differently to adjacent areas. The soils are likely to remain wetter for longer in spring and are likely to wet up earlier in autumn. Timeliness of access for arable cultivations will be essential to facilitate soil structural recovery.

5.106 An aftercare programme is to be formulated to an agreed fertiliser and cropping plan. The need for subsoiling should be regularly assessed, on arable enclosures. The use of organic manures is encouraged where they are available, though not in the first 12 months after re-instatement, to build up soil matter reserves lost during temporary soil storage.

5.107 This route is occupied by a proportion of stocked grazing paddocks. It will therefore be important to discuss when and where horses and/or cattle can be introduced onto the restored areas. Overwintering of horses/cattle in restored fields is not recommended in the first 12-24 months after re-instatement and fences are not to be removed too early from grassland. Heavy textured restored

land is susceptible to damage by livestock, and particularly by horses and dairy cattle. It will be important to keep stock out of restored enclosures until soil structure has recovered to a degree that the soils can carry the animals. This will require careful management of both the soils and of landowner expectation.

Agricultural Land Quality

5.108 The aim of the recommendations above will be to ensure that land affected by the construction can be re-instated to its pre-entry condition and that the Agricultural Land Classification grade returned to its pre-entry status as soon as reasonably practicable after re-instatement.

Mitigation of the Impacts on Land Drainage

Land drainage survey

5.109 Information has been collected from published soil and geology maps, historical maps, aerial photography, local knowledge and drainage questionnaires.

5.110 Baseline data has been collected for land drainage systems on 90% of the Order Land and the provision of land drainage information by landowners and occupiers has, to date, been good for a project of this type. This is unsurprising as this geographical area is reliant on agricultural land drainage and landowners understand its importance to their business.

5.111 Meetings with landowners, occupiers and their agents have taken place to collect drainage information from plans, local knowledge and to discuss concerns and landowner preferences for materials used. This is a process that will continue into the proposed construction phase and thereafter.

5.112 A detailed site survey of agricultural drainage has been completed for 94% of the fields within the Order Land and provides site specific information on a field by field basis.

5.113 Where a detailed soil survey has been undertaken specific information on topsoil and subsoil texture, structure, stone content and drainage characteristics has been collected to support the land drainage design

Land drainage design

5.114 Field drainage design will be undertaken according to the guidelines in ADAS Reference Book RB 345: The design of field drainage pipe systems (HMSO, MAFF 1982) (CD Ref: A.34).

5.115 Drainage will be designed to ensure that systems are retained within an individual ownership boundary and to existing outfalls wherever possible. Drainage design will attempt, wherever reasonably practicable, to ensure that existing catchments

are preserved and that green field run off rates and flood risk are not significantly altered when compared to those before cable installation.

Land drainage plans

5.116 CDD plans have been completed for 94% of the Order Land (the same proportion as the land in respect of which baseline data has been collected) and these have been issued to landowners and occupiers for consultation. These plans have been based on a conceptual working width and cable alignment and it has been explained to landowners and occupiers that the CDD will be refined as construction detail evolves. Follow up meetings have been completed with around 60 (or 75%) of the landowners and occupiers within the Order Land to discuss the CDD. Further meetings are proposed as detailed construction design becomes known. NGVL will also seek to engage with the outstanding landowners and/or occupiers where no CDD plans have yet been prepared.

5.117 It is important to recognise at this stage that CDD plans are likely to change as construction detail evolves, particularly with regard to the cable alignment within the proposed working width and limits of deviation. This is normal on a project of this type and the drainage design process will be reviewed as detailed cable construction design progresses and further investigations are made. Mr Heselton explains (NGVL/OH/1 at para 5.3.5) that CDD is an iterative process and has been accommodated in the Heads of Terms agreements by NGVL. Importantly, this allows landowners to be consulted and respond to changes in their CDD.

Drainage investigations

5.118 An absence of available information on land drainage schemes does not necessarily mean that drainage is absent. It is possible that drainage was installed beyond living memory or a change in ownership and/or simply has not been recorded. The depth and condition of drainage schemes in individual fields remains unproven until they are investigated.

5.119 Intrusive investigations are proposed before cable installation to secure detail on the depth and condition of the drainage schemes in place relative to the final cable alignment and depth. This allows design changes to be fully considered during the construction process and planning for mitigation of cable/drain coincidence. This work is essential in the mitigation process and is to be completed at least 10-12 weeks prior to pre-construction drainage so that drainage plan changes can be discussed and agreed with landowners and occupiers in a timely manner.

5.120 Major crossing drains, both known and suspected, are to be investigated and their level, diameter, type, condition and their outfalls recorded. The condition of any existing main drains to be used as off-site outfalls will be similarly assessed together with the depth and frequency of lateral drain spacings and presence/absence of permeable fill. Likewise, offsite ditches which might form

outfalls for drains within the Order Land are to be cleaned or dredged to original levels as required.

Land drainage installation on the UK Onshore Scheme

5.121 There are two types of primary mitigation that can be considered during construction of a linear route of this type and these are discussed below.

Pre-construction interceptor drainage ('header' drains)

5.122 These drains are installed as the first operation after fencing of the working width using specialist drainage equipment operated by an experienced drainage contractor. They are larger drainage pipes (160-200mm) and are installed on the outer edges of the working width and around 2-3m from the fenceline. The pipes are sized and installed at such a depth to intercept any land drainage pipes that are running towards the working area and divert the clean water to an appropriate outfall.

5.123 It is preferable to install 'header' drains along the top edge(s) of the working width to intercept all existing drains and discharge them into a suitable outfall before they enter the construction zone. This reduces the number of cross cable connections required and enables 'restoration' drains to be laid across the working area parallel with the 'headers' and cables. Wherever possible these drains will outfall into adjacent watercourses without crossing the cables. The use of 'headers' does not eliminate the need for some cross-cable connections. Topography will dictate where some drains still need to be installed across the cables, for example through valley features or at land ownership boundaries etc. Some of these cross-cable drains will be pre-existing main carriers that the new 'header' taps into and others will be new offsite mains required to provide a suitable outfall for the new 'headers'. A typical design is shown on the plan at Appendix 6, Page 38 and in the diagram at Appendix 7, Page 41.

5.124 The location and depth of crossing drains to take water from the interceptor needs to be carefully considered prior to construction and discussed with the cable designer so that depth adjustments can be made to the cable to avoid potential depth co-incidence with the drains.

5.125 Interceptors are usually a large (100-225mm) perforated uPVC pipe laid on the high side of the working area some 3m off the fence line with a possible second drain on the low side if topography dictates. The interceptor is usually installed after external fencing and prior to soil stripping and is located below the mound of topsoil stripped from the working width. Pre-construction drains are not to be used for the removal of 'dirty' site water and will be protected from any inadvertent water ingress.

5.126 Pre-construction interceptor drains are installed of sufficient capacity to collect water from the catchment draining to them at the gradients available and are typically 100-225mm diameter and made of perforated plastic pipe. The depth of the interceptor will be based on intrusive pre-entry investigations of the existing schemes. All existing drains will be connected into the new interceptor either through purpose made or stone junctions depending on the level of siltation in existing drains. The interceptor is sized to the catchments it will intercept and usually will be a minimum 100-160mm diameter. Permeable fill over the interceptor is not always necessary to intercept existing drains but may be utilized (depending on drain depth, spacing and condition), and can be brought up to the topsoil/subsoil interface which means that this drain can also function as a restoration drain. In some instances, there may be a need to install an interceptor drain on both sides of the working width where, for example, the topography of the field is complex, drains enter the working area from both sides or if groundwater levels are naturally high. If a second header is installed on the low side and permeable fill is used (not recommended) it will be covered with a subsoil cap to prevent 'dirty 'surface water from entering the drain or be located in an area with no trafficking. It is important that any existing drains crossing the working area are not allowed to outfall into any header laid on the low side as this could cause silt pollution in adjacent ditches/watercourses. The drain ends will be blocked in the cable trench or, if the drains are shallow, in the header trench.

5.127 Pre-construction drains are normally installed to intercept existing drains rather than to intercept soil water. They will tend to be deep, generally where topography allows, and laid using a laser or GPS controlled drainage trencher.

5.128 The existing drains are positively intercepted by this larger drain usually via purpose made junctions. If the land drains in the field contain more than 60% silt, they will normally not be connected to the interceptor directly but will make use of a permeable fill junction. This helps to prevent direct siltation from the older systems into the new drains.

5.129 During drainage installation the position, type and condition of all land drains intercepted will be accurately recorded using GPS.

5.130 The outfall for this interceptor may be a ditch or watercourse on the boundary or an existing land drain within the field. The interceptor may require a cable crossing to outfall at the correct depth on the low side of the working area. It is not uncommon to lower the cable depth slightly to allow this drain to cross over the cables.

5.131 The depth of the interceptor varies according to the existing drains and outfall levels in each field. They will be laid at a depth necessary to intercept the existing drains- no deeper as this will compromise available drain gradients (affect siltation) and allow water back up the system when ditch levels are high which will

increase siltation and reduce drain life. It is normal to install pre-construction interceptors at around 1.20-1.50m. On this route, these drains may occasionally need to be deeper, particularly on lower lying land where land drainage systems need to be deeper to be able to drain water to an outfall.

5.132 Where an outfall is remote from the working area there will frequently be a need to install an offsite main which may cross one or more fields. The design will make every effort to ensure that landowner drainage and outfalls are kept within each individual ownership boundary.

5.133 Drainage outfalls will make use of a headwall to protect the drain. A sleeve of rigid, unperforated and frost proof pipe is usually installed at the outfall. It will be important to ensure that the depth of the outfall for all drains is carefully planned and designed to the correct water level datum. If water levels are seasonally variable and any header drains are likely to be submerged, then the installation of a temporary flap valve on the outfall pipe may be needed to reduce water ingress into the working area.

5.134 Pre-construction drains are normally installed through topsoil and where possible the mound of stripped topsoil formed over the interceptor to protect it during construction

5.135 The CDD plans will be refined using the results of an intensive intrusive drainage investigation prior to cable installation. This is an essential stage of the drainage design and installation. Thus, the CDD plans prepared to date are in a draft format.

5.136 Land drains passing below hedges or tree areas are prone to root blockage and unperforated pipes are recommended 5m either side and below these crossings.

Feasibility of installing interceptor drains

5.137 The benefits of interceptor drains are that they are easy to install, are effective at intercepting land drainage schemes and work well when replacing conventional drainage systems that rely on laterals and carrier pipes. Drainage is designed parallel to the cable meaning that it can be accommodated easily into the working area and restoration drains can be laid parallel to the headers and make use of the same outfalls when crossing the cables.

5.138 This type of design will be suitable throughout the much of the Project where there are mains carrier drainage schemes or where existing systems are closely aligned to cable corridor.

5.139 Installation of the cables at a depth of 1.20m of cover means that interceptor drains must be installed to collect and divert water from severed drainage systems away from the working area. This will present issues on the Fens between

Stickford and Bicker where there is a high reliance on individual outfall schemes. This is discussed further below.

Cross connections

5.140 Cross connections are installed when existing drains encountered during construction are reconnected across the cable trenches. Many main drains on this route require crossings over the cables which locally will necessitate deepening of the cables. Any connection made at construction stage must be checked or replaced at the completion of the project. The location of crossing drains has been established by initial survey but existing drains will require further investigation to determine their depth and condition. A typical design is shown on the plan at Appendix 6, Page 39, and in the diagram at Appendix 7, Page 41.

5.141 Whilst it is generally considered good practice to install 'header' drains there are instances when simple cross connections will be required. These include isolated drains which may simply be moving water from upslope catchments across the working area, or on land with low agricultural value where there are few drains and where header drain installation is practically difficult to achieve and justify financially. It might include lighter more freely drained soils, where there may be few or isolated pipes draining a specific area. Cross connections usually need to be removed and replaced during cabling and may therefore be temporary pending a permanent connection after installation.

5.142 Cross connections might be considered where less intensive or shallow individual outfall systems are present. Continued access to individual drains from the outfall, for jetting/desilting, would require drains to be cross connected across the working area. The cross-connector drains must be maintained throughout construction and, because they are vulnerable to damage during construction will be accurately marked, checked and replaced at restoration stage. It will be important to ensure that any pre-construction drainage and particularly crossing drains are not damaged by trench, joint bay and/or HDD excavations

5.143 The cross-connector drain will, where possible, be laid above the cable. They are to be supported across the cable trenches with a supporting concrete beam or lintel and consist of sealed pipe. In the unlikely event that a drain was laid below the cable it should be unperforated pipe.

5.144 There are areas of relatively flat land on the route where there is no fall available for grading cross connecting pipes deeper or shallower and it is vital that there is no co-incidence between cable and drain. Whilst siphons can be used in exceptional circumstance they are not advised. This co-incidence is usually avoided by locally deepening the cables at the crossing point.

5.145 Cross connection of existing drains requires extensive pre-construction investigation works as all the drains that cross the working area must be located,

excavated and replaced with stronger pipe. During construction, the crossings must be maintained within the trench excavations and this presents logistical issues during cable installation when temporary pipework must be removed and replaced for cable laying.

5.146 Following cable installation, the junctions connecting the existing drains into the cross-connectors are to be examined and replaced if necessary. A final cross connection from the edge of the topsoil strip to the low side of the trench must be completed and re-instated using permeable fill (if necessary) to the subsoil surface.

5.147 Cross connection of all land drains, whilst feasible, can be onerous, expensive and present difficulties with cable installation and surface water management, particularly if trenches are dug in situations where drains are running or if surface/groundwater levels are high. The work must be completed using a backacter and trenches tend to be wide and use significant amounts of stone when compared to conventional systems of mitigation.

5.148 Any cross connections made will have a smooth connection across the working area to minimise lips on joints. This can prove difficult with clay to plastic connections. Junctions on cross connected drains, no matter how well made, can form points of weakness in the drain or points which encourage siltation or snagging for jetting equipment. Thus, the cross connection of individual outfall systems could be problematic and NGVL will seek to mitigate any issues that this creates.

5.149 Settlement of drainage pipes over the cable must be mitigated by supporting beams for each land drain. This can be problematic where drain angles are oblique and where the length of span increases over the cable trench.

5.150 Cross-connecting the existing drains is generally less expensive than re-draining affected areas of a field, but this is dependent on the drain spacings/numbers being crossed and the type and length of lintels. However, where the route passes through long narrow fields at right angles to the drainage systems then re-draining off site may be cost-effective, particularly when longer term maintenance and jetting issues are considered.

5.151 It is not generally good practice to have numerous cross connections of existing drains across the reinstated cable trenches. These crossings are liable to settlement and increased future maintenance liabilities. This would mean difficult and higher risk repairs over the cables (with associated possible outage) and would risk drainage water getting into the cable trenches themselves. Cross connecting means that the shallowness of some of the existing drains must be preserved and this makes them vulnerable to construction trafficking. This means that it is not possible to install drains along the length of the working width at

restoration stage to assist drainage and rehabilitation of the damaged soils. Cross connections present further difficulties with subsoiling after re-instatement if drains cross the working area are at an acute angle or are at a shallow depth.

Feasibility of cross connecting drains

5.152 The depth of soil cover over the cables will be 1.20m and 0.30m of safety clearance is to be maintained at all times above them, thus providing an effective surface to drain depth of 0.90m. Since many land drains lie at, or slightly below this depth, cross connections cannot currently be installed as a primary form of drainage mitigation on this route, unless the cables are deepened. NGVL has indicated that locally the HVDC and HVAC cables can be deepened to accommodate occasional crossing drains but that deepening the cables along the full 69k route is unlikely to be feasible.

5.153 Crossing drains are likely to require the cable depth to be lowered below the zone where drain co-incidence is likely to occur. In most cases this would require a nominal depth of 1.20-1.30m of soil cover. A further 0.30 m of clearance from the drain to the cable tile might be required. This means that locally the cables would need to be deepened to around 1.50-1.70m to enable crossing mains to be installed.

5.154 There will be some areas where cross connections and crossing drains will be required and these locations need to be discussed with the cable designers at an early stage. These are to be identified during the early pre-construction investigations.

Individual outfalls systems

5.155 An estimated 20km of the route is occupied by land drainage schemes that present technical issues for standard land drainage mitigation. These issues occur where land drains outfall individually into the field ditches or dykes. A typical design is shown on the plan at Appendix 6, Page 40.

5.156 Individual outfall systems are installed where arterial ditch systems are well maintained and often where drainage systems need regular maintenance due to soil type and poor gradients. High pressure jetting is often performed to clear the rapid siltation that occurs in fine sand/silty soils and/or where iron ochre is a problem. Jetting is usually undertaken periodically, every 2-5 years, usually from the outfall but also in field and in response to localised drainage problems.

5.157 The majority of landowners and occupiers with individual outfall systems have requested, during meetings with LDC, that their drains be reinstated on a like for like basis to allow continued access for jetting.

5.158 Landowners and occupies have requested that they be able to retain the capacity to drain across the cables at some point in the future when their drainage scheme is to be replaced.

5.159 Installing the cables with 0.90m of cover will not allow individual drains to be connected across the working width as are likely to lie at a depth of coincidence with the cable. This depth will preclude ease of access from the outfall for jetting any drains on the high side of the working area. Drainage schemes are likely to be incapable of installation in future due to the depth of cover and cable co-incidence.

5.160 Even if it is feasible for existing drains to be cross connected, Interceptor drains may be required for the period of construction to pick up water from the severed drains and prevent it from entering the working areas. Interceptor drains will be required for the period of construction and they may be retained as either permanent restoration drains, or in some certain situation may be temporary and be removed.

5.161 Drains severed by the cables above the interceptor will only be accessible for jetting by excavation of buried pipework. Longer term landowner expectations on ease of jetting and maintenance, which are not unreasonable, cannot always be met in these situations.

Feasibility of re-instating individual outfall systems

5.162 To return a field to the landowner with a drainage scheme with individual outfalls there are several options that NGVL have considered.

- Investigate existing drain depth and install the cable at a safe depth below the existing systems so that drains can be reinstated above the cable and the individual outfall characteristic maintained;

- Reroute the cable so it runs parallel with the existing drains thereby not disturbing the individual outfalls. In practice this is not usually feasible as the route is fixed by planning and by the extent of land and rights acquired pursuant to the CPO Order;

- Re-drain adjacent land where individual outfalls are severed. New schemes would be designed with drains running parallel with the cables and given individual outfalls into alternative ditches thereby preserving the ability to jet directly from a ditch. This may require some ditch maintenance to obtain adequate depth. Depending on the timing of construction, the installation header and restoration drains may also be required;

- Provide a new jetting main parallel with the cable with associated buried chambers at each junction with a lateral from which the drains can be jetted. Whilst this would improve the ability to jet it would make the operation more difficult as jetting would need to be done remote from a water source (i.e. the ditch) and require excavation of soils above the chambers, usually in winter when soils and crops are more susceptible to damage;

- Excavate new outfall ditches either parallel or alongside the cable into which the existing drains could be provided with individual outfalls and jetting. This would involve changes in field boundaries, permanent land loss to new ditches and longer-term land management, access, cultivation and cropping issues; and

- Drain the cable route conventionally using a typical 'header' scheme and compensate the landowner for increased maintenance costs in the long term, an associated decrease in the longevity of drainage systems and future land drainage liabilities.

5.163 In some situations, this might necessitate new ditches or outfalls being required off-site. In these cases, the CDD plans have been annotated. This will require further investigations and agreement of the design principles with the landowner.

5.164 Land drainage schemes outside of the working area would need to be installed at the earliest opportunity after installation of pre-construction drainage. For arable land, this is likely to be following harvest of the next crop and for grassland after the next cut or grazing. Any replacement schemes are to be installed on a like for like basis and take account of required drain size and spacings, specification of permeable backfill and disposal of trench arisings from site.

5.165 Resolving the re-instatement for individual outfall schemes on this route is likely to be complex and involve more than one form of mitigation. Solutions will be based on field specific drainage layout to assess the depth and direction of existing drains, field levels and surrounding ditches/outfalls to enable design solutions to be discussed and agreed with the landowner or occupier. This is currently being undertaken on by NGVL under HoTs and continuing dialogue with landowners, occupiers and their representatives.

Post construction drainage

5.166 Post construction drains will usually be laid parallel to the cables within the working width and are designed to replace drains damaged within the working area. They also provide an outfall for soil water after loosening operations required to promote soil rehabilitation in the construction zone. A typical design is shown on the plan at Appendix 6, Page 38 and in the diagram at Appendix 7, Page 41.

5.167 These drains are usually installed as the final operation prior to topsoil replacement and are laid into subsoil which has been re-instated and brought back to original ground level. Installing post construction drainage into subsoil allows drainage equipment and permeable fill to travel on a subsoil surface and for drain trench arisings (i.e. subsoil) to be spread onto the working areas rather than on the topsoil. Installation at this stage is also logistically sensible as crossing points will be in place and fences not erected, which if removed would not allow downline access to the working areas.

5.168 These drains are usually 80-100mm diameter plastic and generally laid at approx. 0.60-0.80m depth and installed from a subsoil base prior to topsoil replacement. In most instances, these restoration drains will be backfilled with appropriate clean hard stone (permeable fill) which will normally be brought up to the top of the subsoil.

5.169 These drains will be installed immediately before topsoil replacement to mitigate potential siltation and dirty water migrating from site. They are usually taken to an outfall in a ditch or watercourse and make use of a headwall to protect the drain on the side of the watercourse. Typical headwall types are shown in the diagrams at Appendix 7, Page 41.

5.170 The number of restoration drains required is dependent on the layout of the cables; the configuration of pre-construction drains; the working area and the degree of soil structural damage that occurs during the working phases. The proposed cross section of the working width indicates that two restoration drains may be required on the HVDC route. A drain is usually located below the haul road area and the other between the cables and the fence line. Further restoration drains may be included at HDD points or access splays. The number of land drains required is largely dependent on the damage that occurs to the soils during construction, prevailing weather conditions and also the layout of the working width. Detailed post construction drainage design can only be finalised following installation of the cables when their as built alignment is known.

Landowner consultation

5.171 Mr Heselton (NGVL/OH/1 at para's 5.3.1-5.3.5) explains that final drainage design will be subject to an agreement between NGVL and the individual landowner(s) affected by the scheme. This will be incorporated into an option agreement when construction detail is finalised.

Installation of pre-construction and construction drainage

5.172 Drainage installation is undertaken according to ADAS Technical Note on Workmanship and Materials for Field Drainage Schemes, ADAS 1995.

5.173 Installation work will be designed, monitored and recorded by a qualified drainage professional.

5.174 Land drainage is installed by a suitably experienced and qualified land drainage contractor with local knowledge and using specialised machinery. They will install the design under the management of the Principal Contractor working to Construction Design and Management (CDM) Regulations (CD Ref: A.6).

5.175 A provisional land drainage Bill of Quantities has been prepared for the UK Onshore Scheme for which a contractor will bid. LDC estimates that the installation of pre and post construction drainage on this route might cost in the region of £45-£50,000 GBP per kilometre for a pre and post construction land drainage scheme as per the current CDD.

5.176 Drainage installed is recorded using GPS positioning to pick up drains, junctions and outfalls which are used to provide a final record plan for the landowner

5.177 The landowner, occupier or their representatives will be encouraged to meet on site and observe works and confirm that drainage workmanship is to his/her satisfaction. Reasonable inspection of soil re-instatement and land drainage works has been a frequent request during landowner meetings to date and can be accommodated by NGVL.

Management and monitoring

5.178 It is important that mitigation of the impacts of cable installation is appropriately secured, implemented and monitored, from pre-entry and through into the construction phase and beyond. In the present case, this will be achieved through a combination of planning conditions, necessary consents and oversight by NGVL personnel. This is explained in detail in the proof of Liz Wells (NGVL/LW/1 at para 5.42 and section 6).

<u>Relevant planning conditions</u>

5.179 Planning permission for the UK Onshore Scheme includes conditions to ensure that appropriate mitigation is secured and implemented. This is usual in schemes of this type and has been adopted by the four affected Borough Councils (CD C.4-C.7).

<u>Oversight by NGVL and their contractors</u>

5.180 NGVL will employ suitably qualified personnel to design, manage and monitor construction works, including soil handling and drainage installation. There will be up to 20 NGVL staff on site that will inspect each element of the work as it is undertaken. This is a daily process of supervision, rectification (if necessary) and sign-off for the soils and drainage works proposed.

5.181 In addition to engineering staff, NGVL will engage Agricultural Liaison Officers (ALOs) on the UK Onshore Scheme. These are employed by NGVL in an inspection role and also by the principal contractor responsible for the build. An ALO manages the day to day interface between landowners, occupiers and the engineering team and deals with ongoing agricultural issues during construction. An ALO is usually assigned to a specific section of the route to ensure continuity for landowners and occupiers during the construction phase.

5.182 Technical support to the ALO is provided by the NGVL Consents and Lands teams, advising land agents and specialist consultants as required.

5.183 In the circumstances, those affected and the Inspector can have confidence that the mitigation measures that I have described elsewhere in my evidence will be implemented as described.

Responsibilities for installed land drainage

5.184 Mr Heselton outlines in his proof (section 4) that NGVL will be responsible for any repairs or losses resulting from any defects, including land drainage schemes, for the duration of the easement.

Compensation for residual impacts

5.185 Whilst NGVL will seek to mitigate its impacts as far as reasonably practicable it recognises that there will be circumstances that give rise to financial loss and a reasonable negotiated settlement may need to be made. I understand that this is provided for by the HoTs offered to affected landowners and is explained further at Appendix 2, section 11 to the Proof of Evidence of Mr Heselton. I am also advised by NGVL that in the event that terms for a negotiated agreement cannot be concluded, affected parties may be entitled to claim under the CPO Compensation Code and is described further by Mr Heselton (para's 5.5.1-5.5.3).

6. DRAINAGE RIGHTS NEEDED BY NGVL

6.1 The Order Land comprises all of the land required for the construction, operation, repair maintenance and decommissioning of the UK Onshore Scheme. The rights being sought by NGVL are explained at section 7 and also at Appendix 2 of the Statement of Reasons (CD Ref: D.3) and have been separated into 'packages' based on their purpose and applied to specific plots, as appropriate.

6.2 Some of the rights are only required for temporary purposes, such as the creation of construction compounds, and will only be exercised during the construction phase. Other rights will be permanent in nature, such as the right to keep installed, operate, maintain and decommission the cables. Others, such as the right to access the land for the purpose of maintaining the cables, whilst permanent in nature, will in practice only be exercised intermittently.

6.3 The rights 'packages' have been tailored to ensure that a proportionate approach to compulsory purchase is being taken, and that the impact on affected landowners and occupiers is limited so far as reasonably practicable. Accordingly, if a land parcel is only required in order to facilitate land drainage works, only the more limited Drainage Rights package is sought in respect of that land rather than a full Cable Construction Rights package which would permit more intrusive works.

6.4 In my opinion, NGVL has recognised the importance of land drainage and soils at an early stage. The rights packages being sought have been developed with full regard to the survey information, CDD plans produced to date together with landowner and stakeholder feedback. Land drainage rights have been embedded in each of the rights packages being sought and NGVL are confident that they have been thoroughly addressed. This is explained further below.

6.5 A description of the rights being sought by the Project is outlined below. A number of plans have been prepared (1:25,000 scale) by LDC which summarise (for ease) the detailed mapping shown in the Order and are shown at Appendix 5, Pages 30-37. Plan 1, Page 30 has been used to provide exemplars for the various rights packages described in the Statement of Reasons ("SoR") (CD Ref: D.3) below.

Freehold Acquisition

6.6 NGVL seeks the purchase of the freehold title for the purposes of above ground permanent infrastructure at the converter station (CPO Plot 42-16), and its access road (CPO Plots 42- 33; 42-34; 43-01 to 43-09 inclusive and 44-01; 44-02). This is shown coloured pink on Order Maps 42, 43 and 44.

6.7 Paragraphs 6.33 to 6.44 of the Statement of Reasons (CD Ref: D.3) provide a rationale for the works which will be undertaken at the converter station. Detailed plans for construction of the converter station site and access road are to be produced and this will be supported by a Construction and Environmental Management Plan (CEMP). The CEMP will address the installation of pre and post construction land drainage as required; construction dewatering; siltation control; provision of drainage outfalls; ditching and maintenance; water storage and flood risk attenuation.

6.8 A soil and land drainage survey has been completed for the converter station access road. CDD plans and a provisional bill of quantities have been prepared and are shown in the core documents. These have been used to inform the extent of the land area required for the order. Further designs for surface water management; bridges; culverts; flood risk attenuation; landscaping and maintenance will develop as construction detail evolves.

Compulsory acquisition of new rights

Cable Construction Rights

6.9 The Cable Construction Rights are necessary for construction of the HVDC and HVAC Routes and are shown coloured blue on the Order Maps.

6.10 These rights include the majority of land drainage works associated with the construction phases of the project and include the full extent of the proposed working width and limits of deviation.

6.11 The drainage works included within this rights package include permanent and temporary works on land required for:

- Installation of pre-construction land drainage;
- Surface water management, siltation control and dewatering during construction;
- Ditch crossings, ditch cleaning and temporary culvert installation and removal;
- Post construction land drainage together with outfalls within the cable construction area, and/or
- Locations where further investigations and design are likely to be required as part of the access works

Access and Drainage Rights

6.12 This is a tailored rights package affecting only the land shown coloured yellow on the Order Maps (CD Ref: D.2). Typical examples where these rights include CPO Plot references 01-01/02/03/04/05, 02-22 & 04-17/18).

6.13 These areas often occupy land adjacent to existing roads or tracks or in which access works are proposed. It includes rights of access, with or without vehicles, plant and machinery, to facilitate the construction, installation, commissioning, inspection, maintenance, repair, alteration, renewal, replacement, removal and decommissioning of the HVDC and HVAC cables, including rights to carry out minor works to facilitate such access, and rights to carry out de-watering and drainage works.

6.14 Land drainage works included in this package are likely to be necessary in the following areas:

- Proposed access splays, deceleration lanes and turning circles;
- Temporary tracks or hardstandings;
- Temporary ditch crossings;
- Culverts, bridges and/or associated improvement works;
- Dewatering and/or siltation control together with pre and post construction drainage required to mitigate the impact of site access works; and/or
- Locations where further investigations and design are likely to be required as part of the access works.

6.15 CDD plans have not been yet been prepared for much of this land as it occupies land principally in non-agricultural use and detailed design has yet to be completed. However, it remains important to include land drainage within this rights package to ensure that it is considered in the detailed construction design and installed as required.

Construction Compound Rights

6.16 This is a tailored rights package shown coloured green on the Order Maps (CD Ref: D.2). Typical examples where these rights are sought are shown at Appendix 5, Page 30 (CPO Plot references 01-28, 02-06, 03-21 & 04-23). It includes temporary compounds located outside of the main construction corridor.

6.17 Compounds tend to be transitory and relatively short-term installations. They have the potential to impact on land drainage systems, particularly if the topsoil is

stripped from the compound area. Land drainage included in this package will depend on the type of compound and intensity of use.

6.18 Drainage considerations in this package will include:

- Agricultural land drainage systems in and around the footprint of the compound;
- Ditches and ditch crossings; culverts and/or bridges;
- Land required for dewatering and/or siltation control;
- Pre or post construction drainage and any outfalls installed as part of the compound design; and/or
- Locations where the status of existing drainage schemes remains unknown and further investigations and design are likely to be required.

Drainage Rights

6.19 This is a tailored rights package shown coloured brown on the Order Maps (CD Ref: D.2). Typical examples where these rights are sought are shown at Appendix 5, Page 30 (CPO Plot references 02-11, 02-17, 03-08/11, 04-19/21).

6.20 Rights are sought to carry out de-watering and drainage works and to install, alter or reinstate land drainage systems, including the right to access the land with or without vehicles, plant and machinery to undertake those works.

6.21 NGVL has been working with landowners to develop field drainage solutions. The land drainage and soils surveys undertaken to date have been used by NGVL to develop the drainage rights package and land areas included within the Order plans. In some cases, impacts on field drainage systems might extend beyond the cable construction and/or access rights corridors and this is one of the primary reasons for the inclusion of this rights package in the Order.

6.22 This package includes drainage rights required if:

- Off-site mains are required to take water to remote outfalls to facilitate pre and post construction drainage installation (e.g. CPO Plot references 02-11, 02-17);
- Ditch cleaning or deepening is needed to improve water flows outside of the Cable Construction Rights Corridor or Access Rights areas ;
- Concerns raised by landowners on the severance of individual outfall systems necessitates drainage beyond the extent of other rights packages; and

- The status of existing drainage schemes remains unknown and further investigations and design are likely to be required.

6.23 The inclusion of this land within the order provides flexibility for NGVL to further the design of the CDD plans prepared to date and to install appropriate drainage mitigation in the event of voluntary landowner agreement not being reached.

HVDC and HVAC Cable Rights

6.24 These rights are sought in connection with the use, maintenance and decommissioning of the HVDC and HVAC cables and permanent infrastructure to protect and prevent interference with them.

6.25 Land drainage rights within this package relate to the repair and re-instatement of any drainage impacted by the use, maintenance and decommissioning of the cables. This will include:

- Land drainage installed under the construction and access rights packages and in the longer-term; and

- Future drainage that is renewed or replaced as part of the UK Onshore Scheme.

Landfall Zone Rights

6.26 These rights are sought in connection with the ongoing use, maintenance and future decommissioning of the HVDC cables and to protect and prevent interference with them land in the landfall zone CPO plots 01-06, 01-07, 01-08, 01-17, 01-18 and 01-29.

6.27 Land drainage works included in this bespoke package are described in the Cable Construction Rights at 6.9-6.15 above.

Substation Connection Rights

6.28 Rights are sought in connection with the ongoing use, maintenance and future decommissioning of the cables and to protect and prevent interference with them. This package also includes rights to facilitate the 'unlicensed works' to connect the HVAC cables to the NGET Substation. A bespoke connection rights package has created in respect of the CPO plots 41-03 to 41-06 inclusive, 41-10, 41-17, 41-20, 41-21, 41-22 and 41-24, shown coloured blue on the Order Maps (CD Ref: D.2). Land drainage works will be as described in the Cable Construction and Cable Rights packages.

Conclusion

6.29 NGVL has undertaken adequate planning, survey, design and consultation in its consideration of the impacts and mitigation of cable installation on soils and agricultural land drainage. I am satisfied that, in developing the rights packages, the land take proposed within the Order is both reasonable and proportionate and the rights secured will be sufficiently flexible to facilitate construction and remediation of the UK Onshore Scheme.

7. SUMMARY AND CONCLUSIONS

7.1 Construction of the UK Onshore Scheme will inevitably impact on agricultural soils and land drainage.

7.2 Agricultural soils and land drainage affected by the UK Onshore Scheme have been assessed and potential impacts identified. This understanding has informed the design of mitigation to be implemented by NGVL and its contractors and also the development of the rights packages being sought within the Order Land.

7.3 Current designs will develop further as detailed cable design progresses and the rights packages have been tailored to accommodate likely changes.

7.4 Continuing dialogue with affected landowners and occupiers will be necessary and is essential to ensure the best possible construction designs are implemented within the framework of the farming systems in place.

7.5 I understand that NGVL is continuing to negotiate with landowners affected by the Order to secure voluntary rights to carry out drainage and soil re-instatement works on their land. In the event that voluntary agreement cannot be reached, NGVL will rely on the rights packages it has included in the Order to carry out necessary drainage work.

7.6 I am satisfied that, in developing the rights packages for the Order, the land take proposed is both reasonable and proportionate. I am confident that the rights secured will be sufficiently flexible to facilitate construction and remediation of the impacts of the UK Onshore Scheme on soils and agricultural land drainage.

7.7 For the reasons set out above and in the evidence of the other witnesses, I believe that there is a compelling case in the public interest to justify confirmation of the Order.

8. EXPERTS DECLARATION & STATEMENT OF TRUTH

I, David George Royle, declare that:

8.1 I have made clear which facts and matters referred to in this Proof are within my own knowledge and expertise and those which are not. Those that are within my knowledge and expertise I confirm to be true.

8.2 I have indicated the sources of all information I have used.

8.3 I have complied with my duty to the Compulsory Order Inquiry as an expert witness which overrides any duty to those instructing or paying me.

8.4 I am not instructed under any conditional or other success related fee arrangement.

8.5 I have no conflicts of interest.

8.6 I will notify those instructing me immediately and confirm in writing if for any reason my proof requires any correction or qualification.

8.7 I am aware of and have complied with the requirements of the rules, protocols and directions of the Inquiry in connection with the Order which was made on 15th of January 2019.

Signed: 

Dated: 4 June 2019