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Proposed Overhead Line Works Associated with the Provision of a Realigned Crossing for the River Tees

Teesside

Environmental Statement – Volume 1 - Text

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1 INTRODUCTION

1.1 Background

1.1.1. National Grid Electricity Transmission plc (National Grid) owns the high voltage electricity transmission system in England and Wales and operates the electricity transmission system across Great Britain. The Company is responsible for operating the high voltage network, carrying power between power stations and the local electricity supply networks of the Regional Distribution Network Operators (DNOs).

1.1.2. The high voltage electricity transmission system in England and Wales, which operates at 275,000 volts (275kV) and 400,000 volts (400kV), comprises some 7,000 route kilometres (km) of overhead lines, over 600km of underground cable and over 320 substations. At the substations generation is connected to the system and the primary transmission voltage of 400kV or 275kV is transformed to lower voltages to companies with direct connections and to the Regional Distribution Network Operators (DNOs) who take supplies and distribute electricity at lower voltages to factories, offices and homes.

1.1.3. Through the terms of its transmission licence and obligations under Schedule 9 of the Electricity Act 1989, National Grid is required to operate its transmission system in an economic, efficient and co-ordinated manner whilst having regard to the preservation of amenity.

1.1.4. This Environmental Statement has been prepared by National Grid to accompany its application to the Secretary of State for Energy and Climate Change (ECC) for consent under Section 37 of the Electricity Act 1989 to undertake works affecting the existing Norton/Lackenby 275/400kV overhead line.

1.1.5. The works are required to provide a refurbished and realigned overhead line route between towers ZZA229 on the north bank of the River Tees and ZZA241 on the south Bank of the River Tees. The proposed Route Alignment is shown on Figure 1.1.

1.1.6. In addition to this Section 37 Consent, application is also being made to the Secretary of State for a direction under paragraph 7 of Schedule 8 to the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 that planning permission for the proposed overhead line works described in this report be deemed to be granted.

1.2 Purpose of the Environmental Statement

1.2.1. This Environmental Statement presents the findings of an assessment of the potential environmental impacts of proposed overhead line modification works as set out and described throughout this document and in the application for Section 37 consent.

1.2.2. This report has been prepared to accompany an application made under Section 37 of the Electricity Act 1989 for the undertaking of those works and includes:

- the construction of approximately 16no. new towers to enable the realignment of the ZZA overhead line between towers ZZA229 and ZZA241;
- the dismantling of 12no. existing towers between ZZA229 and ZZA242: and
- the upgrading of the line to provide a 400kV capacity line on both circuits between ZZA229 and ZZA241.

1.3 Statutory Requirements

Electricity Act 1989

1.3.1. Section 37 of the Electricity Act 1989 requires consent to be granted by the Secretary of State for the installation above ground of an electric line. This requirement does not apply in circumstances where the electricity line has a nominal voltage not in excess of 20kV or

the electric line is, or will be, within premises in the occupation or control of the person responsible for its installation.

1.3.2. The requirements for the consent of the Secretary of State under Section 37 are also subject to certain exemptions which are set out in the Overhead Lines (Exemption) Regulations 1990 and described further below.

Overhead Lines (Exemption) Regulations 1990

1.3.3. These Regulations set out the circumstances under which the formal approval of the Secretary of State is not required to enable works to an overhead line to be undertaken.

1.3.4. Regulation 3 (1) (c) sets out sets out the exemptions from the requirements of Section 37(1) of the Electricity Act 1989 for certain types of temporary overhead line diversion works. The exemption criteria are summarised below:

- No part of the scheme is within a National Park, an area of outstanding natural beauty, a regional park or SSSI ;
- The maximum distance between the connection points of the diversion with the existing overhead line does not exceed 850 metres; and
- The temporary diversion does not remain installed for a period exceeding six months.

Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 and The Electricity Works (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2007 (EIA Regs)

1.3.5. These regulations apply to any application under Section 37 of the Electricity Act 1989 for consent to install or keep installed an electric line above ground and set out the thresholds and criteria to determine the need for Environmental Impact Assessment (EIA), establish the procedures for undertaking the preparation of an EIA and actions that must be undertaken when submitting an application for Section 36 or 37 consent accompanied by an EIA.

1.3.6. The proposed overhead line modification works fall within Schedule 2 of the EIA Regs as *"an electric line installed above ground with a voltage of 132 kilovolts or more, the installation of which (or the keeping installed of which) will require a section 37 consent but which is not Schedule 1 development."* Falling within Schedule 2 of the Regulations does not necessarily mean that EIA of a proposed development is required, however, taking into account the proximity of the site to the Teesmouth and Cleveland Coast Special Protection Area, National Grid is of the view that the proposed overhead line modification works should be subject to EIA.

Responsibilities under Schedule 9

1.3.7. Alongside the requirements of the EIA Regs, National Grid has responsibilities under Schedule 9 of the Electricity Act 1989 in respect of the preservation of amenity.

1.3.8. Schedule 9 of the 1989 Electricity Act requires National Grid to take account of the following when planning new overhead line developments:

"(a) to have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and,

(b) to do what he reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."

1.3.9. This Environmental Statement seeks to demonstrate National Grid's intention to meet its responsibilities under Schedule 9 and its commitment to the implementation of best environmental practice to avoid, minimise and/or mitigate the effect of its operations on

amenity in general, nationally and internationally designated areas and cultural heritage[1]. The Environmental Statement is submitted by National Grid to accompany its application under Section 37 of the Electricity Act 1989 for consent to carry out works on its existing overhead line to construct and operate the proposed connection.

1.4 Structure and Scope of the Environmental Statement

1.4.1. The assessment described in this Environmental Statement relates to the design of the connection as set out in the Section 37 application submitted in February 2010.

1.4.2. National Grid wrote to the Secretary of State for Energy and Climate Change on 4th December 2009 providing details of the proposed overhead line modification works and setting out the proposed scope of the EIA and the methodology for undertaking the various technical assessments. This letter comprised a formal request to the Secretary of State for his Scoping Opinion in accordance with the EIA Regs. A copy of this letter is provided at Appendix 1.C of this document.

1.4.3. The format and structure of this Environmental Statement is therefore based upon the proposed scope of the EIA as set out in our letter of 4th December 2009 and alongside the requirements of Schedule 4 of the EIA Regs which describes those matters that should be included within an Environmental Statement. This ES is structured around the following Chapter headings:

- Introduction
- Scheme Description
- Need and Alternatives
- Land Use
- Landscape and Visual Impacts
- Ecology and Nature Conservation
- Ornithology
- Cultural Heritage and Archaeology
- Contaminated Land, Ground Conditions and Geology

1.4.4. The Scoping Letter also set out those matters which National Grid believe should not be included within the scope of the Environmental Statement as follows:

- Flood Risk
- Audible Operational Noise
- Radio-Frequency Interference
- Socio-economics
- Air Quality
- Traffic and transportation
- Electric and Magnetic Fields
- Construction Noise.

1.4.5. Following receipt of the formal scoping opinion of the Secretary of State which has confirmed the acceptability of the proposed scope and methodology for the ES, the Environmental Statement has been prepared in accordance with the proposed scope and methodology. A number of those matters that have been scoped out of the Environmental

[1] Schedule 9. National Grid Electricity Transmission plc. Electricity Act 1989 – Schedule 9 Statement: Duty of Preservation of Amenity

Statement are however addressed in appendices to the Environmental Statement. Specifically these are addressed as follows

- Planning Policy – Appendix 1.E
- Traffic and Transport – Appendix 1.F
- Flood Risk – Appendix 1.G

1.4.6. This Environmental Statement has been compiled and produced by National Grid. Specialist and technical inputs to the Environmental Report have been prepared on behalf of National Grid by Atkins.

1.5 Consultation

1.5.1. In December 2009 National Grid held two public consultation events, one at Saltholme RSPB Visitor Centre and another at South Tees Business Centre, both in Middlesbrough, to invite feedback about its preferred route for the proposed overhead line across the River Tees between Salthome and Grangetown. The occupiers of almost 1000 residential properties, approximately 200 businesses and around 20 statutory and non-statutory consultees were invited to these events. Those businesses and statutory/non-statutory consultees who could not attend were subsequently provided with information packs including literature about the scheme, feedback forms and reply paid envelopes. A free telephone response line was also established. The local MP was written to and a briefing has been offered, although this has not been taken up as yet. This has allowed concerns raised by elected Members and members of the public to be considered within the design stage of the project and the EIA. The exhibition made reference to an alternative route alignment being considered by National Grid and landowner, Corus.

1.5.2. Full details of the consultations undertaken during the development of this project, including copies of consultation and project update leaflets, are provided at Appendix 1.A.

1.5.3. National Grid values all contributions and all the consultation responses have been carefully considered in the development of the design of the overhead line and associated mitigation measures which form the subject of this ES.

2 SCHEME DESCRIPTION

2.1 Introduction

2.1.1. This Chapter describes the main components of the overhead line modification works including the construction of the new overhead line and dismantling of the existing line between towers ZZA229 and ZZA241. This section provides details of the construction methods to be utilised and an outline programme for the undertaking of construction and dismantling works.

2.1.2. New permanent and minor temporary construction works will be carried out along a new overhead line alignment from Tower ZZA 229 accessed from Huntsman Drive that leads to the SABIC site on the North side of the Tees to Tower ZZA 241 accessed from Tees Dock Road located within the Corus Steelwork site. The intention is to re-route the overhead line away from the SABIC chemical works so that it crosses the River Tees further upstream, north of South Bank. South of the river, the route alignment to run alongside the railway line in front of the Corus coking plant. The construction works are scheduled to commence in July 2011 through to 2013. The existing Towers that run through the SABIC and Corus works will be dismantled should consent be granted for the proposed route alignment and change in operating voltage.

2.1.3. These works need to be undertaken as the overhead line, which runs between Saltholme on the north bank of the River Tees and Grangetown on the south bank, is now nearing the end of its operational life.

2.1.4. This line requires a full refurbishment, which will involve replacing the existing conductors (wires) and renewing the steelwork and foundations of the pylons. This will ensure the replacement line is suitable for a further 40 years of safe and reliable operation.

2.1.5. Since it was built in the early 1960s, some of the areas around the overhead line have undergone extensive development. Development in this area (ZZA230 to ZZA241) has resulted in access to some pylons becoming more limited, particularly for large machinery.

2.2 Detailed Description of the Proposed Works

2.2.1. The proposed overhead line works comprise of the following matters:

- Construction of realigned route
- Placement of 400kV conductors along realigned route
- Dismantling of existing route.

2.2.2. The proposed realignment will see the erection of approximately 16no. new towers. Broadly speaking these will measure approximately 60 metres above ground level. However, in order to provide the required clearances over the River Tees, it will be necessary to erect 2no. Crossing Towers on the north and south banks of the River Tees. This reflects the current arrangements for crossing the River. It is likely that the 2 Crossing Towers will measure approximately 130 metres in height. Indicative locations and tower designs are shown on Figure 1.1 and 1.2 respectively. However it should be noted that, particularly on the south bank of the River, ground conditions and constraints may mean that these tower locations are not suitable. Additional survey work will be completed to identify the exact location of towers following the grant of consent. The application for S37 consent therefore requests extended tolerances of up to 200 metres to allow for local conditions to be accurately determined and tower locations to be sited in the most effective locations.

2.2.3. Currently the ZZA line comprises one 275kV circuit and one 400kV circuit. The new Tees Crossing forms part of a larger asset replacement scheme which will see the replacement of existing conductors. To reflect the nature of the area and the likely increase in generating capacity, both circuits will be uprated to 400kV.

2.2.4. The realigned route will, when completed, replace towers ZZA230 – ZZA241. These towers will be dismantled following the commissioning of the realigned route in accordance with the broad programme set out below.

2.2.5. The length of the proposed realigned section of new route would be approximately 4.8 kilometres. This compares with an existing length of that part of the route to be realigned of approximately 4.04 kilometres.

2.3 Description of Route

2.3.1. The proposed route of the realigned overhead line is shown on Figure 1 and Figure 1.1. The realigned route commences at Tower ZZA229 (the recently constructed turn in tower to connect the proposed Thor 1020 MW CCGT Power Station to the National Grid) and involves the erection of approximately 16 no. towers on a new route between Tower ZZA229 and Tower ZZA241.

2.3.2. The route travels east from Tower ZZA 229 towards the SABIC site before turning south and running between the boundary of the SABIC site and Reclamation Pond. The proposed route then traverses further vacant land, and then the River Tees. On reaching the south bank the proposed route sails over PD Port land and alongside the Corus site before turning east and following the route of the local railway line. The revised route would rejoin the existing ZZA overhead line route at Tower ZZA241.

2.3.3. S37 consent is sought for the proposed route of the new line. Ground Condition surveys must be undertaken along the route to determine the optimum location for the siting of towers. The towers shown on Figure 1.1 are indicative locations only and a degree of tolerance needs to be built into the scheme to enable the effective and efficient realignment of the ZZA Line.

2.4 Preparation Work

2.4.1. Before construction activities commence along the new alignment a precision ground survey would be carried out to confirm the ground profile both along the centre of the line and on either side where the ground profile slopes across the line route. This would ensure that the new conductors would continue to maintain the statutory clearances.

2.4.2. Where the conductoring works might conflict with trees, the trees would be removed or reduced in height prior to the construction activity. This work would be carried out during the “winter” period to avoid the March - August nesting period.

2.4.3. Vehicular access to every tower along the new route would be required, and routes and detailed arrangements would be agreed in advance with each landowner or occupier.

2.4.4. In certain circumstances where no existing access is available or where ground conditions prevent normal access, it may be necessary to construct a temporary access route. This is usually achieved by the installation of temporary stoned tracks or the installation of temporary plastic trackway laid over the existing ground surface.

2.4.5. Access roads would be installed following the stripping and storage of topsoil and the laying of a geo-textile blanket. This would aid quick and effective reinstatement of the access routes following completion of the refurbishment activities. All access routes and working areas would be clearly demarcated to ensure that the extent of the construction impact is contained to a reasonably practicable minimum. Typical site construction activities fall into three categories : -

Site Construction Activity	Typical Working Area at tower base (subject to modification to reflect local constraints)
Winch/Tensioner site	60 metres by 60 metres with 30 metre by 100 metre corridors either direction beneath the line to site the winch and winched conductors.
Pull through and Suspension tower site	60 metres by 60 metres

2.5 Installation of Tower Foundations

2.5.1 New towers and associated foundations are required. These foundations are likely to be mass concrete. However, should detailed geotechnical surveys identify a need the alternative of piled foundations might be used. If mass concrete foundations are appropriate then holes large enough for the concrete foundations in the shape of a pyramid are mechanically excavated. The dimensions of the excavation would differ, depending on the type of tower to be installed. On excavation of all four leg foundations, steel stubs would be suspended from a template to achieve the correct dimensions and rake for each leg of the tower. All excavations are fenced for protection and the foundations concreted in position, using specially designed shuttering. Concrete would be delivered by ready mixed concrete truck either direct to site or by 4 x 4 dumper vehicles, or by other means to minimise land damage. After a period of 48 hours the concrete formwork is removed and the excavations backfilled and consolidated. The template is then removed from the steel stubs to be used again.

2.5.2 If geological conditions are such that mass concrete foundations are not appropriate, then piled foundations would be installed. Typical methods are driven steel tube, driven pre-cast concrete and augured piles. For all methods a specialist piling rig would be used at each tower site. Where more than one pile is required for a particular foundation, then the tops of each pile are joined together by encasing them in a concrete pile cap. The dimensions of each pile cap would differ depending on the type of tower to be installed.

2.6 Installation of Tower Steelwork

2.6.1 The next major step for all new tower sites would be to deliver the steelwork members of the towers using a 4 x 4 lorry. The assembly of each tower at ground level would proceed as far as possible until the utilisation of a crane is necessary to enable box-section assembly to be completed. It would be National Grid's normal practice to use cranes to erect steelwork, subject to suitable access being available. This reduces the timescale for construction, as well as the number of personnel and vehicle movements to/from the tower sites. Anti-climbing guards would be fitted and maintained at an early stage of erection.

2.7 Conductor Stringing

2.7.1 Having completed the erection of the new towers, the next stage would be to equip them with insulators and the equipment necessary for running out and stringing the conductors. Prior to the commencement of the stringing works, the temporary installation of scaffolding and nets will be required at certain locations to protect obstructions directly beneath the overhead line. The erection equipment and conductor drums for the new sections of line would be transported to site by HGV. The full tension stringing method would be used whereby a winch would be placed at one end and a tensioner at the other. A pilot wire for each conductor would be pulled by a tractor (or by hand in sensitive areas) through the section of line, passing over pulleys at intermediate towers and attached to a winch at one end. The pulleys (and pilot wire) would then be raised and connected to the tower cross arms. By winching the pilot wire the conductor would then be drawn through the section of line under a constant tension, by application of brakes, and would be erected without touching the ground, thus avoiding damage to both the conductors and the surface of the

ground. The conductor would subsequently be tensioned to the correct value and clamped at each tension tower position. Running blocks would then be removed and spacers fitted between the pairs of conductors in each phase.

2.8 Tower Removal / Completion

2.8.1 ***Conductors, Fittings and Insulators*** - Prior to the commencement of dismantling the redundant ZZA transmission line towers, the temporary installation of scaffolding and nets will be required in the span at certain locations to protect obstructions directly beneath the overhead line. Once this has been established the following step would be to unclamp the conductors and place in rollers. The tension of the line is then released and the conductors are lowered to the ground, cut into manageable lengths, coiled and removed from site for recycling. Finally, the insulator strings are removed from each tower and transported from site.

2.8.2 ***Towers*** - Following a site specific risk assessment the towers would be unbolted and lowered in sections using a derrick or crane. Finally, the towers are cut up into manageable sized sections and removed from site for recycling.

2.8.3 ***Foundations*** - The tower base can be removed completely if required but the foundations and stub steelwork remaining in the ground after the towers, conductors, insulators and fittings have been dismantled are normally removed to a level of 1.5 to 1.3 metre below ground level using compressors and cutting equipment. This prevents undue soil disturbance and the tower site can then be brought back into use at an earlier date. The broken concrete and stub steelwork are finally transported from site.

2.8.4 ***Completion*** - After completion of these major operations, sites would be cleared and tidied up. Finally, access routes and disturbed land would be reinstated in agreement with landowners. Any site security fences would be retained throughout the dismantling and construction process

2.9 Duration and Timing of the Refurbishment Activities

2.9.1. The construction and removal of the transmission overhead line towers is anticipated to take approximately 24 months, but the speed at which work would take place is largely governed by weather conditions and supply of materials. The tower sites can be occupied at different intervals throughout the construction period depending on site access and the programme. It is anticipated that the majority of the works would take place commencing August 2011 until November 2012.

3 NEED AND ALTERNATIVES

3.1 Introduction

3.1.1. This Chapter seeks to demonstrate the need for the proposed scheme, it also addresses the viability of potential alternatives to the proposed development. The Chapter sets out the result of a number of studies undertaken by or on behalf of National Grid to determine the current condition of the existing route and its component parts and to determine the viability of potential alternatives to the proposed scheme.

3.2 Need for the Proposed Works

3.2.1. The Norton – Lackenby overhead line including Towers ZZA230 – ZZA241 was constructed in 1961/1962. The conductor system, insulators and fittings are now considered to be in a relatively poor condition and the recent failure of a conductor joint in an adjacent section of OHL and the increased frequency of maintenance requirements indicates the need to replace the conductor system. National Grid has identified that the conductor system should be replaced by 2012.

3.2.2. The ZZA Route is of strategic importance to the operation of the National Transmission system and reliability must be maintained. It should also be noted that the River Tees area is set to experience increased demand for connection to the National Transmission System as proposed energy generation facilities come on stream.

3.2.3. As part of the refurbishment of the ZZA line it has been necessary to ascertain whether the existing tower steelwork is of a condition to enable a further 40 years extension of the life of the assets. As such a number of inspections have been undertaken to determine the current condition of the overhead line.

3.2.4. Inspections undertaken by Electricity Alliance East of the steelwork of towers within this section of the OHL route indicate that the towers appear to be in a relatively poor condition. In order to satisfy the required 40 years extension of asset life, extensive refurbishment of tower steelwork is considered necessary and the extent of refurbishment may justify complete replacement of certain towers on economic grounds.

3.2.5. Work is ongoing in respect of ascertaining the strength of tower foundations, however it can be summarised that the following works are required to maintain the asset life of the ZZA overhead line:

- Replacement of corroded tower steelwork
- Tower strengthening
- Foundation upgrade
- Conductor and earthwire replacement

3.2.6. Since the erection of the ZZA overhead line, the area has been the subject of significant development, particularly on the north bank of the River Tees. This includes the SABIC site and Petroplus developments. There is now a significant level of infrastructure including overground pipelines serving the petro-chemical facilities in the area running through and around the site of a number of towers.

3.3 Alternative Options

3.3.1. Part II of Schedule 4 of the Electricity Works (Environmental Impact Assessment Regulations) 2000 (as amended) identifies the information that should be included within an Environmental Statement and requires an Environmental Statement to contain *"An outline of the main alternatives studied by the applicant and an indication of the main reasons for his choice, taking into account the environmental effects."*

3.3.2. National Grid also has responsibilities under the terms of the Electricity Act 1989 "*to develop and maintain an efficient, co-ordinated and economical system of electricity transmission"*.

3.3.3. In order to comply with these requirements, National Grid has commissioned a number of reports looking at potential alternatives to the proposed scheme. These alternatives can be summarised as follows:

- Option 1 - Strengthen the existing foundations of tower ZZA234 and ZZA235, and consider the extent of work necessary to refurbishment and upgrade towers between ZZA229 and ZZA241.
- Option 2 - Relocate tower ZZA234 online (or offline) towards the north bank of the River Tees, or elsewhere within the SABIC site and consider the extent of work necessary to refurbishment and upgrade towers between ZZA229 and ZZA241
- Option3 - Relocate a complete section of overhead line to remove the existing River Tees Crossing, either as a complete route section between towers ZZA229 and ZZA241, or a subsection between these two points.
- Option 4: Remove the overhead line River Tees Crossing and replace with a cable section within a tunnel beneath the river.

3.3.4. These alternative options are dealt with in detail below.

3.3.5. It should be noted that "do-nothing" has not been considered as a legitimate alternative. Failure to undertake refurbishment works along this section of the ZZA overhead line would not enable National Grid to comply with its obligations under the Electricity Act to maintain an efficient system of electricity supply.

Option 1 – Refurbish existing infrastructure

3.3.6. Condition surveys of the towers along the ZZA line have been undertaken on behalf of National Grid and these indicate that to accommodate refurbished conductors and ensure the life of the asset, strengthening works will need to be undertaken to both the tower steelwork and tower foundations. Although the condition of the foundation for tower ZZA 234 is not known as it has not been possible to undertake intrusive investigations in this area. It has been assumed however that some foundation strengthening would be required to maintain the strength of this particular crossing tower.

3.3.7. The location of Tower ZZA234 is severely constrained by surrounding infrastructure associated with and running through the SABIC site. Whilst it is feasible to relocate some of this infrastructure, this can only be done over a prolonged (5-7 year) period of time. This would not enable the works to be undertaken within the timescales set out in the Section 37 application and the reconductoring of the ZZA route by 2012.

3.3.8. Given the location of Tower ZZA 234, there are likely to be significant operational, construction and health and safety constraints that impact upon the delivery of the asset replacement scheme within the required timescales.

3.3.9. Option 1 has been rejected by National Grid due to health and safety risk associated with construction and future maintenance of National Grid assets within the SABIC site; furthermore the programme associated with pipe relocation within SABIC site is outside of National Grid's control and does not align with National Grid's requirements for system development in this area.

Option 2 – Relocation of Tower ZZA234

3.3.10. Having discounted Option 1 as a viable solution, National Grid has considered the possibility of relocating Tower ZZA234 from its current location yet retaining the remainder of the ZZA route on its current alignment. Two potential solutions were considered as part of this alternative:

- Relocation of Tower ZZA234 online and adjacent to the existing, retaining the remainder of the line in its current location; and
- Relocation of Tower ZZA234 offline and requiring relocating towers ZZA233 – ZZA 236.

3.3.11. Relocating Tower ZZA234 online was first investigated and discussions were undertaken with the landowner on land immediately to the south of the existing Tower ZZA234. The landowner considered the proposed location of a relocated tower here to be acceptable.

3.3.12. However, on further investigation it was identified that, in order to relocate the tower online, a double circuit outage would be required. Investigations further identified that such an outage would be required for a period of approximately eight weeks, putting the grid system at a severe and unacceptable risk. Furthermore, the construction of a replacement tower online would not remove the ongoing construction and maintenance issues with regard to the location of the tower in such close proximity to the petro-chemical works and overground pipelines. This potential option was therefore discounted.

3.3.13. The relocation of Tower ZZA234 offline would necessarily require the realignment of a section of line between towers ZZA233 and ZZA236. This potential option would require the temporary diversion of the line, with single circuit outages. However, the location of the proposed option within the SABIC site with the consequent constraints on construction and health and safety would again present significant challenges to the construction works. Furthermore, any temporary diversion would need to be capable of supporting the river crossing section conductors.

3.3.14. On the basis that the offline relocation of Tower ZZA234 would require the realignment of sections of the ZZA route but would not eliminate the ongoing constraints to construction and maintenance of the Overhead line, the difficulties of constructing a realigned overhead line within the SABIC site and the need for a temporary diversion capable of supporting the river crossing, this potential option has been discounted.

3.3.15. Option 2 has been rejected by National Grid due to health and safety risks associated with construction and future maintenance of assets within the SABIC site; furthermore there are system constraints associated with tower construction and also risk associated with an acceptable Emergency Return to Service for the National Grid circuits.

Option 3 - Relocate a complete section of overhead line to remove the existing River Tees Crossing

3.3.16. In 2008 National Grid commissioned White Young Green (WYG) to consider potential route corridors that may be used for an alternative OHL route. The WYG study was desk based and considered the constraints and opportunities that could influence potential options for the diversion of the existing overhead line.

3.3.17. WYG identified potential constraints to development, identifying them as ‘high’, ’medium’ or ‘low’ value. The objective of the study was to identify potential routes that had the least impact upon high value constraints.

3.3.18. The results of this exercise identified three potential options for a realigned route. These options were described as follows:

- *Route Corridor 1 – Route Description*

North Bank of the River Tees

The initial section of Route Corridor 1 (RC1) incorporates a section of the existing OHL, running east from Saltholme substation to the Reclamation Pond SNCI and parallel to the northern site boundary of the proposed Thor Cogeneration Plant site.

The next section of RC1 ties in at the north west boundary of the Reclamation Pond and runs south across the western boundary of the Reclamation Pond towards Port Clarence landfill, turning south easterly, skirting over the north eastern boundary of the landfill

towards the river crossing section of RC1. This section of RC1 although crossing the Reclamation Pond is a viable route as a result of a planning permission granted in January 2004 allowing reclamation of the Pond for industrial (Class 2) uses.

This section is also common to Route Corridor 2 (RC2).

River Crossing
This section of RC1 ties into the previous section at a point east of the Fire Bund at Port Clarence, west of the Oil Refinery and north of a section of the Teesmouth and Cleveland Coast - SSSI, SPA, Ramsar site. The OHL section crosses the Teesmouth and Cleveland Coast and the River Tees, terminating at a tie in point on the south bank just north of an area of works (LU2.1.8).

This section is also common to RC2.

South Bank of the River Tees
This section of RC1 continues at the tie in point of the river crossing section, running in a north easterly direction, parallel to the northern boundary of the BS Cleveland landfill and Teesport No.2 landfill. The section ties into the existing OHL at a point on the southern boundary of PD Teesport the remaining section of RC1 then follows the current OHL route to Lackenby substation.

- *Route Corridor 2 – Route Description*

North Bank of the River Tees
This route corridor section is common to RC1 and Route Corridor 2 (RC2) and is therefore as described above.

River Crossing
This route corridor section is common to RC1 and RC2 and is therefore as described above.

South Bank of the River Tees
This section of RC2 continues at the tie in point of the river crossing section, running in a southerly direction, parallel to the western boundary of an unknown works. At the at south western corner of the unknown works the section turns 90 degrees and continues east parallel to the southern boundary of Corus tying into a section of the existing OHL north of Teesside Works, the remaining section of RC2 then follows the current OHL route to Lackenby substation.

- *Route Corridor 3 – Route Description*

North Bank of the River Tees
The initial section of Route Corridor 3 (RC3) incorporates a section of the existing OHL, running east from Saltholme substation to the south western boundary of the Seal Sand Industries area of land use.

The next section of RC3 runs south between two areas of the Teesmouth and Cleveland Coast – SSSI, SPA, Ramsar site along the route of a dismantled railway line. Beyond the areas of nature designation RC3 continues south parallel to the alignment of the western boundary of the historic Fire Bund at Port Clarence, Port Clarence historic landfill and Clarence Works historic landfill.

River Crossing
This section of RC3 ties into the previous section at a point south of Clarence Works historic landfill and west of the south western boundary of the Koppers site. The OHL

section crossing the River Tees terminates at a tie in point on the south bank of the River Tees, east of the South Wharf area historic landfill.

South Bank of the River Tees
This section of RC3 continues at the tie in point of the river crossing section, running in an easterly direction along the alignment of the railway line towards PD Teesport. At the south western corner of the unknown works RC3 incorporates a section common to both RC2 and RC3 with the route continuing east parallel to the southern boundary of Corus and tying into a section of the existing OHL north of Teesside Works.
The WYG report also attributed risks to the identified alternative options. As a result of the length of RC3 and the environmental risks associated with it (when compared to those associated with Route Corridors 1 and 2) no further consideration has been given to developing RC3 as a potential alternative route.

3.3.19. Since publication of the WYG report, National Grid has undertaken further refinement of the proposed route corridors 1 and 2 in order to identify a preferred route option. This has involved discussions with relevant landowners to identify further potential constraints to development. These further investigations have identified the following matters:

- Planned development in the area to the east of Brine Field substation on land owned by Impetus
- The west edge of the SABIC site is no longer operational and SABIC has advised that plant can be dismantled to permit the development of the OHL in this area.
- SABIC and Petroplus operate the area on the north bank of the River Tees. Within the area under consideration for the alternative OHL, SABIC occupies land which is not currently operational, while Petroplus manage existing storage facilities for petrochemical processing. Direct over sail of the Petroplus tanks was considered unacceptable to all parties.
- Augean plans to develop wind turbines on land to the west of the SABIC site. While the turbines do not appear to directly impact on the OHL, National Grid has a policy to ensure neither party's infrastructure is compromised.
- The north bank of the River Tees is designated a RAMSAR site and as such of environmental significance.
- The majority of land in the area under consideration on the south bank of the River Tees is under the ownership of Corus.
- The South Bank Wharf is considered by Corus to be the last remaining unused deep water wharf remaining on the River Tees, and has great potential value in respect of future development along the River. As such any proposed OHL should seek to avoid this area. To the south west of this wharf is the area referred to as the 'Offshore Base', within which vessels are maintained. The Port Authority advises that potential vessel movements in the future include rigs from the North Sea and also wind turbines for offshore installation.
- Corus has indicated that the remainder of the site on the south bank has potential value in relation to future development and as a consequence any potential OHL alignment should be kept to the perimeter of the site.
- Existing operational infrastructure within the Corus site includes the Coking Plant on the north side of the Middlesbrough – Redcar railway line. Corus has indicated that any OHL infrastructure should be positioned to the south of the plant rather than the north.

3.3.20. All these factors have been taken into consideration when determining a potential route for a potential realigned overhead line.

3.3.21. Option 3 is National Grid's preferred option and forms the basis of the application for S37 consent.

Option 4 - Remove the overhead line River Tees Crossing and replace with a cable section within a tunnel beneath the river.

3.3.22. During the original IP2 study the Electricity Alliance East engaged Donaldson Associates (DA) to undertake a study of routing options for the crossing using cables in a tunnel. The DA study assessed the following potential options:

- Three different options (options A, B and C) for a bored tunnel between the Tees Dock Road (around tower ZZA241) and the proposed Brine Fields substation (tower ZZA229);
- One option (option D) for a bored tunnel from within the SABIC chemical works (around tower ZZA232) to a point on the opposite side of the River Tees within the Corus steelworks site (tower ZZA236);
- One option (option E) for a bored tunnel from within the SABIC chemical works (around tower ZZA232) to the Tees Dock Road (around tower ZZA241).

3.3.23. This study was limited to a desk study to identify a preferred solution, identification of any significant issues on the obvious routes that may jeopardise the option (e.g. unsuitable geology or obstructions) and alternative routes where appropriate.

3.3.24. The study was based on an assumed tunnel diameter of 4 metres as required by National Grid for their London Tunnel schemes. The proposed diameter allows for safe personnel access to the tunnel, the operation of a tunnel vehicle system to assist with maintenance and inspection works and a safe environment in which the plant can operate.

3.3.25. Several potential tunnel route options were determined with potential shaft sites at the Tees Dock Road, to the north of the SABIC site; near to the proposed Brine Fields Substation and also within the Corus site near to an existing conveyor. Vertical alignments for each of the tunnel options have been determined based primarily on avoiding existing infrastructure and with the entire tunnel likely to be located within Marl (existing geology).

3.3.26. The DA study concludes that construction of a tunnel between the Tees Dock Road and the Brine Fields substation site to the north of the Tees is considered to be viable. The exact terminal points for the tunnel should be further defined once a preferred option for the tunnel alignment has been agreed upon.

- DA note that no major issues have been identified during this study, but there are risks associated with the proposed route options. For example, obtaining agreements from landowners to construct a shaft and a head house in land under their ownership.
- At this stage DA considers that these risks are surmountable and with careful negotiation landowner approvals could be attained.
- The programme for development of a tunnel scheme varies across these options and ranges from 4 years 6 months (shortest route option)through to 6 years (longest route option)
- Costs of the proposed scheme are estimated at being between approximately £46 million (cheapest option) and £76 million (most expensive option)

3.3.27. Option 4 has been rejected by National Grid due to health and safety risks associated with tunnel construction; a lack of clear space for sealing end compounds; a programme outside of National Grid requirements for system development; increased system complexity and excessive cost associated with such a development.

3.4 Conclusion

3.4.1. This chapter seeks to establish the need for the proposed development, setting out and establishing the need for the proposed development and summarising the main alternatives to the proposed scheme.

3.4.2. The scheme proposed within the S37 comprises Option 3 as detailed above. This option has been refined over the past two years and has been subject to detailed investigation and information gathering to ensure that the proposed development provides the most suitable option for development.

4 ECOLOGY

4.1 Introduction

4.1.1 This chapter considers the effects of the proposed Tees Crossing Asset Replacement Scheme on ecological features. This Ecological Impact Assessment (EcIA) assesses potential impacts on sites designated for their nature conservation value (other than those designated for their bird assemblages or species – see paragraph below) as well as legally protected and notable species of flora and fauna (terrestrial and aquatic) and habitats.

4.1.2 All issues relating to birds are discussed separately in Chapter 5 Ornithology, including an assessment of the effects of the scheme on the nearby international bird sites.

4.1.3 Three options were initially considered for the Tees Crossing Asset Replacement Scheme. Two of these were subsequently discounted; the proposed alignment is shown on Figures 4.1 and 4.2 and is referred to as the proposed Tees Crossing Asset Replacement Scheme route. In addition to consideration of the three route options, alternative schemes were considered including replacement of the existing route in-situ and tunnelling under the River Tees. Chapter 2 provides information regarding the alternative schemes and options together with information regarding the viability of each. Ecological input was provided from an early stage of the scheme, to assist in the identification of a preferred route that, where possible, minimised adverse effects on ecological features.

4.1.4 This chapter comprises the following sections:

- a description of the method of survey and assessment;
- a description of the existing conditions;
- identification and assessment of the significance of ecological effects (pre-mitigation) arising from the construction and operational stages of the overhead line's lifespan;
- identification of any cumulative impacts associated with the proposed 400kV overhead line in combination with any other projects in the surrounding area;
- identification of mitigation measures which will be fully integrated into the design and works programme in order to either avoid or reduce any adverse ecological effects to an acceptable (i.e. not significant) level; and
- consideration of likely residual (post-mitigation) impacts.

4.1.5 The assessment of effects is based on information gathered through an extended desk study as well as an Extended Phase 1 Habitat Survey undertaken in November 2009.

4.2 Method of Assessment

Consultation

4.2.1 Natural England is a statutory consultee in respect of all Environmental Statements and nature conservation. From the beginning of Atkins involvement in this project, consultation has been undertaken with NE to develop the survey and assessment protocols.

4.2.2 Initial consultation was conducted on the 29th April 2009 with Andy Douse (Ornithological Policy & Advice Manager) of Scottish Natural Heritage (SNH) to discuss the protocol for bird surveys and assessment in relation to transmission lines.

4.2.3 Following the initial consultation listed above and the production of the Ecological Constraints Report2 a meeting with NE was set up to discuss the various ecological issues and also to outline the proposed survey programme.

4.2.4 Following the meeting, further information regarding the Teesmouth and Cleveland Coast SPA was provided by NE on the 9th June 2009 and the results of the initial scoping report were sent to NE on the 26th June 2009.

4.2.5 In addition, NE sent a formal email response regarding the proposed survey programme on the 8th of July, confirming that they considered the survey programme to be sufficient. Natural England's full response to the scoping report is included in Appendix 4.A.

Determination of Zone of Influence

4.2.6 The proposed activities were reviewed in order to identify the spatial scale at which ecological features could be affected. The zone of influence is the area encompassing all predicted ecological effects from the proposed scheme, both those which will occur by land-take and habitat loss and those which will occur through disturbance such as noise.

4.2.7 Due to the potential impacts of the Tees Crossing Asset Replacement Scheme on bird populations in the local area, it was considered that the effects of the scheme could extend beyond the proposed limit of development and its immediate surroundings. Therefore a maximum zone of 10 km was considered appropriate for the identification of statutory sites of nature conservation value that have been designated for their bird interest, as described in Chapter 5: Ornithology. For all other statutory and non-statutory designated sites it was considered more appropriate to use a zone of 2 km from the proposed replacement overhead line.

4.2.8 With regard to historical records of legally protected and notable species from the past five years (with the exception of bats), a standard search area of 2 km was used. Due to the potential impact of the Tees Crossing Asset Replacement Scheme on local bat populations which may roost at a greater distance from the site than 2 km, a zone of 5 km was searched.

4.2.9 The field survey area included all habitats along the Tees Crossing Asset Replacement Scheme route including a buffer of at least 50 m either side where access was available.

4.2.10 These various search areas are marked on the Designated Sites Map, Figure 4.3.

4.2.11 The zone of influence was reviewed on an on-going basis throughout the desk study and site survey phases of the EcIA as well as during design development phases. The zone of influence for the desk study initially extended the stated distances from all three of the optional routes for the Tees Crossing Asset Replacement Scheme; this was reduced accordingly when the preferred alignment was selected.

Desk Study

4.2.12 The following searches and data requests were conducted as part of an ecological constraints assessment undertaken at an early stage in the scheme whilst the three initial options were being considered (03/09). This information was reviewed during the production of this EcIA to reflect changes in the design of the proposed replacement 400kV overhead line and the preferred alignment.

[2] 5082314 National Grid Tees Crossing Eco Constraints Report FINAL 180509.doc

Web-based Searches

4.2.13 The Multi Agency Geographical Information for the Countryside (MAGIC) website (www.magic.gov.uk) and the Natural England (NE) website (www.natureonthemap.org.uk) were used to identify all statutory designated sites of importance for nature conservation within the relevant search areas a maximum zone of 10 km was considered appropriate for the identification of statutory sites of nature conservation value. For all other statutory and non-statutory designated sites it was considered more appropriate to use a zone of 2 km from the proposed replacement overhead line route.

4.2.14 Aerial plans of the proposed overhead line route corridor were viewed on the Google Maps (http://maps.google.co.uk) and Maps Live (www.maps.live.com) websites to identify any other ecological features and habitats of note. Ordnance Survey maps were also used to identify the presence of any ponds within 500 m of the site. Great crested newts, a European Protected Species, can use suitable terrestrial habitat up to 500 m from a breeding pond[3] although latest research suggests that newts are likely to travel no more than 250 m from ponds when suitable habitats for foraging and hibernation exist within this distance around their pond[4]. As a precaution, the search area for waterbodies covered a 500 m zone around the study area.

4.2.15 The National Biodiversity Network website (http://data.nbn.org.uk/) was also reviewed to obtain any existing records for legally protected or notable species in the Teesmouth area.

4.2.16 The UK and Tees Valley Biodiversity Action Plans (BAPs) were reviewed to identify priority habitats and species that may be present within the survey area.

Record Requests

4.2.17 Records of all legally protected and notable species were requested from the EYE Project (North East Regional Environmental Data Hub) in March 2009. In addition, information on any non-statutory sites of nature conservation importance, designated and protected by planning policies at a county level, were also requested.

4.2.18 The Environment Agency (EA) and NE were also contacted in March 2009 for any information regarding legally protected and notable species records, or for any additional information on local fisheries that they may hold.

4.2.19 The Tees Valley Wildlife Trust (TVWT) was contacted in March 2009 for any additional local bat and badger records that may not have been registered with the EYE Project.

4.2.20 Additional ecological information was also provided by consultees as a result of the project scoping process.

4.2.21 Only species records from the last 5 years (2004 – 2009) were considered as part of the survey due to the highly developed nature of the survey area.

4.3 Field Surveys

Extended Phase 1 Habitat Survey

4.3.1 A walk-over ecological survey of the preferred route corridor to the north of the River Tees was undertaken by two Atkins ecologists on the 19th November 2009 and a further survey was conducted on 2nd February 2010 for the area to the south of the river. The

[3] Great crested newt mitigation guidelines, English Nature, 2001.

[4] English Nature report (ENRR) Number 576. 'An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt *Triturus cristatus*'

surveys broadly followed the Extended Phase 1 Habitat Survey methodology[5] as set out in Guidelines for Baseline Ecological Assessment[6]. The survey recorded the dominant habitats, together with searches for field signs of legally protected species or habitat capable of supporting such species. All plant names follow the New Flora of the British Isles[7].

4.3.2 The survey also aimed to identify the presence of invasive species subject to legal control such as Japanese knotweed and giant hogweed listed in Schedule 9 Part II of the Wildlife and Countryside Act 1981 (as amended).

4.3.3 With regard to legally protected and notable species, the following searches were undertaken, where access allowed, in areas where there was suitable habitat for the species:

- a search for signs of otter such as spraints, resting sites (holts), tracks and feeding remains;
- a search for signs of badger activity including setts, tracks, snuffle holes and latrines;
- a search for signs of water voles including droppings, footprints, feeding remains, bankside burrows and suitable habitat capable of supporting the species;
- an assessment of the potential for mature trees or buildings on or close to the route to support bats and the potential for the works to affect bat foraging and commuting routes;
- an assessment of the site's potential to support reptiles and amphibians, including an assessment of the potential for waterbodies within 500 m to support great crested newts. All such habitats were assessed using the Great Crested Newt Habitat Suitability Index (HSI)[8]. The HSI considers key habitat suitability factors such as geographic location, waterbody size and permanence, the presence of predatory fish and waterfowl, availability of suitable terrestrial habitat and proximity to other ponds and scores each factor based on its level of suitability;
- an assessment of the site's potential to support white clawed crayfish;
- an assessment of the terrestrial habitats on site for their potential to support breeding birds and in particular any species listed on Schedule 1 of the Wildlife & Countryside Act (1981) or species with UK or local Biodiversity Action Plans (wetland habitats and the designated site are covered by the ongoing bird survey work and not considered here);
- identification of UK BAP species (e.g. skylark, brown hare).

4.3.4 The broad habitat types located within the survey area have been mapped on the Phase 1 Habitat Maps (Figures 4.1 and 4.2). Features of note are identified on the maps with a

[5] Handbook for Phase 1 Habitat Survey, 2003. Joint Nature Conservancy Council (JNCC).

[6] Guideline for Baseline Ecological Survey, 1995. Institute of Environmental Assessment.

[7] New Flora of the British Isles, 2nd edition, 1997. Stace, C.A.

[8] National Amphibian and Reptile Recording Scheme website: http://www.narrs.org.uk/Documents/nasdocuments/HSI_guidance.pdf

target note (e.g.T1) and have been referred to as such in the text while detailed descriptions of these features are provided in the Target Note Record (Appendix 4.B).

4.3.5 Based on the findings of the Extended Phase 1 Habitat Survey, no further specialist legally protected species surveys were considered necessary.

4.3.6 All relevant legislation relating to legally protected species which are known or likely to be present along the proposed replacement overhead line route corridor is provided within the text in the relevant sections.

Survey Limitations

4.3.7 Ecological surveys are limited by a variety of factors which affect the presence of fauna such as season, climate, migration patterns and species behaviour. For instance, the Extended Phase 1 Habitat Surveys being carried in November/February were conducted outside of the optimal season for the identification of floral communities and associated habitat types. Therefore, the surveys were not able to provide a complete list of plant species within the survey area. Furthermore, the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

4.3.8 Despite this, the level of information obtained during the survey was considered to be suitably detailed enough to adequately allow the identification of habitat types and to make an assessment of the presence and habitat suitability for protected species.

4.3.9 Nevertheless, the results of this EcIA have allowed an evaluation of ecological features within the zone of influence to be made, together with an assessment of the significance of any impacts of the proposed development and the likely requirements for mitigation.

4.4 Nature Conservation Evaluation

4.4.1 A number of criteria have become accepted as a means of assessing the nature conservation value of a defined area of land which are set out in *A Nature Conservation Review*[9] and include diversity, rarity and naturalness.

4.4.2 The nature conservation value of an area of land and the species it supports is usually assessed in terms of:

- International importance (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Wetlands of International Importance (Ramsar sites));
- National importance (Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs));
- Regional/county importance (Local Nature Reserves (LNRs), Sites of Importance for Nature Conservation (SINCs), ancient woodlands);
- Local importance (significant ecological features such as old hedges, woodlands, ponds);
- The site and immediate environs (e.g. habitat mosaic of grassland and scrub);
- Negligible importance would usually be applied to areas of built development, active mineral extraction, or intensive agricultural land.

[9] A Nature Conservation Review (Ratcliffe, 1977)

4.5 Impact Assessment

4.5.1 The assessment of the potential impacts of the Tees Crossing Asset Replacement Scheme takes into account both on-site effects and those that may occur to adjacent and more distant ecological features over the lifetime of the 400kV overhead line (i.e. construction, operation and decommissioning). Effects can be permanent or temporary and can include:

- Direct loss of wildlife habitats;
- Fragmentation and isolation of habitats;
- Disturbance to species from noise, light or other visual stimuli;
- Changes to key habitat features;
- Changes to the local hydrology, water quality and/or air quality.

4.5.2 The significance of an adverse effect (or a beneficial effect) is the product of the magnitude of the effect and the value or sensitivity of the nature conservation features affected. In order to characterise the effects on each feature, the following parameters are taken account of:

- The magnitude of the effect;
- The extent of the area over which the effect would occur;
- The duration of the effect;
- Whether the effect is reversible and over what timeframe;
- The timing and frequency of the effect.

4.5.3 There is no agreed absolute method for assessing the significance of adverse or beneficial effects on nature conservation features. Effects are unlikely to be significant where features of low value or sensitivity are subject to low or short-term effects. However, where there is a number of small scale effects that are not significant alone, the assessor may determine that, cumulatively, these may result in an overall significant effect. Following current guidance, this assessment identifies whether the effects described are significant, based on the integrity and the conservation status of the ecological feature.

4.5.4 The integrity of legally designated sites is described as follows and has been used in this assessment to determine whether the effects of the proposals on a designated site are likely to be significant:

> *The integrity of a site is the coherence of the ecological structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*[10]*.*

4.5.5 The conservation status of habitats and species within a defined geographical area is described as follows and has been used in this assessment to determine whether the effects of the proposals are likely to be significant:

> *For habitats, conservation status is determined by the sum of influences acting on the habitat and its typical species, that may affect its long term distribution, structure and functions as well as the long term survival of its typical species within a given geographical area;*

[10] Guidelines for Ecological Impact Assessment in the United Kingdom, IEEM, 26 June 2006

> *For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long term distribution and abundance of its population within a given geographical area.*[10]

4.5.6 Mitigation measures have been agreed, incorporated into the design and programme and taken into account in the assessment of impacts. The residual impact assessment reflects the completed scheme assuming successful application of the mitigation measures and takes into account the likely success of the mitigation using the scale of confidence in prediction given above. Monitoring requirements and the criteria for measuring the success of mitigation are identified where appropriate. In addition enhancement measures are identified where considered practical.

4.5.7 In addition to determining the significance of an impact on any ecological features, this EcIA also identifies any legal requirements for mitigation measures and discusses any policy implications. This refers to policies as set out in Local Development Plans and/or Local Development Frameworks.

4.6 Policy and Guidance

National Policy and Guidance

4.6.1 This assessment takes account of the following legislation:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- Wildlife and Countryside Act, 1981 (as amended);
- The Countryside and Rights of Way (CROW) Act, 2000;
- The UK Biodiversity Action Plan (UKBAP).

4.6.2 Planning Policy Statement 9 (PPS9) – Biodiversity and Geological Conservation – sets out planning policies on the protection of biodiversity and geological conservation through the planning system. These policies complement but do not replace or override, other national planning policies and should be read in conjunction with other relevant statements of national planning policy.

4.6.3 The baseline surveys follow the nationally recognised *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment, 1995). The assessment of nature conservation and impact on ecological features follows *Guidelines for Ecological Impact Assessment in the UK* (Institute of Ecology and Environmental Management, 2007).

Regional Policy, Guidance and Legislation

Regional Spatial Strategy for the North East - 2021

4.6.4 The Regional Spatial Strategy (RSS) for the North East was adopted in July 2008 and forms part of the regional planning tier of the development plan for application site, in conjunction with the 'Saved' planning policies and the emerging Local Development Framework.

4.6.5 The North East Plan, as the RSS is commonly known, forms part of the statutory development plan for the region, and Stockton on Tees Borough Council (SoTBC) and Redcar and Cleveland Borough Council (RCBC) are required to prepare a Local Development Framework which is in general conformity with the RSS.

4.6.6 The Tees Valley is specifically considered by the RSS through the provision of Policy 10 which seeks to continue the regeneration, further economic growth and support the need for sustainable communities in the area. Policy 10, which gives priority to the regeneration of the Stockton-Middlesbrough Initiative area which includes both banks of the River Tees between Stockton, Middlesbrough and Redcar, Hartlepool Quays and

Darlington. The policy also seeks to support and encourage the sustainable development of Teesport whilst also ensuring that any internationally designated sites of nature conservation importance are subject to rigorous examination, taking into account the existing biodiversity and geodiversity of the area.

4.6.7 Policy 33 deals with biodiversity and geodiversity and states that planning proposals should "ensure that the Region's ecological and geological resources are protected and enhanced to return key biodiversity resources to viable levels".

Local Policy, Guidance and Legislation

4.6.8 Local plans list policies and objectives relevant to the specific requirements for their area. These policies are used to assess the merit of any planning application submitted to the Local Planning Authority and therefore need to be considered during the assessment of value and impact of a development.

4.6.9 The application site falls under the jurisdiction of two unitary authorities – Stockton on Tees Borough Council (SoTBC) and Redcar and Cleveland Borough Council (RCBC).

4.6.10 The SoTBC Local Plan was originally adopted in 1997, with an alteration to the Plan (Alteration Number 1) adopted in March 2006. The Local Plan underwent a formal review due to the requirements of the Planning and Compulsory Purchase Act (2004) in September 2007 and the 'Saved' policies within the Plan will be retained until the Local Development Framework (LDF) is adopted. The SoTBC Core Strategy underwent its public examination in May 2009, as such the document has considerable weight in the decision making process and would be considered as a material planning consideration when assessing the planning application. The following policies relate to ecology and the relevant nature conservation sites (no relevant policies were identified within the Redcar and Cleveland Borough Council Local Plan and Local Development Framework):

4.6.11 Policy EN1 deals with proposals for development in or likely to affect sites of special scientific interest, stating that:

4.6.12 *"Where such development may have a significant adverse effect directly or indirectly on the SSSI, it will not be permitted unless the reasons for the development clearly outweigh the value of the site itself and national policy to safeguard the intrinsic nature conservation value of the national network of such sites. Where development is permitted, the council will consider the use of planning obligations to ensure the protection and enhancement of the site's nature conservation interest."*

4.6.13 Policy EN2 stipulates against development within Local Nature Reserves (LNR) where it would be harmful to the elements giving rise to their designation.

4.6.14 Policy EN4 deals with development which is likely to have an adverse effect upon sites of nature conservation importance, stating that it *"will only be permitted if:-*

(i.) There is no alternative available site or practicable approach; and
(ii.) Any impact on the site's nature conservation value is kept to a minimum."

4.6.15 The land adjoining North Tees Works, and the environmental importance of this is dealt with through policy EN5 which states that development on said land, which is likely to have an adverse impact on the sites of nature conservation importance, will only be permitted if appropriate compensatory measures are provided. The policy suggests that appropriate conditions and/or planning obligations will be sought to achieve this.

4.6.16 Paragraph 2.38 of the Local Plan details the International Nature Reserve within the study area, which is located to the East of Cowpen Bewley Road and to the West of Seal Sands. Policy EN12 deals with this and states that *"development will only be*

permitted if it is required in connection with existing industry, for the management of wildlife, including new habitats, for marshland grazing or if it facilitates public access for the enjoyment and interpretation of the environment and nature." The policy goes on to state that this site will be treated as a SSSI and as such is subject to policy EN1.

Stockton on Tees Local Development Framework

4.6.17 The SoTBC Local Plan is currently being replaced by the Local Development Framework in its early stages. In May 2009 the Council's Core Strategy underwent a formal Examination in Public SoTBC released the Submission Document prior to the Examination, which when adopted, will set out the long term strategic aims and policies for the Borough, setting the Spatial Aims for the next 15 – 20 years.

4.6.18 The broad aims of the Core Strategy are in alignment with the RSS, as outlined above, however the document sets out the strategic aims for the Borough at the local level. The main objectives of the Submission document in relation to the development site are:

Objective 8 which seeks to "*protect and enhance the Borough's natural environment and to promote the creation, extension and better management of green infrastructure and biodiversity, taking advantage of the Borough's special qualities and location at the mouth of the River Tees*"; and

Objective 10 which seeks to "*ensure better use of resources, particularly the re-use of previously developed land*".

Biodiversity Action Plans

4.6.19 The UK Biodiversity Action Plan (UKBAP) highlights a number of habitats and species that are of nature conservation importance nationwide. Relevant habitats include intertidal mudflats, ponds and brownfield sites all of which also appear on the LBAP below.

4.6.20 The local Biodiversity Action Plan (Tees Valley Biodiversity Action Plan) – LBAP contains information regarding Habitat Action Plans that have been produced for current habitat conservation priorities in Tees Valley area (e.g. field margins, brownfields, mudflats and salt marshes). Species Action Plans have also been produced for local conservation priorities including barn owl, dingy skipper, ringed plover and water vole.

4.7 Baseline Description

Designated sites

4.7.1 There is one international statutory designated site within 10 km of the proposed replacement overhead line the Teesmouth and Cleveland Coast SPA and Ramsar site. A summary of this site is provided in the table below, but full detail is included in the separate ornithology chapter as the site is a wetland site specifically designated for bird populations.

4.7.2 Within 2 km of the proposed 400kV overhead line there are four national statutory designated sites and one non-statutory site, which is an RSPB nature reserve. These designated sites are listed in Table 4.1 below, along with an identification number against which they can be identified in the Designated Sites Map, Figure 4.3. Table 4.1 also provides short descriptions of each site and its qualifying interests along with the approximate closest distance from the proposed 400kV overhead line route and/or its alternatives.

Table 4.1: Statutory and non-statutory designated sites within the Zone of Influence

Site Name and Designation	Site Description and Qualifying Interests	App. distance from proposed 400kV overhead line
(1) Teesmouth and Cleveland Coast SPA and Ramsar Site[11]	Covering an area of approximately 1250 ha this suite of sites incorporates a range of coastal habitats including sand and mudflats, rocky shore, saltmarsh, freshwater marsh, and sand dunes associated with the heavily modified Tees Estuary. It is designated for its feeding and roosting habitats which support important populations of waterbird during the winter and passage periods, as well as breeding seabirds in summer.	**0m** - the preferred route of the proposed replacement overhead line passes over part of this site where it crosses the River Tees.
(2) Tees and Hartlepool Foreshore and Wetlands SSSI[12]	This 255 ha site, which underpins the Teesmouth and Cleveland Coast SPA and Ramsar site, several coastal areas which are an integral part of the complex of wetlands, estuarine and maritime sites supporting the internationally important population of wildfowl and waders on the Tees Estuary.	**0 m** - the preferred route of the proposed replacement overhead line passes over part of this site where it crosses the River Tees.
(3) Seal Sands SSSI[13]	Notified in 1966, Seal Sands, which is part of the Teesmouth Flats and Marshes, is the only area of extensive intertidal sandflats in northeast England. This 294 ha site is designated due to ornithological importance supporting large populations of various waterfowl and wading birds during the winter.	**800 m** to the north of the preferred route.

[11] Teesmouth and Cleveland Coast SPA and Ramsar site citations: (SPA – (http://www.jncc.gov.uk/page-1401) Ramsar site - (http://www.jncc.gov.uk/page-1389)).

[12] Tees and Hartlepool Wetlands and Foreshore SSSI citation: (http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=2000289).

[13] Seal Sands SSSI citation: (http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1000141).

Site Name and Designation	Site Description and Qualifying Interests	App. distance from proposed 400kV overhead line
(4) Teesmouth NNR[14]	This 355 ha coastal site incorporates a range of habitats including mud- and sandflats of Seal Sands and the sand dunes, saltmarsh and grazing marshes of North Gare. The area is recognised for its importance for large aggregations of overwintering wetland birds as well as for supporting the only colony of breeding common seals on the northeast coast of England.	**800 m** to the north of the preferred route.
(5) Saltholme RSPB Reserve (non-statutory designated site)[15]	Saltholme is an extensive area of open grazing marsh and freshwater pools which supports large concentrations of waders and waterfowl throughout the year but particularly during the winter months. The reserve also supports a variety of small birds, amphibians, invertebrates and plants.	**1.2 km** to the east of the preferred route.
(6) Cowpen Marsh SSSI[16]	Also notified in 1966, Cowpen Marsh is an integral part of the Tees Estuary comprising extensive saltmarsh characterised by abundance of representative species, with adjacent coastal grazing marsh and intertidal mudflats. This 116 ha site represents an important overwintering site for migratory wildfowl and wading birds and also supports a variety of breeding birds in summer.	**1.7 km** to the northwest of the preferred route.

4.7.3 There are no local authority non-statutory designated sites (e.g. sites of importance for nature conservation) or areas of ancient woodland within 2 km of the proposed 400kV overhead line route or its alternatives.

4.8 Habitats identified during field survey

4.8.1 The main habitat types found along the proposed replacement overhead line route corridor, as illustrated on the Phase 1 Habitat Survey Maps, Figures 4.1 and 4.2 include:

- watercourses (the River Tees);
- standing open water (the Reclamation Pond and associated waterbodies);
- species-poor semi-improved grassland; and,

[14] Teesmouth NNR site description: (http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1006937.aspx).

[15] Saltholme RSPB Reserve description: (http://www.rspb.org.uk/reserves/guide/s/saltholme/).

[16] Cowpen Marsh SSSI citation: (http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1000036)

- dense and scattered scrub.

4.8.2 Other subsidiary habitats include small areas of neutral grassland, scattered clumps of trees, patches of marginal vegetation, bracken, tall ruderal vegetation17, bare ground with ephemeral vegetation18, large bunds of rubble/loose material and hard standing.

4.8.3 The various broad habitat types located within and adjacent to the survey area have been mapped on the Phase 1 Habitat Maps (Figures 1 and 2). Features of particular interest have been referred to in the text with a target note (e.g.T1) and are identified as such on the maps (Figures 4.1 & 4.2). Detailed descriptions of these features are provided in the Target Note Record (Appendix 4.B).

Watercourses

The River Tees

4.8.4 The proposed replacement overhead line route crosses the River Tees at T1 (NZ527221). At this location the watercourse is approximately 400 m wide with a 4 to 5 m high boulder embankment along the north shore (see Photo 4.1) and wharfs and jetties of the industrial docks demarcating the southern shore (see Photo 4.2).

Photo 4.1: Boulder defences of the River Tees North Bank

Photo 4.2: Wharf frontage along the River Tees South Bank

4.8.5 This part of the river is highly tidal with approximately 20 ha of intertidal mudflat being exposed along the north shore at low tide. Meanwhile, during high water the Mean High Water Springs Mark (MHWS) extends a third of the way up the boulder embankment of the north shore. The south side of the river which forms the main shipping channel is constantly submerged and has no inter-tidal habitat.

4.8.6 The intertidal area, which represents one of the few foraging grounds that are available to wetland birds upstream of the coast, forms part of the Teesmouth and Cleveland SPA, Ramsar site and SSSI (see Chapter 5: Ornithology for further details). Consequently, this stretch of the River Tees is recognised as being of international value.

[17] Tall ruderal vegetation is defined as tall stands of weedy vegetation often associated with disturbed ground.

[18] Ephemeral vegetation is defined as defined as short, patchy plant communities associated with free draining, nutrient poor, stony soils typical of derelict urban sites and disturbed ground.

Standing open water

The Reclamation Pond

4.8.7 The 27.5 ha Reclamation Pond is an extensive, open waterbody which lies within a large depression, the north, south and western sides of which are generally defined by steep-sided embankments composed of earth, slag, rubble or boulders, up to 4 m high in places (see Photo 4.3). The eastern side has a less steep slope.

4.8.8 Vegetation around the margins is limited to stands of common reed and long-bracted sedge, which is particularly dominant along the northern shoreline (see Photo 4.4), along with occasional small stands of reedmace. Elsewhere the marginal vegetation is dominated by species poor semi-improved grassland which extends from the surrounding land down to the water's edge.

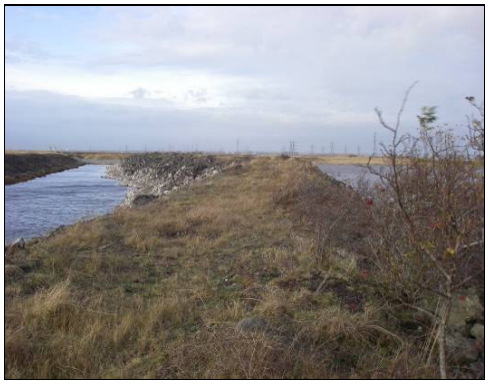

Photo 4.3: Boulder embankments in the SE corner of the Reclamation Pond

Photo 4.4: Reed and sedge dominated north shore of the Reclamation Pond

4.8.9 There was no sign of aquatic plant species around the margins although the pond supports large numbers of herbivorous and omnivorous waterfowl (e.g. tufted duck, gadwall and coot) which were observed feeding on pondweed located just below the surface out on the open water.

4.8.10 Water quality at the time of survey generally appeared to be good (mesotrophic), although a small area along the eastern shore was polluted by a chemical leaking from an outfall or spillage on the adjacent land.

4.8.11 The Reclamation Pond, which is known to be an important habitat for large numbers of waterfowl (see Chapter 5: Ornithology), is an important habitat along the Tees Crossing Asset Replacement Scheme route and is considered to be of local nature conservation value. Planning permission has been granted to Thor Cogeneration Ltd (TCL) for construction of a new power station in this area which will result in loss of up to ¾ of the current reclamation pond area. It is not known when the first phase of infill will commence.

Small waterbodies associated with the Reclamation Pond

4.8.12 A small, square pond, approximately 0.2 ha in size, is located along the eastern edge of the Reclamation Pond (T3). This pond did not contain any aquatic plant species and the northeast corner was contaminated by the same pollution described above although small numbers of waterfowl have been recorded on it. Due to its proximity to the Reclamation Pond it is recognised as part of the same wetland habitat and is therefore also considered to be of local nature conservation value.

4.8.13 Another very small pond, less than 0.1 ha in size, is present along this eastern edge of the Reclamation Pond (T4). This pond was heavily polluted and did not appear to

support any wildlife and it was covered over by a protective mesh presumably to prevent people and wildlife from falling in. Due to the heavy pollution this pond was considered to be of negligible value for nature conservation.

Species-poor semi-improved grassland

4.8.14 Much of the proposed route passes over areas of disused land composed of made-ground comprising crushed hardcore and compacted earth and slag which was used to build the land up when the area was reclaimed from the former intertidal zone of the Tees Estuary.

4.8.15 Semi-improved grassland dominates these areas of reasonably nutrient-poor underlying substrate, particularly around the Reclamation Pond and in the area of derelict ground on the north side of the River Tees (see Photo 4.5) and the area adjacent to the river bank on the south side of the river. This grassland habitat which comprises a characteristic floral community supports a variety of fauna including small birds, small mammals and invertebrates, and is also considered suitable for populations of common reptiles (such as common lizard). This area is considered to be of ecological value in a site context.

Photo 4.5: Extensive semi-improved grassland and scattered scrub

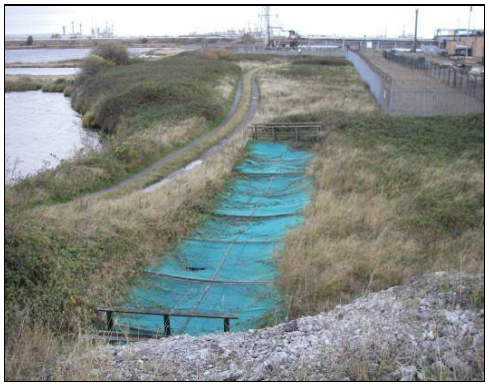

Photo 4.6: Scattered bramble scrub along the eastern edge of the Reclamation Pond

4.8.16 The semi-improved grassland area to the south of the river was noted as containing common spotted orchids, these are fairly widespread throughout Britain and are commonly found in calcareous or neutral grassland, on railway banks and road verges as well as colonising waste ground/former industrial sites.

4.8.17 A very small patch of semi-improved neutral grassland dominated by grasses such as crested dog's-tail and fescues is located adjacent to Huntsman Drive outside of the proposed route and the immediate survey area. Although it demonstrates higher floral diversity than the surrounding semi-improved grassland this habitat is considered to be of negligible value due to its isolation and small size.

Dense and scattered scrub

4.8.18 The semi-improved grassland is interspersed with patches of dense and scattered scrub dominated by bramble, dog rose and hawthorn bushes (see Photo 6). These areas of scrub provide foraging, shelter and nesting opportunities for birds and small mammals and are considered to be of site value.

Other Habitats

Trees

4.8.19 The only trees which are present along the overhead line route to the north of the river are two small clumps of semi-mature silver birch, one located to the northeast of the Reclamation Pond, the other located immediately south of Huntsman Drive (the approach road to Sabic Oil Refinery). Four other small (3-5 trees) clumps of semi-mature broad-leaved trees are present on the bunds to the south of the river. These trees provide some nesting opportunities for birds and are considered to be of relatively low, site value.

Tall ruderal vegetation

4.8.20 Small patches of tall ruderal vegetation dominated by rosebay willowherb and tansy are also located in the vicinity of the proposed replacement overhead line route corridor. Other than providing foraging opportunities for insects, reptiles and small birds, these relatively small areas of habitat are considered to be of limited value within the site context.

Bare ground with ephemeral vegetation

4.8.21 There are occasional small areas of bare ground along the proposed route corridor which support low growing, ephemeral vegetation. These areas are of negligible nature conservation value.

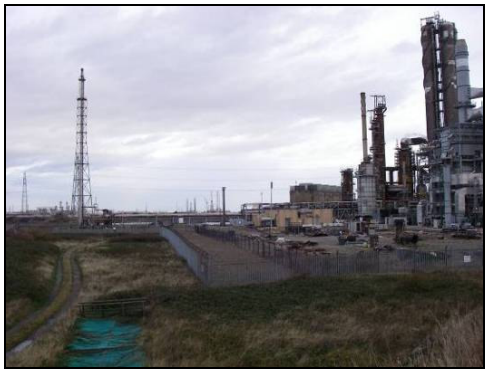

Photo 4.7: Hard standing lay down areas within the Sabic Refinery Site

Photo 4.8: Lay down areas and portacabin offices within the Sabic Refinery Site

Hard standing

4.8.22 The industrial parts of the survey area (e.g. the Sabic Oil Refinery and the Corus site to the south of the river) consist almost exclusively of areas of hard standing. These areas are either operational zones, areas used to site portacabin offices or are used as lay down areas (see Photos 4.7 and 4.8). Like the bare ground, these areas are of negligible nature conservation value.

4.8.23 To the south of the river the land within the survey boundary is owned by Corus steel works. The general area through which the two alternative routes pass is made up of derelict ground consisting of extensive open areas of rough grassland, rubble heaps and bare ground as well as areas of hard standing associated with the operational facilities and laydown areas of industrial works and the Teesside Docks. These habitats are generally considered to be of low ecological value.

4.9 BAP Habitats

4.9.1 Based on the information gathered during the desk study, the following UK and local BAP priority habitats are known, to be present in the zone of influence:

- intertidal mudflats (UK & LBAP);
- ponds (UK & LBAP);
- brownfield sites (LBAP).

4.10 Legally Protected and Notable Species

Desk survey results

4.10.1 Table 4.2 provides details of all legally protected/notable species records (excluding birds) which were provided within the 2 km search from the past five years (2004 - 2009). Records for otter, bats, water vole and reptiles are also shown on Figure 4.3.

Table 4.2: Legally Protected and Notable Species Records within the Zone of Influence

Species	Location and date of records and approximate distance from proposed 400kV overhead line
Otter 2 records	Reclamation Pond (NZ520230) (2004) - 170 m west
	Drainage network near Greatham Creek Bridge (NZ510250) (2004) - 1.5 km north
Bat records 4 records	Pipistrelle species at Cowpen Bewley (NZ482250) (2007) – 3.9 km west
	Two unknown bat species at Cowpen Bewley (NZ482250) (2008) - 4 km west
	Pipistrelle species at Cowpen Bewley (NZ482250) (2008) – 4 km west
Water vole 1 record	One record associated with Knitting Wife Beck, Grangetown (NZ551209) (2007) - 1 km southeast
Reptiles (common lizard) 1 record	An area of open grassland surrounded by industrial works (NZ522244) (2005) - 830 m north
Brown hare 25 records	The majority of these records were located in the open grassland areas of Saltholme, and Cowpen Marsh to the north and east of the proposed 400kV overhead line.
Common seal 10 records	All of the common seal records provided for the 2 km search area were located within the network of minor creeks associated with Greatham Creek to the north of the proposed 400kV overhead line.
Grey seal 7 records	All of the grey seal records provided for the 2 km search area were located within the network of minor creeks associated with Greatham Creek to the north of the proposed 400kV overhead line.

Grayling butterfly	The South Bank area adjacent to the south-west of the Corus site is known to provide habitat which supports the grayling butterfly, a UK BAP species. This area is adjacent to the southernmost route option on the south bank of the River Tees.

4.10.2 There were no records of great crested newts from within the 2 km search area from the past five years; however, there was one record from 1986 located near a water reservoir within the Sabic Oil Refinery (NZ528232) approximately 640 m to the east of the proposed replacement overhead line.

4.10.3 The records prior to 2004 did not indicate the presence of any other protected or notable species in the area, other than the great crested newt record listed in the paragraph above.

4.10.4 Based on the information gathered during the desk study, all of the listed protected/notable species above appear on the UK or Local BAP. There is also suitable habitat present for dingy skipper butterflies within the zone of influence.

Field Surveys

Otter

4.10.5 No evidence of otters was detected during the Extended Phase 1 Habitat Survey although the Reclamation Pond and River Tees were identified as potentially suitable foraging habitats for this species. No resting sites were identified and it was considered that neither of these habitats provided suitable resting opportunities for otters.

4.10.6 Consequently, it was concluded that while these habitats may attract individual otters in search of foraging opportunities (as evidenced by the otter record provided for the Reclamation Pond (see Table 4.2 above)) it is extremely unlikely that any resting sites exist within the vicinity of the proposed replacement overhead line route corridor.

Great crested newt

4.10.7 During the extended Phase 1 Habitat Survey, the Reclamation Pond was assessed for its suitability to support great crested newts using the standard Habitat Suitability Index (HSI). The Reclamation Pond achieved an HSI score of 0.48 which corresponds to a habitat suitability rating of 'poor'. This rating was largely due to the large size of the pond and the presence of waterfowl and lack of suitable egg-laying plants. As such it was concluded that the potential for the Reclamation Pond to support great crested newts was low.

4.10.8 The two smaller ponds associated with the reclamation pond were also rated poor using the HSI largely due to heavy pollution, lack of emergent vegetation and the presence of wildfowl.

4.10.9 The only great crested newt record provided during the desk study was from near a small water reservoir within the Sabic Oil Refinery site from 1986 (see paragraph 3.4.2 above). However, 500 m is the recognised maximum terrestrial distance that great crested newts will travel from breeding ponds (although they will generally remain within 250 m where suitable habitat is present) and this record was located approximately 640m from the proposed replacement overhead line. Furthermore, there is no suitable connecting habitat between the reservoir and the proposed footprint of the overhead line as the waterbody is located within the refinery site and surrounded by operational buildings and hard standing.

4.10.10 Consequently, it is considered extremely unlikely that great crested newts will be present within aquatic or terrestrial habitat within the proposed route.

Bats

4.10.11 There were no trees or buildings with the potential to support roosting bats identified in the areas covered during the Extended Phase 1 Habitat Survey. The small clusters of young silver birch which are the only trees located within the survey area do not possess any cracks or crevices which could provide roosting opportunities for bats.

4.10.12 The only buildings located within the accessible parts of the survey area were the portacabins within the Sabic Oil Refinery Site. These small, poorly-insulated buildings were not considered to be suitable for use as roosting sites for bats.

4.10.13 Consequently, it is extremely unlikely that any bat roosts are located along the proposed replacement overhead line corridor or in the adjacent habitats due to the lack of roosting opportunities in the area.

4.10.14 Although no specific bat surveys have been undertaken, sightings of up to two bats, most likely noctules, were recorded at dawn and dusk during the summer vantage point bird surveys undertaken as part of this project in 2009. These bats were observed foraging over the open rough grassland habitat on the west side of the Reclamation Pond (T5). These observations suggest that the grassland habitat in the wider area including that within the proposed route corridor could be a foraging area for bats. The river could also act as a commuting corridor, although generally the area of the proposed route is not considered to be of particularly high value for bats due to the lack of trees, hedgerows and large expanses of hard-standing and industrial areas. The locality is also affected by light pollution from the nearby industrial sites.

Water vole

4.10.15 The Reclamation Pond and associated waterbodies were considered to have low potential to support water voles based on the compacted earth/slag and rubble banks as these substrates would preclude the construction of burrows by this species. The lack of a varied range of aquatic and marginal food plants is also likely to preclude the presence of water voles. As such, the likelihood of water voles occurring at the Reclamation Pond is considered to be extremely low.

4.10.16 With regard to the River Tees, this tidal, estuarine habitat is sub-optimal for water voles as the species generally does not occur in saline environments. In addition to this, the rock boulder sea defences of the north bank and industrial wharfs on the south bank do not provide suitable habitat for burrow construction. As such, it is extremely unlikely that water voles would occur along the River Tees.

Badger

4.10.17 A probable badger dropping was discovered along the north bank of the River Tees (T6) during the Extended Phase 1 Habitat Survey. However, no setts were found along the route corridor and the compacted hardcore of the made ground means it is unlikely that badgers would dig setts in the area.

4.10.18 No records of badger were provided within the area of search. The availability of suitable habitat (e.g. scrub, farmland and woodland) for badgers within and immediately surrounding the proposed development is negligible. However, the evidence found during the Phase 1 Habitat Survey suggests that badgers occasionally pass through the survey area probably in search of food.

Reptiles

4.10.19 The mosaic of grassland and scrub and areas of rubble which form the underlying substrate of the North Tees Area provide suitable foraging and hibernating conditions

respectively for reptiles such as common lizard and slow worm. Given the proximity of the Reclamation Pond, grass snakes may also occur here.

4.10.20 To the south of the river the semi-improved species poor grassland and the rubble bunds provide potential foraging and hibernation habitat for common reptile species such as common lizard and slow worm.

4.10.21 No reptile sightings have been made during ecological surveys for this project. There is a record of common lizard in the grassland to the north of the Reclamation Pond approximately 830 m from the proposed route. This grassland area is connected to the proposed route by potentially suitable grassland habitat for foraging and migration and therefore it is entirely possible that reptiles will be present within habitats along the proposed 400kV overhead line route corridor.

Brown hare

4.10.22 Several records were received of brown hare, a UK BAP species, in the grassland habitat within and adjacent to the proposed replacement overhead line route on the north side of the River Tees. The areas of open grasslands which extend westwards from the route corridor towards Saltholme provide suitable habitat for this species.

Common seal

4.10.23 Incidental sightings of common seals have been made occasionally on the River Tees in the vicinity of the proposed 400kV overhead line crossing site during the bird surveys associated with this project in 2009. Seal Sands SSSI, located on the Cleveland coast approximately 6.5 km downstream of the point where the proposed 400kV overhead line crosses the River Tees, is recognised as an important seal haul out, where common seals predominate. The nearest record of a seal to the works is approximately 500 m north of the proposed route corridor. However, the turbid water and intensive shipping traffic of the River Tees at this point in the channel means that the river does not represent optimal habitat for this species and the animals recorded during the bird surveys are likely to have been young, inexperienced individuals exploring the river in search of foraging opportunities.

Invasive plant species subject to legal control

4.10.24 No invasive plant species subject to legal control were identified along or in the vicinity of the proposed replacement overhead line route. However access to the proposed replacement overhead line route alternatives on the southern side of the River Tees was not permitted. As such, this report is not able to provide detailed descriptions of the habitat or species types present within these parts of the survey area.

Summary

4.10.25 No individual habitats or species populations identified on the site are considered to be of more than site level value when assessed under the criteria for nature conservation evaluation. Habitats of value at site level are the trees, scrub, grassland and tall ruderals vegetation described above. Brown hare and possibly reptiles are the only protected/notable species with potential to exist within the proposed route corridor. Any populations of these species present are not considered to be of more than site level value.

4.11 Prediction and Evaluation of Impacts

Construction

Identification of Potential Impacts

4.11.1 Chapter 1: Introduction to the Project provides a description of the proposed works associated with the installation of the Tees Crossing Asset Replacement Scheme including the scheme design and the construction programme. The key activities which could result in ecological effects in the absence of mitigation include the following:

- temporary loss of habitat through the installation of tower foundations, access tracks and contractors compounds;
- visual, auditory (noise) and vibration disturbance of wildlife within and immediately adjacent to the replacement 400kV overhead line generated by construction activities;
- potential contamination of the River Tees and local waterbodies through accidental spillage of chemicals or fuels.

4.11.2 The following provides an assessment of the likely effects of these activities on the various ecological receptors which are known or likely to be present within the zone of influence, as identified through the desk study and field survey.

4.11.3 Chapter 5, Ornithology contains information regarding potential impacts on birds.

Impact assessment

Designated Sites

4.11.4 The installation of towers immediately adjacent to the River Tees and the spanning of overhead wires over the river is expected to result in visual and auditory disturbance of wetland birds using the Teesmouth and Cleveland Coast SPA and Ramsar Site and Tees and Hartlepool Wetlands and Foreshore SSSI. All issues relating to the disturbance of wetland birds will be discussed in Chapter 5: Ornithology.

4.11.5 This suite of designated sites could also potentially be affected by pollution caused by accidental spillage of fuels or chemicals from construction vehicles involved in the installation works immediately adjacent to the River Tees. However standard pollution control measures such as pollution prevention guidelines (PPG's)19 will be adhered to throughout the construction period. The application of these approved pollution control measures will reduce the likelihood of any spillages actually occurring. Consequently, the risk of these designated sites being polluted through chemical or fuel spillage is considered to be extremely low and as such the likely ecological impact is not expected to be significant.

4.11.6 All other designated sites within 2 km of the proposed replacement 400kV overhead line are located over 500 m from the footprint of works and are not connected to the development by any watercourses. Consequently, the risk of these designated sites being contaminated as a result of construction activities is negligible and as such the impact is anticipated to be not significant.

[19] Environment Agency Pollution Prevention Guidelines website: (http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx).

Habitats

4.11.7 Construction of the foundations for the towers is expected to result in the temporary loss of several small, isolated plots of semi-natural habitat and bare ground staggered along the proposed route corridor. The tower bases will be approximately 10 m2; given this small-scale loss during construction and predominance of this type of habitat along the proposed replacement overhead line route and adjacent areas, this loss is considered to be minimal. Coupled with the low (site context) ecological value of this habitat, it is concluded that the impact associated with the loss of semi-improved grassland will be not significant. It should be noted that the loss of habitat under each tower will be temporary only as all land other than the tower footings will be reinstated once construction has been completed.

4.11.8 Small, linear strips of semi-natural habitat are to be temporarily lost through the establishment of temporary access tracks for plant and personnel along the route corridor. The semi-improved grassland habitat will be most affected by these tracks. However, it should be noted that the existing grassland has developed over disturbed ground and since the access tracks are expected to be relatively narrow, and given the abundance of semi-improved grassland in the surrounding area it is expected that these areas will quickly recolonise naturally. As such, the effects of temporary habitat loss through the creation of access tracks are not expected to be significant.

4.11.9 The establishment of works compounds will take place off site on industrial land hard standing land only. Any ecological impacts caused by this will be negligible and temporary.

4.11.10 The Reclamation Pond and River Tees could potentially be affected by pollution caused by accidental spillage of fuels or chemicals from construction vehicles involved in the pylon installation works. However, as mentioned above standard pollution control measures such as PPGs will be adhered to throughout the construction period. Therefore, the risk of the Reclamation Pond or associated waterbodies being contaminated is considered to be extremely low and the likely ecological impact is expected to be not significant.

Species

Otter

4.11.11 Historical records indicate that otters are present in the North Tees area. Therefore, animals which may occasionally come to forage at the Reclamation Pond or River Tees could occur in the vicinity of the installation works. However, with regard to disturbance, it is considered that the works will be relatively discrete and limited to diurnal works within the narrow 400kV overhead line route corridor. Even in the unlikely event that an otter entered the area during construction works, there are considered to be suitable alternative wetland foraging grounds in the surrounding area for animals to be temporality displaced to. As such the impact of disturbance on otters is predicted to be not significant.

4.11.12 There is an extremely low potential risk of otters venturing into the works areas and compounds at night and becoming trapped, injured or killed as a result of interference with machinery or falling into pits for example. However, the likelihood of such an event can be further reduced by implementing simple, standard precautionary construction site wildlife mitigation measures such as those identified in Section 4.12 (e.g. providing escape routes from open pits). As such, the potential impact is predicted to be not significant.

Bats

4.11.13 Bats have been noted foraging over the semi-improved grasslands in areas immediately surrounding the proposed 400kV overhead line route. Although some of this habitat is expected to be lost through the installation of towers the total loss is anticipated to be minimal considering the abundance of semi-improved grassland in the surrounding area. As such, the loss of potential foraging habitat is not predicted to have a significant impact on bats.

4.11.14 Since they are nocturnal, bats are unlikely to be disturbed by construction activities which are expected to be confined to daylight working hours. Therefore, the impact is predicted to be not significant

Badger

4.11.15 Field survey evidence suggests that badgers very occasionally pass through the survey area to forage. However, given the nocturnal behaviour of this species it is extremely unlikely that badgers will be disturbed by the construction works which are expected to occur during daylight hours. As such the impact of disturbance on badgers is predicted to be not significant.

4.11.16 As with otters, there is an extremely low potential risk of badgers venturing into the works areas and compounds at night and becoming trapped, injured or killed. However, the likelihood of such an event can be further reduced by implementing the standard precautionary construction site wildlife mitigation measures identified in Section 4.12. As such, the potential impact is predicted to be not significant.

Reptiles

4.11.17 The temporary loss of small patches of semi-improved grassland and areas of rubble bunds to accommodate the towers represents the loss of habitat which could support reptiles such as common lizard (known be present in the surrounding area) and slow worm. However, given the abundance of suitable grassland habitat immediately adjacent to the proposed route corridor and in the surrounding area, and the large rubble bunds alongside the road and within the semi-improved species poor grassland area to the south of the river, the loss of these habitats during construction is considered to be minimal. As such the impact on reptiles is predicted to be not significant.

4.11.18 Common reptile (including the common lizard) are protected under the Wildlife and Countryside Act 1981 S.9(1) (part); S.9(5). This makes it illegal to intentionally kill or injure any common reptile species.

4.11.19 In order to prevent individual reptiles being injured or killed during the vegetation clearance or ground preparation works for the towers a Precautionary Method of Working (PMW) will be adopted during the works in order to reduce the risk of an offence being committed. Further details of a standard reptile PWM are detailed in Section 4.12: Mitigation Measures.

Brown hare

4.11.20 Brown hare is a UK BAP and Local BAP priority species with respective species action plans.

4.11.21 Brown hares, which are known to be present in the open areas of semi-improved grassland which surround the proposed 400kV overhead line route, particularly on the north side of the River Tees, are likely to experience visual and auditory disturbance as a result of construction activities.

4.11.22 However, such disturbance is only expected to affect animals within 100 m or so of the construction works. Given the availability of alternative grassland habitat in the wider

area it is expected that animals will simply be temporarily displaced to less disturbed areas during the construction programme. Consequently, the impact of disturbance on brown hares is predicted to be not significant.

4.11.23 There is also an extremely low potential risk of brown hares entering the works areas and becoming trapped, injured or killed. However, implementation of the standard precautionary construction site wildlife mitigation measures mentioned above and identified in Section 4.12 is predicted to reduce any potential impact to a negligible (not significant) level.

Common seal

4.11.24 Common seals, which occasionally venture up the River Tees, could be disturbed by construction activities. However, seals which occur along the river are considered to be habituated to the activity and disturbance associated with this channel. Therefore any works taking place within or immediately adjacent to the river, which are anticipated to be temporary and relatively discrete, are expected to be well within existing disturbance levels. As such, disturbance of common seals is not predicted to have a significant impact.

Invertebrates

4.11.25 The temporary loss of small patches of semi-improved grassland to accommodate the towers represents the loss of habitat which could support invertebrates such as the dingy skipper and grayling butterfly species (both of which are UK and Local BAP priority species). However, given the abundance of suitable grassland habitat immediately adjacent to the proposed route corridor and in the surrounding area, the loss of this habitat is considered to be minimal. Whilst the possibility of harm to these butterfly species during construction activities is unavoidable their preference for disturbed ground sites means that post construction the grassland be re-instated and no permanent effect on the species will occur. As such the impact on invertebrates is predicted to be not significant.

Orchids

4.11.26 The common spotted orchids found in the grassland to the south of the river are widespread throughout Britain and are known colonisers of waste ground and former industrial areas. Common spotted orchids are efficient at colonising areas using seed and vegetative methods. As the area of habitat lost in this area will be minimal and temporary with the areas beneath each tower being re-instated following completion of construction, any impact on the orchid population in this area is likely to be negligible and temporary.

Operation

Identification of Potential Impacts

4.11.27 Once in place, the effects on ecological receptors associated with the operation of the Tees Crossing Asset Replacement Scheme are expected to be limited to the following:

- low level visual and /or auditory disturbance of wildlife through the operation of high voltage transmission equipment and routine maintenance operations; and,
- potential collision of bats and birds with the overhead wires.

4.11.28 The following provides an assessment of the likely effects of these activities on the various ecological receptors identified in the study area.

Impact assessment

Designated sites

4.11.29 Issues relating to the disturbance and collision risk of birds associated with the Teesmouth and Cleveland Coast SPA and Ramsar Site, Tees and Hartlepool Wetlands and Foreshore SSSI and other sites designated for their wetland bird populations will be discussed in Chapter 5: Ornithology.

4.11.30 No other impacts are predicted to affect designated sites within 2 km as a result of the operation of the replacement 400kV overhead line.

Habitats

4.11.31 There are not anticipated to be any impacts on habitats during operation of the replacement 400kV overhead line. Following construction, areas underneath each tower will be reinstated, leaving the only permanent habitat loss at the tower footings themselves. This loss is minimal and the impact is considered to be negligible.

Species

All species

4.11.32 Visual and auditory disturbance generated through the construction and operation of the high voltage replacement 400kV overhead line is expected to be negligible. The proposed Tees Crossing Asset Replacement Scheme will be constructed as close to existing industrial areas as possible and the heavily industrialised nature of the area means the impact of disturbance on locally occurring wildlife is predicted to be not significant. This is consistent with the findings of surveys undertaken in close proximity to the existing overhead line route located north of the Reclamation Pond and Sabic Oil refinery.

4.11.33 Disturbance created during routine maintenance works (e.g. general human activity and operation of handheld power tools) is expected to be negligible particularly given the high levels of ambient noise and activity in the industrial Teesport area. Furthermore, such works are expected to take place during daylight hours and therefore are unlikely to affect any crepuscular or nocturnal species (i.e. otter, bats and badgers). Considering the background levels of activity and noise these routine maintenance works will not have any effect on populations of notable/protected species such as brown hare, reptiles, seals and invertebrates. As such, disturbance on locally occurring wildlife is predicted to be not significant.

Bats

4.11.34 Noctule bats have been noted foraging above the grassland and it is possible that the habitat mosaic of open standing water, running water, bare ground and grassland could provide foraging opportunities for a range of species, although it is not considered to be of particularly high quality given the lack of trees and hedgerow habitats and the light pollution from nearby industrial areas. Pipistrelle bats are also known to be present in the general area.

4.11.35 The majority of bat species in the UK fly well below the proposed height of the cables. Of the two species known to be present in the area, pipistrelle tend to fly at heights of under 10 m (generally between 5 – 10 m above ground level) while noctule bats do often fly above 10 m, and sometimes can be as high as 70 m above ground level[20]. Towers likely to be used to carry the transmission lines at the Reclamation Ponds would be

[20] RUSS, J. 1999. The Bats of Britain and Ireland. Echolocation calls, sound analysis, and species identification. Alana Books, Powys

around 50 m in height with the lowest cable height at 18-20m above the ground. Towers likely to be used for the River Tees Crossing would be around 120 m high with the lowest cable being at least 65m above the river. However, given their small size, manoeuvrability and unique sense of echolocation which allows them to detect very small objects in their surroundings, and as the cables will be static (as opposed to wind turbine blades for example which are harder to detect) it is considered unlikely that the proposed Tees Crossing Asset Replacement Scheme will pose risk of collision for bats.

4.11.36 Furthermore, the proposed Tees Crossing Asset Replacement Scheme to the north and south of the River Tees generally follows the edge of existing industrial areas rather than bisecting the grassland and open water mosaic. Therefore, it is considered unlikely that replacement 400kV overhead lines will result in the displacement of bats by affecting bat commuting or foraging behaviour.

4.11.37 Consequently, the potential impact of the proposed replacement 400kV overhead line on bats (i.e. collision risk and displacement) is considered to be not significant.

Decommissioning of existing overhead line

Identification of Potential Impacts

4.11.38 Ecological impacts associated with the decommissioning of the existing overhead line are expected to include the following:

- temporary loss of habitat through the creation of access tracks and contractors compounds;
- visual and /or auditory disturbance of wildlife; and,
- potential contamination of the River Tees and local waterbodies through accidental spillage of chemicals or fuels.

4.11.39 It should be noted that these potential impacts are almost identical to the construction impacts listed above in section 4.1.1 with the exception that they will not result in any permanent loss of habitat.

4.11.40 The following assessment of the likely effects of these activities on the various ecological receptors therefore refers back to the construction impacts.

Impact assessment

Designated Sites

4.11.41 Issues relating to the disturbance of wetland birds associated with the Teesmouth and Cleveland Coast SPA and Ramsar Site and Tees and Hartlepool Wetlands and Foreshore SSSI will be discussed in Chapter 5: Ornithology.

4.11.42 As with the construction impacts, designated sites could potentially be affected by pollution caused by accidental spillage of fuels or chemicals. Pollution controls should be adhered to as described in Section 4.12 below (Mitigation Measures).

4.11.43 All other designated sites are located over 500 m from the footprint of works and are not connected to the development by any watercourses. Consequently, the risk of these designated sites being contaminated as a result of decommissioning works is negligible and the impact is predicted to be not significant.

Habitats

4.11.44 As at construction, small, linear strips of semi-natural habitat are to be temporarily lost through the establishment of access tracks for plant and personnel along the route

corridor. Considering the low nature conservation value of these habitats and the fact that disturbed areas are likely to naturally recolonise the temporary loss of these habitats is considered to be not significant.

4.11.45 Works compounds will be located off site on industrial/hard standing areas so as to avoid any potential ecological impacts.

All Species

4.11.46 Disturbance of species caused during decommissioning works is expected to be similar to that at construction. Given that these works are expected to take place during daylight hours they are unlikely to affect any crepuscular or nocturnal species (i.e. otter, bats and badgers).

4.11.47 Even if wildlife were to be disturbed by the decommissioning works, activities might only be expected to affect animals venturing within 100 m or so of the works areas. In such circumstances there are considered to be suitable alternative habitats in the surrounding area (e.g. wetland foraging grounds for otters or grassland and scrub for badgers and brown hares) for animals to be temporality displaced to. As such, disturbance on locally occurring wildlife during decommissioning is predicted to be not significant.

4.12 Mitigation Measures

Construction

Standard pollution control measures

4.12.1 Standard pollution control measures such as pollution prevention guidelines (PPG's)[19] will be implemented during construction of the proposed 400kV overhead line.

General construction measures

4.12.2 As otters, badgers and brown hares are known to occasionally pass through the areas within and adjacent to the proposed 400kV overhead line corridor the following standard precautionary wildlife measures will be adopted to minimise potential injury or mortality of animals which may enter the construction site:

- the works footprint will be contained within as small a corridor as possible to preserve habitat used by locally occurring wildlife;
- no construction works will be conducted after daylight hours;
- all trenches, trial pits, excavations and especially sewers and manholes will be covered overnight to prevent animals entering these holes. Where pits and trenches cannot be closed or filled on a nightly basis, a plank should be placed into the excavation so that an animal can use this as a means of escape if necessary;
- the site compound will be fenced off to prevent entry and potential injury of larger mammals;
- all rubbish and construction materials will be collected and removed from site on a regular basis to prevent trapping or injury of wildlife. No rubbish should be allowed to enter the local watercourses / waterbodies and if it does this should be removed immediately.

Precautionary Method of Working (PMW) for Reptiles

4.12.3 A PMW will be adopted for reptiles in order to reduce the risk of individual animals being injured or killed during the vegetation clearance or ground preparation works for the towers.

4.12.4 The PMW is a document containing working methods to avoid or reduce impacts on protected species. This document should be produced by a suitably qualified ecologist and be in place before the commencement of works (i.e. prior to ground preparation works) and will involve the following;

- Toolbox talk: All site operatives, including contractor and sub-contractor staff, will receive a briefing (from the scheme ecologist). The briefing will include details of legal protection of reptiles, the precautionary methods of working, identification of reptiles and procedures to be followed if reptiles are found within the works area at any stage of construction.
- Vegetation removal: a staged approach to vegetation should take place including hand searching by an ecologist the PMW should include the following stages.

Table 4.3 – Staged approach to reptile PMW

Stage	Action(s)
1	All log piles, rubble piles 'natural refugia', tins, felt etc. should be carefully dismantled and removed by hand by an ecologist. Any reptiles found during this process should be released in places of safety as similar to the situation they were found in within the receptor area. These places of refuge can often be usefully recreated within the receptor area.
2	Cut the grass and vegetation using hand tools to 150 mm height. Cut material will be removed from the site by rake to avoid the risk of reptiles using it as shelter.
3	Hand search vegetation piles that remain and dismantle by hand. Searching will include carefully checking underneath any potentially suitable refugia present in the working area (such as stones, logs and any other debris that have been uncovered by the vegetation cut). Once checked all such potential refugia will be removed from the working area.
4	Cut remaining vegetation to ground level (< 50 mm) to render the site inhospitable for reptiles. Cut material will be removed from the site by rake to avoid the risk of reptiles using it as shelter. This should be carried immediately after the first cut and removal of vegetation.

4.12.5 Since reptiles hibernate over the winter months, the clearance process outlined above will be undertaken between March and October while animals are still active and able to move out of the affected areas.

Operation

4.12.6 No mitigation measures are considered necessary for the operational phase of the proposed 400kV overhead line.

Decommissioning of existing overhead line

Standard pollution control measures

4.12.7 As with the construction phase, standard pollution control measures will also be implemented during the decommissioning of the existing overhead line. Therefore, the likelihood of any chemical or fuel spillages actually occurring and the contaminants subsequently entering the Teesmouth and Cleveland Coast SPA and Ramsar Site and Tees and Hartlepool Wetlands and Foreshore SSSI or other semi-natural habitats, (e.g. the Reclamation Pond) is anticipated to be extremely low.

Standard precautionary construction site wildlife measures

4.12.8 The standard precautionary construction site wildlife measures listed above will also be employed during the decommissioning of the existing overhead line to reduce the potential risk of injury or mortality on species such as otter, badger and brown hare as a result of the works to a negligible level.

Potential for enhancement of site

4.12.9 There is little scope for enhancement of the site since the land take is minimal and habitats will quickly regenerate once the construction is completed. Also National Grid do not own land to either side of the route corridor which limits the scope for wholesale landscape/habitat alterations. Any scrub habitat lost during the construction phase will be reinstated at the end of the construction works.

4.13 Residual Impacts

4.13.1 This section provides a summary and evaluation of the residual effects of the proposed scheme once the mitigation measures above have been implemented (Section 4.13.3 - 4.13.4 and Table 4.4). This section also provides an assessment of the cumulative impacts associated with other projects being undertaken in the general area (Section 4.14).

4.13.2 All issues relating to birds are discussed separately in Chapter 5: Ornithology, including an assessment of significance of the scheme on the nearby international bird sites.

Construction, operation and decommissioning

4.13.3 There are no predicted significant residual impacts on ecological features during the construction, operation or decommissioning phases of the proposed Tees Crossing Asset Replacement Scheme.

4.13.4 Table 4.4 overleaf provides a summary of potential ecology impacts that have been predicted for this scheme together with an outline of mitigation that will be undertaken and any residual effects that should be considered.

Table 4.4 Impacts, mitigation and monitoring measures.

Impact	Incorporated mitigation / offsetting / enhancement measure	Extent to which impact mitigated[21]	Monitoring requirements (if any)
Construction (including Decommissioning of existing line)			
Habitat Loss.	Habitat loss will be minimised and working areas marked to avoid spread, site compound will be placed off-site in existing industrial areas and access points will be restricted. Habitats under tower bases will be reinstated following completion of construction.	Substantially (impact not significant)	None
Disturbance of wildlife within and immediately adjacent to the working area.	Precautionary wildlife measures will be adopted to minimise potential injury or mortality of animals which may enter the construction site. A PMW will be adopted for reptiles in order to reduce the risk of individual animals being injured or killed during the vegetation clearance or ground preparation works for the towers.	Fully	None
Potential contamination of the River Tees	Standard pollution control measures such as pollution prevention guidelines (PPG's)[19] will be implemented during construction of the proposed 400kV overhead line.	Fully	None
Operation			
No impacts are predicted due to the operation of the replacement overhead line.	N/A	N/A	None

4.14 Cumulative Impacts

4.14.1 Britmag Residential development 6.5 km to the north of the proposed Tees Crossing Asset Replacement Scheme has undergone Appropriate Assessment in relation to the level of impact on the nearby Teesmouth and Cleveland Coast SPA and Ramsar site. The concerns expressed during the assessment of this project related to disturbance of birds for which the European site is designated as a result of increased recreational activities, increased disturbance from dogs and disturbance of birds during construction and land reclamation activities. These concerns were mitigated for by timing the works for the summer months outside the most sensitive season for birds and instituting and monitoring a ban on dogs 'off lead' on the foreshore. As a result of these mitigation measures it was considered that no significant impacts would occur.

[21] Key to predicted success of mitigation:

Fully - Impact fully mitigated and no effects predicted.

Substantially - Mitigation would be largely successful at reducing impact.

Partially - Mitigation would be successful at reducing impacts, but some effects likely.

4.14.2 As this disturbance/potential impact has been mitigated for and is of a substantially different nature to those within the scope of the Tees Crossing Asset Replacement Scheme, no potential cumulative impacts are foreseen.

4.14.3 The Teesside Environmental Reclamation & Recycling Centre (TERRC), approximately 5 km to the north of the Tees Crossing Asset Replacement Scheme has also undergone Appropriate Assessment in relation to the nearby Teesmouth and Cleveland Coast SPA and Ramsar. Concerns raised within this assessment included habitat loss due to loss of intertidal mud flat and alteration of tidal propagation, visual and auditory disturbance to birds and pollution and consequent drop in water quality.

4.14.4 This disturbance/potential impact was mitigated for as part of this project and the outcome of the assessment was that there would be no adverse impact upon the SPA/Ramsar site. No habitats similar to those affected by the TERRC scheme will be affected by the Tees Crossing Asset Replacement Scheme. No cumulative impact is predicted due to the mitigation measures listed above and the relatively minor level of the works on the Tees Crossing Asset Replacement Scheme and the temporary nature of the visual and auditory disturbance impacts predicted.

4.14.5 Thor Cogeneration Project adjacent to the Tees Crossing Asset Replacement Scheme is likely to result in all or some of the Reclamation Pond area being lost. This will constitute a considerable loss of habitat in the area for reptiles and wild fowl. There is also likely to be a visual and auditory disturbance impact associated with the construction of the Thor Cogeneration Project on birds in the area.

4.14.6 As mitigation measures listed above in section 4.12 minimise habitat loss and visual/auditory disturbance impacts of the Tees Crossing Asset Replacement Scheme it is highly unlikely that any cumulative impacts will result from the Asset Replacement Scheme occurring alongside the Thor Cogeneration Project.

4.14.7 Tees Renewable Energy Plant, a biomass fired power station located on the south side of the river approximately 1200 m north-east of the Tees Crossing Asset Replacement Scheme is proposed on land of very low ecological impact with no adverse effects on ecology predicted and is therefore unlikely to have any cumulative impact with the Tees Crossing Asset Replacement Scheme.

4.15 Conclusions

4.15.1 Overall the impacts of the proposed Tees Crossing Asset Replacement Scheme on nature conservation are not considered to be significant.

4.15.2 Effort has been made to locate construction site compounds and towers away from ecologically sensitive areas of the site such as the mud flats and waterbodies. A precautionary method of working has been advised in order to prevent killing or injury of any reptiles using the site.

4.15.3 Short term temporary disturbance to fauna using the site has been limited by restricting the works to diurnal work and implicating good construction practice such as limiting works to the minimum area and covering trenches at night.

4.15.4 The risk of pollution caused by accidental spillage of fuels or chemicals from construction vehicles involved in the installation will be minimised by standard pollution control measures such as pollution prevention guidelines (PPG's)22 being adhered to throughout the construction period.

4.15.5 No monitoring is considered necessary on this site given the limited scope for the presence of protected and notable species and the generally low value of the habitats present, as discussed within this ES chapter.

[22] Environment Agency Pollution Prevention Guidelines website: (http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx).

5 ORNITHOLOGY

5.1 Introduction

Background

5.1.1 This chapter discusses the potential ornithological impacts of the proposed Tees Crossing Asset Replacement Scheme, which includes the decommissioning of the existing route (as shown on Figure 5.1) and construction of the replacement 400kV overhead line crossing (also shown on Figure 5.1). Potential impacts include those during construction as well as potential long-term implications for bird species and assemblages in the local area. Details of other ecological issues are contained within Chapter 4, Ecology.

5.1.2 Ecological input was provided from an early stage of the scheme, to assist in the identification of a preferred route that, where possible, minimised adverse effects on ecological features. Three options were initially considered for the Tees Crossing Asset Replacement Scheme. Two of these were subsequently discounted following input regarding the potential impacts on ecology and ornithology as well as other potential constraints; the final proposed alignment is shown on Figure 5.1 and is referred to as the proposed 400kV overhead line. In addition to consideration of the three route options, alternative schemes were considered, including replacement of the existing route in-situ and tunnelling under the River Tees. Chapter 2 provides information regarding the alternative schemes and options together with information regarding the viability of each.

5.1.3 An Appropriate Assessment screening will be submitted to Natural England in March 2010 taking into account the bird survey results as detailed in this chapter. The outcome of this screening will inform the requirement for Appropriate Assessment.

5.2 General Approach

5.2.1 The requirement for specific in-depth ornithological assessment of the potential risk posed by the proposed scheme follows standard guidance from both Natural England[23] and Scottish Natural Heritage[24] and is also in accordance with current literature regarding birds and overhead lines in other European Union countries[25].

5.2.2 There are three main potential effects of overhead line installation on birds: disturbance, displacement and collision risk. This chapter presents an assessment of these effects both during construction and once operational.

5.2.3 Potential mitigation and avoidance measures and residual impacts associated with disturbance and displacement from construction and the presence of overhead power lines are fairly well documented. The potential issues relating to bird collision with overhead lines are not so well understood. There appear to be a number of factors to consider when determining collision risk including: bird behaviour, size and age, time of day, time of year, human disturbance, land-use, overhead line configuration, local topography and weather conditions. Often a combination of the factors may interact resulting in a particular stretch of overhead line being a collision 'hot-spot'. The

[23] Natural England Technical Information Note TIN069. Assessing the effects of onshore wind farms on birds. Jan 2010. It should be noted that although this guidance specifically relates to windfarms the principles of assessing avian collision risk are applicable for schemes such as overhead line placements also.

[24] Survey methods for use in assessing the impacts of onshore windfarms on bird communities. SNH, 2005

[25] Hass, D. Nipkow, M. Fiedler, G. Schneider, R. Hass, W. Schürenberg, B. (2005) Protecting birds from overhead lines. Nature and environment, No. 140 Council of Europe Publishing

research undertaken to date indicates that collisions are generally not random. Overall the number of collisions with overhead lines nationwide is considered to represent only a relatively small fraction of non-natural mortalities and is not considered to be biologically significant.

5.2.4 This chapter describes the existing ornithological interests on site based on desk based assessment, consultation with relevant organisations and survey work undertaken during 2009 and early 2010. Bird surveys will be undertaken over a full 12 month period; this is due to be completed in early May 2010 at which time a supplementary report will be produced presenting the results of the full 12 month period and providing a full impact assessment based on the full data set. This current document uses information gathered between May 2009 and mid January 2010 to inform the collision risk analysis and general impact assessment.

5.2.5 The likely impacts of the scheme are also assessed in this chapter, taking into account where possible the potential changes to existing bird activity levels as a result of infilling of the Reclamation Ponds, location shown on Figure 5.2 (these are scheduled to be partially infilled in spring/summer 2010 by the nearby Thor Cogeneration development) and mitigation measures which will be implemented and have been incorporated into the design brief for the project (deflectors on the earth wire). Other embedded mitigation measures that form part of the proposed development and will be implemented during the construction phase are also detailed. Any residual impacts taking into account the mitigation embedded in the proposed development are outlined. Details of monitoring that will be undertaken post construction are also provided.

5.3 Key Findings (as of January 2010)

5.3.1 As outlined above, bird surveys will be undertaken over a full 12 month period. However, as this is only due to be completed in May 2010, this chapter has been based on information gathered between May 2009 and January 2010. This is considered sufficient to provide a baseline for this impact assessment, which will be updated when the remaining data are available.

5.3.2 Data gathered to date indicates that once mitigation has been taken into account there will be short-term negative impacts on the SPA qualifying (redshank) and assemblage species at the River Tees through minor and temporary levels of disturbance during the construction phase of the works. Short term displacement from habitat surrounding the crossing may also occur during construction although it is thought that this will not be permanent, that displacement will be localised only and that birds will quickly habituate to the new crossing.

5.3.3 At the Reclamation Ponds it is more difficult to predict the likely effects as the predicted baseline will be significantly different from the present situation as the waterbody is likely to be infilled for the permitted Thor Cogeneration Plant prior to commencement of construction of this scheme. It is likely that the effects from the overhead line on birds using the pond will be similar to those at the River Tees with birds only being temporarily affected by the construction process. In reality fewer birds are likely to be present in this area by the time construction work commences, so the effects are likely to be lower than predicted.

5.3.4 It is likely that there will be some bird collision associated with the proposed overhead line, although data gathered to date indicates that this is unlikely to be significant and in particular, only low numbers of collisions are anticipated for the SPA qualifying species in the area.

5.3.5 There will be no loss of or deterioration in habitat within the designated site boundaries (see Chapter 4 – Ecology). Whilst there will be some effects on bird species and assemblages present, there are not considered to be any effects that will be significantly

detrimental to fulfilment of the SPA conservation objectives for this site or that will affect the ability of the populations to survive at their current conservation status.

5.4 Method of Assessment

Determination of Zone of Influence

5.4.1 Due to the potential impacts of the proposed replacement overhead line on bird populations in the local area, it was considered that the effects of the scheme could extend beyond the proposed limit of development and its immediate surroundings. Therefore a maximum zone of 10 km was considered appropriate for the identification of statutory sites of nature conservation value that have been designated for their bird interest. For all non-statutory designated sites (and statutory sites designated for qualifying features other than birds) it was considered more appropriate to use a zone of 2 km from the proposed replacement overhead line route. The 2 km search area is marked on the Designated Sites Map, Figure 5.1 with statutory designated sites within the wider 10 km search area also shown.

5.4.2 With regard to historical records of bird species, other than those records provided on designated site citations, a standard search area of at least 2 km was used.

5.4.3 For the fieldwork, the survey area was limited to within 500 m of the proposed route corridor. Furthermore following the initial scoping visit in May 2009 and following consultation with Natural England (see Section 5.4.5 – 5.4.7 below) it was agreed that the section of the proposed route corridor to the south of the River Tees would not require specialist ornithological survey.

5.4.4 The survey areas used for this scheme can be seen on Figure 5.2.

Consultation

5.4.5 From the beginning of the scheme, consultation has been undertaken with Natural England (NE) to develop an appropriate survey and assessment scope.

5.4.6 In addition, Andy Douse (Ornithological Policy & Advice Manager) of Scottish Natural Heritage (SNH) was contacted on 29th April 2009 to discuss the standard protocol for bird surveys and assessment in relation to transmission lines. At the time of undertaking this consultation, SNH were the leading UK statutory authority regarding birds and wind farms or other utility structures.

5.4.7 In addition, contact has also been made with other relevant organisations to discuss the scheme and to gather information regarding ornithological interest in the area. Table 5.1 below lists the statutory and non-statutory bodies that were contacted for this scheme and summarises their responses (where appropriate). Appendix 5.A contains responses from Natural England, RSPB and Teesmouth Bird Club.

Table 5.1 - Consultees and Responses

Consultee	Date of Consultation	Summary of Response
Scottish Natural Heritage (SNH)	29th April 2009 (Telephone Conversation)	Proposed overhead lines should generally be assessed in the same fashion as wind turbines using SNH windfarm guidance.
Joint Nature Conservation Committee	May 2009	Information provided regarding the recent SPA Review and confirmation that figures from the review should be used for the Teesside assessment of bird interests of the Teesmouth and Cleveland Coast SPA.

Consultee	Date of Consultation	Summary of Response
Natural England (NE)	5th June 2009 (Meeting and Site Visit)	Agreement in principle with suggested survey methodologies, discussion regarding requirement for Appropriate Assessment screening.
	9th June 2009	Provision of information regarding the Teesmouth and Cleveland Coast SPA
	8th July 2009	Scope of proposed detailed survey methodologies for full 12 month period agreed and confirmation received that south of the river did not need to be included in survey work.
	23rd September 2009	Response to e-mail confirming scope of ornithological survey autumn 2009 – spring 2010 saying "having had a look through I think the proposals should be enough to provide sufficient data in relation to the asset replacement scheme and I look forward to receiving a copy of the initial survey findings."
	10th December 2009 (Public Exhibition)	Satisfied with scoping report and general progress with survey work.
	4th January 2010	Response regarding proposed overhead lines to DECC as part of scheme scoping including a requirement for robust EIA methodology and production of an Environmental Statement .
	14th January 2010	Provision of Wetland Bird Data for the entire estuary for assessment of SPA assemblage species
	14th January 2010	Agreement of use of mean of peaks for assessment of assemblage species and the use of conservation objectives from SSSIs for the assessment.
RSPB	3rd November 2009	Screening response to National Grid. RSPB key concerns identified as collision of flying waterbirds during day and night; displacement of waterbirds, and; displacement during construction
	3rd December 2009 (Meeting)	Requirement discussed for a comparative study regarding displacement of birds from areas underneath overhead lines.
	18th January 2010	Noted that gulls are technically within the SPA assemblage (as waterbirds) although they are not counted; however, the RSPB suggested there does not appear to be a particular reason to specifically consider gull species in this instance. Robust amount of dusk and dawn data should be collected.
Teesmouth Bird Club (TBC)	November 2009	Requirement for detailed surveys especially in relation to the SPA and Reclamation Ponds; the presence of a scoping plan for a four turbine wind farm on the Augean land adjacent to the proposed route should be considered; the requirement for installation of bird markers on the proposed overhead lines, and consideration of mitigation measures including the provision of raptor boxes or platforms.

Consultee	Date of Consultation	Summary of Response
	10th December 2009 (Public Exhibition)	Consideration of other projects should be included in the assessment such as the proposed bridge and Augean wind farm.

5.5 Desk Study

5.5.1 A detailed desk based assessment was undertaken in April/May 2009 to gather existing ecological data for the study area and to identify potential ecological constraints to the three initial proposed route options[26].

Web-based Searches

5.5.2 The Multi Agency Geographical Information for the Countryside (MAGIC) website (www.magic.gov.uk) and the Natural England (NE) website (www.natureonthemap.org.uk) were used to identify all statutory designated sites of importance for nature conservation within the relevant search areas as detailed above.

5.5.3 In addition, the Joint Nature Conservation Committee (JNCC) website[27] was examined for the most up to date citation for the Teesmouth and Cleveland Coast SPA.

Records Requests

5.5.4 The following organisations were contacted in April 2009 to obtain detailed information regarding the local area (more detail regarding requests and desk study responses are provided in Appendix 5.B, Waterbird Survey):

- Natural England: for information regarding nearby designated sites;
- British Trust for Ornithology (BTO): to obtain Wetland Bird Survey Count data (WeBS)28 consisting of localised high tide (2002/2003 – 2006/2007) and low tide (2006/2007) datasets for the River Tees estuary (sectors as shown on Figure 5.3a);
- Teesmouth Bird Club (TBC): to obtain breeding bird records for the period of 1999-2006 for the study area and land up to 2 km. Data was also requested for incidental and notable species records within this area between 2000 and 2008. The survey tetrads used for this records request are shown on Figure 5.3b.

5.6 Literature Review

5.6.1 The planning application for the nearby Thor Cogeneration Plant development was reviewed. This development will be situated partially on the current Reclamation Pond, see Figure 5.4) to obtain information regarding flight path and wintering bird survey data from surveys undertaken between September and December 2006 for this scheme.

5.6.2 Other planning application documents reviewed over the course of this assessment included those for the Britmag Residential proposal (6.5 k to the north); the Teesside Environmental Reclamation and Recycling Scheme (TERRC – 5 km to the north) and the Tees Renewable Energy Plant (1.2 km to the north-east). Information regarding the nearby Augean Landfill proposed wind turbine installation was not reviewed as the scheme is still at the scoping stage.

5.6.3 In order to gather background information regarding potential risks on birds as a result of overhead lines, a literature review was also undertaken. This involved web-based

[26] Tees Crossing Asset Replacement Scheme: Ecological Constraints Report, Atkins, 2009

[27] http://www.jncc.gov.uk/

[28] The Wetland Bird Survey is a national bird census programme co-ordinated through the British Trust for Ornithology, the Wildfowl and Wetlands Trust (WWT), the RSPB and the Joint Nature Conservation Committee.

searches as well as a review of journal articles. References are provided where appropriate in this chapter and in the associated technical appendices.

5.7 Field Surveys

5.7.1 An initial scoping visit was undertaken on 29th May 2009 alongside the first Vantage Point survey (see below). This survey covered land along the proposed overhead line and up to 50 m from it in each direction (where access permitted) to the south and north of the river to confirm survey areas. During this work, notes were made on suitability of habitats along the river edge and adjacent land for use by birds and appropriate Vantage Point survey locations were also selected.

5.7.2 Following this initial visit to site and consultation with Natural England (as detailed above) a survey scope was produced for a 12 month period dating from May 2009 to May 2010. This survey scope included two main survey types: Vantage Point (VP) surveys and waterbird surveys.

5.7.3 In addition to this, comparative surveys were also undertaken in winter 2009/2010 at two other locations (the Blyth Estuary in the north-east of England and the Firth of Forth in the south-east of Scotland) to examine the potential issue of displacement (following request by RSPB in December 2009).

5.7.4 A summary of the approach followed for these surveys is outlined below.

Waterbird Surveys

5.7.5 The main aim of the waterbird surveys was to gather information regarding use of the habitats along the preferred route by SPA qualifying species and the SPA assemblage to gain an understanding of their importance to these populations.

5.7.6 Waterbird Surveys involved at least one high tide count and one low tide count per month (between May and January 2010) and predominantly focused on all species of waterfowl as defined in Wetlands International[29]. Single high and low tide surveys were conducted during the summer and winter months (May 2009 to August 2009 and December 2009 to mid January 2010 respectively), while three high and low tide visits were conducted per month during the autumn passage period (September 2009 to November 2009) to account for the high turnover of birds passing through the site on migration. Out of the three high and low tide counts conducted during each of the autumn months, the peak count for each species was used for this assessment. No low tide data was gathered in May 2009 as survey work commenced part way through the month. The survey areas are shown on Figure 5.2.

5.7.7 Surveys observed the general methodology of the Wetland Bird Survey (WeBS) for both high and low tide counts, as described in Gilbert et al. (1998)[30]. Absolute counts were made of all water birds seen within the survey area.

5.7.8 Waterbird surveys will continue through February-May 2010 (with an increased survey effort in spring 2010 to observe passage migrants); the results of this work will be provided in a supplementary report upon completion.

5.7.9 Appendix 5.B contains further information regarding the waterbird survey methodology.

[29] 'Waterfowl' includes divers, grebes cormorants, herons, swans, geese, ducks, rails, waders, gulls and terns, (Gilbert, G. Gibbons, D.W. and Evans, J. (1998) Bird Monitoring Techniques. The Royal Society for the Protection of Birds (RSPB).

[30] Gilbert, G., Gibbons, D.W., and Evan, J. (1998). Bird Monitoring Methods. The Royal Society for the Protection of Birds.

Vantage Point Surveys (VP)

5.7.10 The main aim of the VP surveys was to gather information regarding the activity of 'target species' (see paragraph below) and their flight paths and heights in this area (focal sampling) in order to inform a collision risk analysis for the scheme as well as gathering additional information regarding general waterbird activity in the area. This involved sampling flight activity by recording the height, duration and position of flight lines.

5.7.11 Throughout each season, surveys were spread throughout the day to cover all activity periods. Special emphasis was placed on survey at dusk and dawn when bird activity (especially waterbirds) can be most active as birds return or head out to roosting grounds. This approach is consistent with SNH Guidance.

5.7.12 Birds were recorded at all heights with potential collision risk zones noted as: a conservative range of 20 – 120 m at the River Tees (split into two zones – Collision Zone 1, 20-80 m and Collision Zone 2, 80 – 120 m), to account for sag in the lines during periods of warm weather and a conservative range of 20 – 60 m at the Reclamation Ponds.

5.7.13 For this assessment target species were selected from the following lists:

- Annex 1 of the EU Birds Directive[31] ;
- Schedule 1 of the Wildlife & Countryside Act 1981;
- Birds listed on the citation for the Teesmouth and Cleveland Coast SPA (Article 4.1 and Article 4.2)32;
- Birds listed as part of the assemblage for the Teesmouth and Cleveland Coast SPA (Article 4.2) (which will also include all species listed on the SSSI citation); and,
- Other bird species considered to be vulnerable to collision with overhead lines.

5.7.14 Further detail regarding selection of target species and a full species list is provided in Appendix 5.C, together with a detailed methodology for the survey work.

5.7.15 Two VP locations were selected (as shown on Figure 5.2) to provide adequate coverage of both the River Tees and its adjacent north bank (VP1) and the Reclamation Pond area (VP2); both VPs were considered to be the best locations to gain full coverage of the required survey areas. More information regarding the VP locations and access points to them is provided in Appendix 5.C.

5.7.16 A total of 36 hours of VP work was undertaken at each VP in summer 2009 (May-September) and in autumn 2009 (September-November). To date, 20 hours of VP work have been undertaken at each VP in winter 2009/2010 (November-mid January). Appendix 5.C provides the date and time of each survey together with weather conditions.

5.7.17 A further 16 hours of VP work will be undertaken at each VP location between January – early March 2010 (to complete the winter season) and 36 hours will be completed at both VPs between mid March – May 2010 (to gather spring data). The results of the survey work from January 2010 onwards will be presented in a separate supplementary report.

[31] Species listed in Annex I of the Directive are the subject of special conservation measures to ensure their survival and reproduction in their area of distribution. These measures shall take account of: 1) species in danger of extinction; 2) species vulnerable to specific changes in their habitat; 3) species considered rare because of small populations or restricted local distribution; 4) other species requiring attention.

[32] Member States are required to classify the most suitable areas for species listed in Annex 1 of Article 4.1 of the Birds Directive as Special Protection Areas (SPAs). Member States will take similar measures for regularly occurring migratory species not listed in Annex I, bearing in mind their breeding, moulting and wintering areas and staging posts along their migration routes. Particular attention shall be given to the protection of wetlands. (Article 4.2).

Comparative (displacement) Studies

5.7.18 Comparative studies were undertaken on three occasions (once per month) between December 2009 and February 2010 at estuarine habitat on the Blyth and Forth estuaries (at Blyth (OSGR NZ 286 822) and Clackmannanshire Bridge (OSGR NS 917 879) - survey areas shown on Figures 5.5 and 5.6), to establish whether birds at these locations are displaced at existing overhead line crossing points. The two sites were selected as they are analogous to conditions in the proposed Tees crossing in having mud-flats with a number of waterbirds present (including redshank, a target species for this assessment) and have existing overhead line crossings. The general suitability of these sites for use as part of this study was discussed with the RSPB in December 2009.

5.7.19 The comparative studies included waterbird surveys conducted at high and low tide following the same methodology as that employed at the River Tees.

5.7.20 Appendix 5.D outlines the full methodology for this work and provides descriptions of each site.

5.7.21 This document includes the results of all three visits between December and February at these locations.

Survey Limitations

5.7.22 Ornithological surveys are affected by a variety of factors which affect the presence of birds such as season, weather, climate, migration patterns, food availability, species behaviour and the presence of predators. Therefore bird surveys for these sites may not have produced a complete bird list and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. Nevertheless, the results of these bird surveys thus far have given an indication of the likely use of the area around the proposed overhead line by bird species during the summer, autumn and winter months and in particular those species listed on the SPA citation, those which are legally protected and those at particular risk from collision with the overhead lines.

5.7.23 This assessment is based on survey work undertaken at the River Tees over an eight month period from May 2009 – mid January 2010; the results of the remaining VP and waterbird surveys (January – May 2010) will be presented in a supplementary report in June 2010. Although survey work is continuing alongside production of this document, a cut-off of VP and waterbird survey data from mid January 2010 was taken for this assessment in order to allow a collision risk analysis to be undertaken for this chapter.

5.8 Impact Assessment

General Approach

5.8.1 The potential effects of the proposed replacement overhead line on locally occurring bird populations are considered over the full lifespan of the overhead line (i.e. construction and operation) both within the scheme boundary and the larger zone of influence (as outlined in 2.1).

5.8.2 The impacts may affect resident (or seasonal) populations as well as those that are more transient during passage/migratory periods or on a more irregular basis. As well as potential impacts on general bird populations in the area, certain 'target' species have been selected for specific assessment as part of this scheme – as outlined in 5.7 above and as detailed in Appendix 5.C.

5.8.3 This assessment also takes into account predicted baseline conditions on commencement of the proposed works (programme likely to be July 2011 to October

2013). The predicted baseline at the Reclamation Pond which supports substantial populations of a variety of waterfowl species and a significant proportion of the SPA assemblage, is likely to be significantly different from the conditions recorded during field visits between summer 2009 and winter 2009/2010 as infilling of this waterbody is likely to be undertaken during 2010 (as indicated on Figure 5.4) for the Thor Cogeneration Plant construction. The effect this will have on the presence, abundance and activity of waterbirds has been taken into account in this assessment.

5.8.4 A cumulative impact assessment and assessment of in combination effects has also been completed for this scheme.

5.8.5 The significance of an adverse effect (or a beneficial effect) is the product of the magnitude of the effect and the sensitivity of the nature conservation features affected. There is no agreed absolute method for assessing the significance of adverse or beneficial impacts on nature conservation features. Effects are unlikely to be significant where features of low value or sensitivity are subject to low or short-term impacts. However, where there are a number of small scale effects that are not significant alone, the assessor may determine that cumulatively these may result in an overall significant effect.

5.8.6 Negative and positive impacts on nature conservation features have been characterised based on predicted changes as a result of the proposed activities. In order to characterise the impacts on each feature, the following parameters are taken into account regarding birds:

- the magnitude of the effect (i.e. death, injury or displacement);
- the extent of the area over which the effect would occur and to what proportion of the species population;
- the duration of the effect;
- whether the effect is reversible and over what timeframe; and
- the timing and frequency of the effect.

5.8.7 The assessment identifies those positive and negative impacts which would be 'significant', based on the integrity and the conservation status of the ecological feature.

5.8.8 The integrity of 'defined' sites is described as follows and has been used in this assessment to determine whether the impacts of the proposals on a designated site are likely to be significant:

The integrity of a site is the coherence of the ecological structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.[33]

5.8.9 The conservation status of habitats and species within a defined geographical area is described as follows and has been used in this assessment to determine whether the impacts of the proposals on non-designated habitats and species are likely to be significant:

For habitats, conservation status is determined by the sum of influences acting on the habitat and its typical species, that may affect its long term distribution, structure and functions as well as the long term survival of its typical species within a given geographical area;

[33] Guidelines for Ecological Impact Assessment in the United Kingdom, IEEM, 26 June 2006

For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long term distribution and abundance of its population within a given geographical area[34].

Collision Risk Analysis

5.8.10 From the flight data gained during VP surveys for target species, a Collision Risk Analysis (CRA) was undertaken for both the River Tees and the Reclamation Ponds sections of the proposed overhead line to inform the impact assessment for this scheme. These sections were selected as potential collision risk locations due to their proximity to the SPA and habitat types present.

5.8.11 The CRA followed a method devised by MBEC Ltd. as part of the Beauly to Denny 400kV Overhead Transmission Line Environmental Statement[35]. This methodology was further developed using on-site observations of bird interactions with existing overhead lines and the application of known collision avoidance rates from birds with overhead lines from the literature[36].

5.8.12 The CRA focused on those target species recorded flying through the overhead line corridor (the route itself and a buffer of 100 m to either side) at potential collision height. For the River Tees a conservative range of 20 – 120 m (split into two zones – Collision Zone 1, 20-80 m and Collision Zone 2, 80 – 120 m) was taken as the potential collision risk zone, to account for sag in the lines during periods of warm weather. For the Reclamation Ponds a conservative range of 20 – 60 m was taken as the potential Collision Zone.

5.8.13 Bird flights have been recorded conservatively and where flights are recorded within the Collision Zone even if this is only a small proportion of the total flight time (e.g. 15 seconds of a 3 minute flight) it is still recorded as being overall at collision height and within the Collision Zone. Furthermore, flights recorded at some point in the Collision Zone and which cross the proposed overhead line corridor, even if they are not within the Collision Zone at the point of crossing, will still be recorded as such within the data.

5.8.14 Appendix 5.C contains a full methodology and staged approach for this CRA. The reasoning behind use of certain assumptions and rates is also outlined.

Impact Significance

5.8.15 There are no set criteria to determine whether a population of a species is important. A 1% threshold (of European bird populations) is currently used for selection of protected areas throughout Europe and nationally in the UK (for SPAs, Ramsar sites and SSSIs)[37]. Selection of protected areas also includes sites where an assemblage of over 20,000 birds is present[37].

5.8.16 In the context of this assessment a decision was made that the critical threshold of 1% would be cascaded down to the local scale and used to determine whether the individual wetland sites within the scheme survey area (the River Tees and the Reclamation Ponds) were of significance for qualifying species of the Teesmouth and

[34] A Nature Conservation Review (Ratcliffe, 1977)

[35] Paul Bradshaw MBEC. Proposed Beauly to Denny 400kV Overhead Transmission Line, Annex 8, Bird Collision Mortality Assessment 2009.

[36] Balmer, D.E. Henderson, I.G. and Clark, N.A. (1995) A study of the Risk of Collision with Power Lines by Waterbirds in Winter at Shotton Steel Works, North Wales. BTO Research Report No. 153.

[37] Protecting internationally important bird sites. *A review of the EEC Special Protection Area network in Great* Britain. JNCC, 1990.

Cleveland Coast SPA[38];i.e. if a population recorded within the scheme survey area was recorded as being >1% of the species population at the SPA, or if the assemblage numbers recorded on site were over 1% of the SPA assemblage, then this was taken to be significant.

5.8.17 From the BTO WeBS data and the field survey data (Waterbird and VP surveys) the 1% threshold was also used to establish whether the number of individuals for each waterbird species and for the overall assemblage likely to be affected by the proposed overhead line (by either displacement or collision with overhead lines) will be significant or not, where anything over 1% (e.g. >1% of its SPA qualifying population) represents a significant proportion of the Teesmouth and Cleveland Coast SPA population[39].

5.8.18 Significance for overall SPA assemblage species has only been assessed in the context of the overall assemblage rather than individual populations. However, where species have been present in the development area in notable numbers this has been highlighted within the text.

5.8.19 For those species not included as waterbird species as part of the SPA citation, contextual assessment has to be made from International, National or County Records for individual species. With respect to this assessment most target species not included as part of the Teesmouth and Cleveland Coast SPA assemblage are raptors for which records are held from an international to a local level[40].

5.9 Policy and Guidance

5.9.1 Chapter 4 Ecology provides detailed information regarding national, regional and local policies that are relevant to this scheme. As these are more relevant to that chapter they are not repeated here.

5.9.2 The assessment of the effects of the proposed replacement overhead line on bird species and their populations has been based on current guidance from Natural England[23], SNH[24] and the Institute for Ecology & Environmental Management (IEEM) 2006 Guidance for Ecological Impact Assessment in the UK[41].

5.9.3 This assessment takes account of the following legislation:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- Wildlife and Countryside Act, 1981 (as amended);
- The Countryside and Rights of Way (CROW) Act, 2000.

5.10 Baseline description

Site Description

5.10.1 The proposed overhead line will run from the existing overhead line north of the Reclamation Ponds down the eastern bank of the Reclamation Pond adjacent to the

[38] It should be noted that there is no accepted criterion for establishing the importance of discrete sites within SPAs for individual qualifying species. Determining a count sectors importance for individual qualifying species by employing the critical threshold of 1% of that species qualifying population is recognised within the ecology field as a standard method for assessing the importance of sites within SPAs and follows the Joint Nature Conservation Committee's recommended procedure for the selection of biological SSSIs.

[39] Data on the SPA bird populations (other than those listed individually on the citation (SeeTable 3.1 and 3.2) has been provided by A. Whitehead of Natural England.

[40] Records for raptors and other notable species recorded within Teesside and within Cleveland have been provided by the Teesmouth Bird Club.

[41] Guidelines for Ecological Impact Assessment in the United Kingdom, IEEM, 2006.

Sabic petrochemical plant. The Reclamation Pond is a large waterbody which provides ideal habitat for waterbird species. West of the Reclamation Ponds there is another waterbody called Dorman's Pool (part of the SPA) which also provides high quality habitat for waterbirds and birds regularly pass between these two ponds. West of Dorman's Pool is a complex of other wetland areas which are part of the Saltholme RSPB reserve providing a range of habitat for waterbird species both in the waterbodies themselves and the surrounding grassland. The location of these sites is shown on Figure 5.2.

5.10.2 The overhead line then crosses over Huntsman Drive and continues south-east along the western edge of the Petroplus site above an area of scattered scrub and grassland. The River Tees crossing point is adjacent to the Petroplus site and passes across the river to the south-western edge of the Corus works. The River Tees has a large mudflat on its northern shore, this mudflat (which is exposed at low tide only) is shown on the Phase 1 Habitat Plans (Figures 4.1 and 4.2 in Chapter 4) and its extent is marked on Figure 5.1. This provides an important feeding resource for waterbird species, especially waders which feed on the mud during low tide. To the south of the river the route passes through an open area comprising hard standing and bare ground with ephemeral vegetation with low potential for use by birds.

5.10.3 The Reclamation Pond is likely to be infilled during 2010 (onwards) for construction of the Thor Cogeneration Plant. The approximate extent of infill is shown on Figure 5.4.

Designated Site Information

5.10.4 There is one international statutory designated site for birds within 10 km of the proposed replacement overhead line – the Teesmouth and Cleveland Coast SPA and Ramsar. The proposed overhead line cables will run above this designated site at the location shown on Figure 5.1 (mudflat exposed at low tide). The closest tower is at least 30 m from the designated site boundary. Within 2 km of the proposed overhead line there are four national statutory designated sites (three Sites of Special Scientific Interest (SSSIs) and one National Nature Reserve (NNR), all designated for their bird interest), along with one RSPB nature reserve. It is important to note that the Reclamation Ponds are not part of any of these designations.

5.10.5 These sites are shown on Figure 5.1; more detailed information regarding their ornithological interest is contained in paragraphs 3.2.4 onwards. For information regarding other ecological interests refer to Chapter 4 Ecology.

5.10.6 There are no non-statutory designated sites (e.g. sites of importance for nature conservation) or areas of ancient woodland within 2 km of the proposed overhead line route.

International Statutory Site – Teesmouth and Cleveland Coast

SPA information

5.10.7 The Teesmouth and Cleveland Coast SPA[42] consists of 18 individual sites stretching from the Cleveland Coastline upstream to the Inner Tees at Middlesbrough. This complex of sites contains a variety of coastal and estuarine habitats which attract large numbers and a wide variety of over-wintering and passage wetland birds (waders and waterfowl) to the area.

[42] Teesmouth and Cleveland Coast SPA and Ramsar site citations: (SPA – (http://www.jncc.gov.uk/page-1401) Ramsar site - (http://www.jncc.gov.uk/page-1389))

5.10.8 The SPA is designated under the EU Birds Directive (1979) due to its importance in protecting and conserving certain European wild bird populations and their habitats, as well as protecting migratory birds and species which are considered rare or vulnerable.

5.10.9 Sites designated as SPAs under the Birds Directive and Special Areas of Conservation (SACs) under The Habitats Directive (1992) make up the 'Natura 2000 Network' of protected sites. The Birds Directive (1997) and the Habitats Directive (1992) are transposed into UK law through the Conservation (Natural Habitats, &c) Regulations 1994.

5.10.10 The current SPA citation used for this assessment was updated following a Joint Nature Conservation Committee (JNCC) review of SPAs in 2001[43]. The current numbers of birds listed on the SPA citation as qualifying species (as given in Tables 5.2 and 5.3 below) and the number of bird species listed on the assemblage are different from the original NE citation (which was last updated in March 2000 – Pers. comm. David Stroud, JNCC Senior Ornithological Advisor (May 2009).

5.10.11 A copy of the current full and updated Teesmouth and Cleveland Coast SPA citation as used for this assessment is provided in Appendix 5.E.

5.10.12 The site qualifies under Article 4.1 of the directive (79/409/EEC) by supporting populations of European importance of species listed on Annex 1, as listed in Table 5.2 below.

Table 5.2 - Qualifying bird populations of the Teesside and Cleveland Coast SPA under Article 4.1 (breeding and on passage populations of species of European importance (Annex 1))

Species	Individuals	% of GB Population
Breeding		
Little tern (S*ternula albifrons*)	37	1.7%
On Passage		
Sandwich tern (*Sterna sandvicensis*)	2,190	5.2%
Ringed Plover (*Charadrius hiaticula*)	634	1.3%

5.10.13 The site also qualifies under Article 4.2 of the directive (79/409/EEC) by regularly supporting wintering bird populations of European and international importance of the following migratory species as listed in Table 5.3.

Table 5.3 - Qualifying bird populations of the Teesmouth and Cleveland Coast SPA under Article 4.2 (wintering populations of migratory species of European and International importance)

Species	Individuals	% of World Population
Knot (*Calidris canutus*)	4,190	**1.2%** Western European / Canada population (winter peak mean)
Redshank (*Tringa totanus*)	1,648	**1.1%** wintering European / West African population (winter peak mean)

5.10.14 The site further qualifies under Article 4.2 by supporting a wintering waterfowl assemblage of European importance consisting of at least 21,406 individuals of various different species. Species listed on the updated current SPA citation as part of the assemblage include:

[43] JNCC SPA Review of the Teesmouth and Cleveland Coast SPA, conducted in 2001. SPA Review - (http://www.jncc.gov.uk/default.aspx?page=1993)

Sanderling (*Calidris alba*);
Lapwing (*Vanellus vanellus*);
Shelduck (*Tadorna tadorna*); and
Cormorant (*Phalacrocorax carbo*).

5.10.15 It should be noted that NE view all waterbird species as being part of the SPA assemblage not just those listed above and this survey and assessment has been conducted taking this into account. Technically speaking gulls are included within the SPA assemblage (as waterbirds) although they are not officially counted as part of the assemblage; their presence has therefore been considered in this assessment but numbers have not been included in overall assemblage figures.

5.10.16 NE has provided data for all SPA assemblage species over the entire estuary, Appendix 5.E includes detail regarding assemblage numbers. This data will be used as part of the assessment to ascertain whether habitats within the zone of influence of the proposed overhead lines will support significant proportions of the waterbird assemblage individual species populations.

Ramsar Information

5.10.17 The Teesmouth and Cleveland Coast is also listed as a Ramsar site under the agreement on the Conservation of Wetlands of International Importance especially as Waterfowl Habitat (an agreement signed in Ramsar, Iran 1971).

5.10.18 There is no specific legislation governing the protection of Ramsar sites. However, the UK Government has decided as a matter of policy to afford Ramsar sites the same level of protection as Natura 2000 sites (the collective term for SPAs and Special Areas of Conservation SACs).

5.10.19 Although the Ramsar citation for this site also provides numbers for bird species including knot, redshank and the overall waterfowl assemblage, this assessment has made use of numbers from the SPA citation only given that these numbers are greater (in each case) than those given on the Ramsar citation and as the site boundaries are the same.

National Statutory Sites and non-statutory sites within 2 km of the route

5.10.20 The Tees and Hartlepool Foreshore and Wetlands, Seal Sands, Cowpen Marsh SSSIs, Teesmouth NNR and RSPB Saltholme Reserve are all designated at least in part for their bird interests. All these sites support nationally important populations of waterfowl species. Seal Sands in particular supports a waterbird assemblage of approximately 28,000 individuals (approximately 24,000 waders and 4,000 waterfowl).

5.10.21 A number of species are listed in the various SSSI citations including the following list which represent the most important and up to date component of the SSSIs[44], [45] & [46]. These species are also specifically listed within the Teesmouth and Cleveland Coast SPA draft conservation objectives document and include:

Annex 1 Species

Little tern *(Sternula albifrons*)
Sandwich tern (*Sterna sandvicensis*)

[44] Tees and Hartlepool Wetlands and Foreshore SSSI citation: (http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=2000289)

[45] Seal Sands SSSI citation: (http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1000141)

[46] Cowpen Marsh SSSI citation: (http://www.sssi.naturalenglang.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1000036)

Migratory Species

Knot (*Calidris canutus*);
Redshank (*Tringa totanus*)

Internationally important assemblage of waterbirds

Knot (*Calidris canutus*);
Redshank (*Tringa totanus*)
Sanderling (*Calidris alba*);
Lapwing (*Vanellus vanellus*);
Little grebe (*Tachybaptus ruficollis*);
Shoveler (*Anas clypeata*);
Widgeon (*Anas penelope*);
Teal (*Anas crecca*), and;
Shelduck (*Tadorna tadorna*).

5.10.22 Further species including purple sandpiper, turnstone, pochard, goldeneye, bar-tailed godwit and grey plover are also listed within the three SSSI citations although these are not listed as important components of the SPA. This may therefore mean that these species are not now present in significant numbers at a national level.

5.11 Background Information

5.11.1 Appendix 5.B contains more detail regarding the WeBS and Teesmouth Bird Club data gathered for this assessment.

High Tide BTO WeBS Data

River Tees

5.11.2 At the River Tees, records of twenty SPA assemblage waterbird species were provided, along with records of six gull species. Of the SPA qualifying species only seven were for species listed individually in either the SPA citation or as important components of the three SSSIs. The majority of species records were in notable numbers with regard to their overall assemblage populations.

5.11.3 Records of redshank (a qualifying species of the SPA) were provided, in significant numbers on the River Tees between July and December. No records were obtained during May and June and it is therefore likely that the birds utilising the mudflat under the proposed overhead line are a post breeding population which stay in the area to winter. The peak count for redshank was 145 representing 8.8% of the SPA qualifying population.

5.11.4 The data suggests that curlew, lapwing and shelduck use the mudflat under the proposed overhead line and that the river is likely to be an important site for local populations of these species post breeding: wintering (curlew and lapwing) and breeding (shelduck).

5.11.5 Gull species were recorded in high numbers post breeding, especially for black-headed gull, herring gull and lesser black-backed gull.

Reclamation Ponds

5.11.6 At the Reclamation Ponds records of twenty-eight SPA assemblage waterbird species were provided. Of these species only seven were for species listed individually in either the SPA citation or as important components of the three SSSIs. The majority of species present were recorded in notable numbers with regard to their overall assemblage populations. Five gull species were also recorded including little gull.

5.11.7 Most birds known to utilise the Reclamation Ponds are post-breeding, passage or wintering species and the duck species in particular as listed above are on passage to wintering grounds further south in the UK and Europe. Herring gull and black-headed gull were the only gull species recorded in any large number. Both these peak counts were from the autumn/winter period.

Low tide BTO WeBS data

5.11.8 Low tide counts were also provided by the BTO. Records were only available for monthly counts for the winter period from November 2006 to February 2007. Low tide counts involve counting birds across the low tide (which is the opposite to BTO High Tide counts which form the core of the National WeBS dataset).

5.11.9 Four species records were provided for birds using the exposed mudflat under the proposed overhead line. These species included shelduck, oystercatcher, curlew and redshank. Of these species, counts of redshank were the only ones that were significant with the count of 166 representing 10.1% of the SPA qualifying population. Shelduck and curlew were also noted in fairly high number.

Breeding Bird Information

5.11.10 Information provided by the Teesmouth Bird Club in 2 km tetrads for breeding birds was examined over the route of the proposed overhead line. Tetrads are shown on Figure 5.3b.

5.11.11 No Schedule 1 or Annex 1 bird species records were provided for Tetrads 52G, 52F and 52L which lie directly in the line of the proposed overhead line. One record of little ringed plover (Schedule 1 species) was provided for 52K; the overhead line clips this tetrad at the southern edge of the Corus site and there is habitat within approximately 500 m of the proposed route which provides suitable habitat for this species.

5.11.12 The only record of breeding little tern (an Annex 1 qualifying species of the SPA) provided is from tetrad 52C, which covers the area around the mouth of the Greatham Creek and Cowpen Bewley approximately 1.5 km north of the proposed overhead line.

5.11.13 The records provided suggest a large number of other bird species are known to breed within the general area; the majority of these species are common although some records for UKBAP and BoCC red list species are also present including a record of 95 reed buntings in 52B.

5.12 Teesside Field Survey Results

Waterbird Surveys

5.12.1 Details of the waterbird surveys undertaken between May 2009 and January 2010 are provided in Appendix 5.B, this includes full tabulated results. This section provides the key findings only over this period. Survey work will continue throughout February-May 2010; the full results will be provided in a supplementary report in summer 2010.

General SPA Qualifying Species and Assemblage activity levels

5.12.2 Over the course of the waterbird surveys, the only SPA qualifying species recorded at the River Tees were redshank and ringed plover. However, while redshank were abundant and consistently recorded at this location, ringed plover was only represented by a single bird on one survey occasion. Redshank were also frequently recorded at the Reclamation Pond but in numbers of no more than two or three birds. In addition occasional sightings of sandwich terns were recorded at the Reclamation Ponds during the summer (Vantage Point) survey work.

5.12.3 There were no records of little tern or knot at the River Tees or the Reclamation Pond during any of the surveys. These species are understood to occur elsewhere within the Teesmouth and Cleveland Coast SPA with little terns breeding at sites such as South Gare and Coatham Sands located approximately 5 km north-east of the proposed overhead line. Meanwhile knot typically occur in the more expansive areas of inter-tidal sand and mudflats, including locations such as Seal Sands and Bran Sands, located approximately 2 km and 4 km from the proposed overhead line respectively.

5.12.4 With regard to species of the Teesmouth and Cleveland Coast SPA wetland bird assemblage, both the River Tees and Reclamation Ponds were found to support a wide variety of waterbirds including both waterfowl and waders. The River Tees for example regularly supported large numbers of curlew along with smaller numbers of cormorant, oystercatcher, shelduck and lapwing. Meanwhile the Reclamation Ponds supported an abundance of waterfowl particularly during the autumn and winter months with species including shoveler, gadwall, pintail, tufted duck, little grebe and coot being the most abundant. As such, both of these sites were considered to contribute to the available habitat for wetland birds of the SPA assemblage (even though the Reclamation Ponds are not within the footprint of the SPA).

River Tees

5.12.5 The River Tees is a highly dynamic tidal site. Throughout the tidal cycle the mudflat under the proposed overhead line route which is part of the Teesmouth and Cleveland Coast SPA is exposed and then fully submerged at low tide and high tide respectively. Birds utilise the mudflat for feeding at low tide and then roost along the rock armour or other adjacent areas at high tide.

Low tide

5.12.6 Records for most species from the 2009 - January 2010 low tide counts mirror the BTO WeBS records with redshank being recorded in significant numbers from August to December. The December peak count of 154 redshank represents 9.3% of the SPA qualifying population.

5.12.7 Of the twenty-eight waterbird species recorded during the low tide survey work, eighteen were counted in numbers which represented over 1% of their own individual Tees Estuary numbers. Of these species the only counts of particular note were for curlew and lapwing, these species were the only SPA assemblage species other than redshank present along the river in any abundance.

5.12.8 Gull species were also regularly recorded on the mudflat, exposed rocks and the river at low tide throughout the season. The river at all parts of the tidal cycle appeared to be an important staging post for gull species (especially black-headed and common gull) prior to roosting along the estuary towards Bran Sands.

High Tide

5.12.9 Records for most species at the River Tees at high tide were very low, which is likely to be a direct correlation with the reduction in feeding opportunity when the mudflat is submerged.

5.12.10 Redshank was still recorded passing through this area in significant numbers with the October peak of 32 birds representing 1.9% of the SPA qualifying population. Likely roosting areas were noted upstream and downstream outside of the survey area.

5.12.11 None of the high tide surveys recorded a total number of birds which met the 1% threshold of the SPA assemblage.

5.12.12 Twelve of the twenty-three species recorded during the surveys were recorded in numbers greater than 1% of their Tees Estuary populations.

5.12.13 Gull species were also recorded, predominantly in low numbers.

Reclamation Ponds

5.12.14 The Reclamation Ponds are a closed system and there is little change in the conditions present throughout the tidal cycle.

5.12.15 The majority of notable records taken at the Reclamation Ponds at high and low tide were for waterfowl species. All species regularly recorded were similarly recorded in the BTO WeBS data. Species numbers were in general lower for the field surveys than for those recorded during the BTO WeBS surveys.

Low Tide

5.12.16 During low tide counts the numbers recorded reached the 1% critical threshold against the SPA assemblage during each month of survey with a maximum of 1515 birds recorded in October representing 7.1% of the overall SPA assemblage.

5.12.17 Thirty five species of waterbird were recorded throughout the survey period at the Reclamation Ponds during low tide. Of these, the numbers recorded for eighteen species reached the 1% threshold against their Tees Estuary populations.

5.12.18 Schedule 1 species including kingfisher, long-tailed duck and little gull were also recorded at the Reclamation Ponds during the low tide surveys, although only a few individuals were counted suggesting this site is not important for these species.

High Tide

5.12.19 At high tide the 1% critical threshold for the SPA assemblage was reached during each month of survey with a maximum of 1541 birds recorded in October representing 7.2% of the overall SPA assemblage. There does not seem to be any notable influx of birds from the River Tees to this location at high tide.

5.12.20 Thirty-one species of waterbird were recorded throughout the survey period at high tide at the Reclamation Ponds. Of these seventeen reached the 1% threshold for their Tees Estuary populations.

Vantage Point Surveys

5.12.21 Field surveys involving Vantage Point Surveys were conducted through the summer, autumn and winter months (and continue to be conducted to complete a full year of field survey). Results presented within this document include both the results of the summer and autumn surveys and those for the winter up until mid January (including five of the nine winter surveys).

5.12.22 Appendix 5.C contains full VP survey data and an assessment of the results. This section highlights the findings of key relevance to the assessment only; however, due to the importance of this information for the collision risk analysis and impact assessment this information contained in this document is fairly detailed.

5.12.23 For the River Tees, Collision Zone 1 is taken as 20 – 80 m and Collision Zone 2 is taken as 80 – 120 m; and for the Reclamation pond the Collision Zone is taken as 20 – 60 m above ground level.

5.12.24 Figure 5.7 shows examples of transits that would be counted as passing through the overhead line corridor, to assist with this section and Appendix 5.C provides more information regarding this approach.

Summer Surveys

River Tees – VP1

5.12.25 A total of 749 transits were recorded for thirteen target species passing through the overhead line corridor at the River Tees (VP1) during the summer from May to September 2009 at all heights. 53.7% of these transits passed through the proposed overhead line corridor below collision height. Of the other transits recorded, 35% were recorded within Collision Zone 1 while 11.3 % of transits were recorded within Collision Zone 2.

5.12.26 Common tern was the most abundantly recorded bird passing through the overhead line corridor (at all heights) accounting for 45.9% of all species transits, at all heights. Curlew was the second most recorded species with 19.6% of all recorded transits. Black-tailed godwit, cormorant, grey heron, redshank and shelduck were the other main species recorded in the overhead line corridor. Flocks of common tern and black-tailed godwit passing through the corridor increased the transit numbers for these species (e.g. 38 black-tailed godwit crossed the corridor twice during the survey work accounting for 76 transits from only one flight). Bird flights within the corridor are shown on Figures 5.8a – 5.8b.

5.12.27 Transits recorded were generally for birds moving up and down the river itself (particularly cormorant and common tern) or for those travelling to and from the river from nearby wetland sites such as Saltholme and Seal Sands. A number of the flights especially for curlew and common tern were recorded within the overhead line corridor at the corner of the Petroplus plant (location shown on Figure 5.1) where birds go around the corner of the existing infrastructure at this location to either access or return from the river (as is the case for common tern) or to roost on the grassland as is the case for curlew (see relevant species flight maps in Figures 5.8a – 5.8b.

Reclamation ponds – VP2

5.12.28 A total of 472 transits were recorded for twenty-one target species passing through the overhead line corridor (at all heights) at the Reclamation Ponds (VP2) during the summer, from May to September 2009. 47.9% of these transits passed through the proposed overhead line corridor below collision height between 0 – 20 m or above it at over 60 m. The other 52.1% of the transits were recorded within the Collision Zone.

5.12.29 Common tern was the most abundantly recorded bird passing through the overhead line corridor accounting for 38.1% of all species transits, at all heights. Curlew, gadwall, grey heron, greylag goose, tufted duck and wigeon also transited the overhead line corridor in notable numbers. Of the species transits recorded within the Collision Zone, only common tern was recorded in any significant numbers. Single flights of flocks of golden plover and sandwich terns accounted for fairly a fairly high number of transits for these species being recorded. Bird flights within the corridor are shown on Figures 5.9a-5.9b.

5.12.30 No particular commuting route was observed at this location, other than movement between Dorman's Pool and the Reclamation Ponds (locations of these waterbidies are shown on Figure 5.1). Flights between these waterbodies were generally below collision height and outside of the overhead line corridor. Flights were also observed for species passing through the existing overhead line corridor to the north of the Reclamation Ponds. No collisions were seen and most birds gained height before crossing this corridor, although some more agile species (e.g. common tern) made no avoiding action and flew between the lines.

General Activity noted at both sites during summer VP work

5.12.31 Over the summer months flight activity during daylight hours was mostly related to foraging activity at both sites. Common terns were regularly seen hunting over both the River Tees and the Reclamation Ponds. Other species such as gulls and waders utilised habitat on a more tidal basis and general activity was usually related to tides especially at the River Tees.

5.12.32 Towards the end of the summer breeding period from July onwards the amount of activity increased as early migrants and non-breeding adults became more common. Many waterfowl species showed some movement at dawn and dusk between the mosaic of waterbodies at Teesside.

5.12.33 A number of observations were made of two peregrine falcons with the core of activity around the Sabic refinery. Breeding was not confirmed (and was not part of this study) and no juvenile peregrine were seen.

5.12.34 Generally activity was much lower alongside the existing Sabic works than elsewhere (i.e. along the line of the proposed overhead line), presumably because the Sabic plant provides limited foraging resources or commuting lines and the infrastructure may be an obstacle to flights.

Autumn Surveys

River Tees – VP1

5.12.35 A total of 934 transits were recorded for fifteen target species passing through the overhead line corridor (at all heights) at the River Tees (VP1) during the autumn from September to November at all heights.

5.12.36 Of transits recorded passing through the proposed overhead line corridor 30% were below collision height; 64.6% of all transits were recorded within Collision Zone 1 (see note regarding golden plover below) while only 5.5 % of transits were recorded within Collision Zone 2. Of the transits in Collision Zone 2, some flights (e.g. one flock of 19 greylag geese) would have in reality been above the potential collision risk zone as they passed through the overhead line corridor over land rather than over the river where the cables will begin to reduce in height.

5.12.37 A single flock of 500 golden plover which crossed the overhead lines once within Collision Zone 1 accounted for 53.5% of all bird transits and 82.9% of flights within Collision Zone 1. It is important to take this into account when considering overall flight activity for all species during autumn at the River Tees as the number of transits for all other species was low. This golden plover flight has still been included within the collision risk analysis; however, it should be noted that its inclusion raises the collision risk substantially.

5.12.38 Other than golden plover, cormorant was the most abundantly recorded bird passing through the overhead line corridor at all heights accounting for 16.8% of all species transits, at all heights. Curlew was the second most recorded species with 8.2% while redshank and greylag goose also contributed an important component of all flight activity. Bird flights through the overhead line corridor are shown on Figures 5.10a-5.10b.

5.12.39 Transits were generally for species moving up and down the river (cormorant) or for those travelling to and from the river (grey heron and curlew). Grey heron was travelling to and from other wetland sites further to the north and north-west such as Saltholme, and Seal Sands while curlew was utilising the mudflat at the River Tees then commuting the short distance to roosting sites in the grassland adjacent to the river. As for summer a number of the flights were recorded within the overhead line corridor at the corner of the Petroplus plant.

Reclamation Ponds – VP2

5.12.40 A total of 1828 transits were recorded for twenty-two target species passing through the overhead line corridor (at all heights) at the Reclamation Ponds (VP2) during the autumn, from September to November. Of the transits recorded, 56.4% passed through the proposed overhead line corridor below collision height or above it at > 60 m. The other 43.6% of the transits were recorded within the Collision Zone.

5.12.41 Lapwing was the most abundantly recorded species passing through the overhead line corridor accounting for 37% of all species transits, at all heights. Pink-footed goose, shoveler and wigeon also transited the corridor in significant numbers accounting for 22.4%, 11.1% and 14.1% of all flight activity at all heights respectively.

5.12.42 Of transits passing within the Collision Zone, flight activity was recorded all over the Reclamation Ponds. As for summer, a commuting route was observed for species travelling between Dorman's Pool and the Reclamation Ponds. Waterfowl species passing between these ponds included gadwall, mallard, shoveler, pintail, pochard and wigeon. These birds tended to enter the overhead line corridor while circling to gain or lose height when leaving or arriving at the waterbody. Further commuting routes for curlew appear to be present from birds passing through the survey area northwards towards Seal Sands and from birds going south to the River Tees. The large flights of lapwing were of birds from Saltholme flushed by a predator and circling before returning to roost back at Saltholme. Flights are shown on Figures 5.11a-5.11b.

5.12.43 It should be noted that single flights of bird flocks accounted for large numbers of transits within the Collision Zone for species such as lapwing, shoveler and wigeon. No regular flights through the overhead line corridor were recorded for these species, only occasional flights of flocks.

General Activity noted at both sites during summer VP work

5.12.44 Over the autumn months flight activity included a large number of flights of waterfowl species especially at the Reclamation Ponds. Birds including gadwall, shoveler, pochard and wigeon were likely to be passage migrants utilising the ponds as well as other Teesside waterbodies as a stop over while travelling further south. Such birds knowing the site less well than local birds are considered more likely to make a higher number of flights[3] as they are less aware of the potential threat of predators (therefore meaning they are more liable to be 'scared up') or the best foraging or roosting sites. Activity of such species was most noticeable at the Reclamation Ponds at dusk and dawn.

5.12.45 Common tern flights were not recorded after the September visits, this is likely to be due to migration. Species such as gulls and waders were recorded using the habitat on a tidal basis with localised activity levels being directly related to the tides.

5.12.46 At both the River Tees and the Reclamation Ponds gulls were the main species group showing movement at dawn and dusk to roost sites located towards the outer parts of the estuary at Bran Sands and Seal Sands. Counts in the autumn of birds utilising the River Tees and birds crossing the Reclamation Ponds at and above height often exceeded 1000 birds passing over in groups of tens to hundreds of individuals. Furthermore, large groups of several thousand gulls were often recorded congregating either on the water or along the exposed mudflat of the River Tees at dusk, of which the largest count was estimated to be up to 10'000 common and black-headed gulls.

5.12.47 Other species of note recorded during the autumn included a migrating marsh harrier hunting above Dorman's Pool, a short-eared owl crossing the Reclamation Ponds and a merlin seen on a number of occasions hunting above the grassland close to VP1.

5.12.48 Activity was much lower within the overhead line corridor in comparison to areas further to the south west where the River Tees and open ground is present and at the Reclamation Ponds where open water is present. This correlates with the findings of the autumn survey work also.

Winter Surveys (up until mid January 2010)

River Tees – VP1

5.12.49 A total of 652 transits were recorded for sixteen target species passing through the overhead line corridor at the River Tees (VP1) during the winter from October to mid

January at all heights. Of the transits recorded, 46.8% passed through the proposed overhead line corridor below collision height ; 53.2% of all transits were recorded within Collision Zone 1 while only 1.8 % of transits were recorded within Collision Zone 2. Lapwing and mallard were the two main species recorded transiting the overhead lines within CZ1. Within CZ2 activity was limited, curlew, lapwing and peregrine falcon were the three species recorded and transits across the season were minimal for all three species.

5.12.50 Large flocks of birds accounted for large number of transits although the number of overall flights was relatively low. Lapwing for example had only 20 flights which accounted for 188 transits. Curlew and redshank also showed similar patterns of flight activity.

5.12.51 Lapwing was the most abundantly recorded bird passing through the overhead line corridor at all heights accounting for 28.8% of all species transits, at all heights. Mallard, redshank and curlew also transited the corridor in large numbers at all heights accounting for 18.7%, 18.1% and 15.5% respectively. These species and lapwing accounted for the majority of flights passing through the corridor. Flights through the overhead line are shown on Figures 5.12a-5.12b.

5.12.52 Distinct flight routes were observed for the different species. Of the species recorded most, cormorant was again recorded transiting the corridor down the River Tees. Curlew was utilising the mudflat at the River Tees then commuting the short distance to roosting sites in the grassland adjacent to the river and beyond to Saltholme and Seal Sands.

5.12.53 Flights in January were related directly to the weather conditions, as lapwing (a species not regularly recorded on the mudflat) was roosting on this habitat probably as a result of ponds at Saltholme and the Reclamation Ponds being frozen.

Reclamation Ponds – VP2

5.12.54 A total of 556 transits were recorded for sixteen target species passing through the overhead line corridor at the Reclamation Ponds (VP2) during the winter period, from October to mid January. Of the transits recorded through this corridor, 89.7% of transits below collision height between 0 - 20m or above it at > 60 m. The other 10.3% of the transits were recorded within the Collision Zone.

5.12.55 Pink-footed goose was the most abundantly recorded species passing through the overhead line corridor accounting for 50.1% of all species transits, at all heights. Shoveler was the only other species accounting for a large proportion of the transits with 21.4% of all recorded flights at all heights.

5.12.56 Flight activity was recorded over wide parts of the Reclamation Ponds. The previously obvious commuting routes between the southwest corner of the Reclamation Ponds and Dorman's Pool were less obvious and the majority of flight activity within the Collision Zone was by either flights of golden plover or peregrine falcon. Flight activity at the pond was directly affected by the cold weather in December and January (pond was frozen on both occasions) and birds recorded were mostly over-flying the pond rather than trying to land or take-off from there. Peregrine falcon transits were mostly of a single bird hunting while small flocks of golden plover transited the corridor while travelling from north to south.

General Activity noted at both sites in winter (up until mid January)

5.12.57 During the winter months (which overlapped with the autumn survey period) flight activity included a number of flights of waterfowl species especially at the Reclamation Ponds. Bird species similar to those recorded during the autumn surveys were observed although only in large numbers and in greatest activity during October.

5.12.58 During December and January the freezing conditions at Teesside meant that most of the Reclamation Ponds were frozen over and few bird flights were recorded for species travelling to this waterbody. A number of flights outside of the overhead line corridor and above collision height were recorded for species including pink-footed goose which were travelling southward to try and find more suitable conditions. During this period other species of waterfowl and waders were also being forced into utilising the River Tees and species such as teal and tufted duck were recorded which were rarely present on the river before this point. Lapwing was also present on the river in greater numbers than previously recorded. Due to the presence of such species along the River Tees (which are prey species for peregrine falcons) activity of peregrine falcon was also recorded on a number of occasions at the river during the frozen period.

5.12.59 At both the River Tees and the Reclamation Ponds gulls were again the main species group showing movement at dawn and dusk to roost sites located towards the outer parts of the estuary at Bran Sands and Seal Sands. The freezing weather in December and January forced more gulls onto the river to feed as the Augean site was covered in snow as were many of the Teesside waterbodies such as the Reclamation Ponds.

5.12.60 As previous, activity was generally lower within the overhead line corridor at the Reclamation Ponds in comparison to above the pond itself. However, at the River Tees a 'pinch point' was observed where birds travelling to and from the mudflat, (especially curlew) commute along the border of the Petroplus site. Small numbers of curlew also use this grassland directly in the line of the proposed route to roost during high tide.

Summary of Vantage Point survey findings

5.12.61 The Vantage Point survey results provide detail on target bird species flights through the proposed overhead line corridor at all heights. Where significant flights (or species) have been noted at the combined Collision Zone height these have been specified.

5.12.62 At VP1 (River Tees) 13 target species were recorded passing through the overhead line corridor (at all heights) in summer; 15 target species in autumn and 16 target species in winter. Of all SPA assemblage flights recorded at this location, 46.3% of all transits were recorded flying through the combined Collision Zone (incorporating both Collision Zones 1 and 2) in summer; 70.1% in autumn and 55% in winter; the majority of other transits recorded were below collision height. Of the SPA qualifying species, only redshank was recorded with only three transits within the combined Collision Zone in summer; no transits in the combined Collision Zone in autumn and only one transit through the combined Collision Zone in winter.

5.12.63 At VP2 (Reclamation Ponds) 21 target species were recorded passing through the overhead line corridor (at all heights) in summer; 22 species in autumn and 16 in winter. Of all SPA assemblage flights recorded at this location, 52.1% of all transits were recorded flying through the Collision Zone in summer, 56.4% in autumn and 89.7% in winter (although this figure was skewed by a single large flock of golden plover transiting through the corridor). Of the SPA qualifying species, redshank and sandwich tern were recorded at the Reclamation ponds. Three redshank transits were recorded passing through the Collision Zone in summer, two in autumn and two in winter. Twenty-one transits of sandwich tern were recorded through the Collision Zone in summer but none were recorded in autumn or winter.

5.13 Comparative Survey Results – Blyth Estuary and Clackmannanshire Bridge

5.13.1 Appendix 5.D contains full information regarding these surveys, including a table of comparative data.

5.13.2 For the Blyth Estuary the results demonstrated that the distribution of the three most abundant species (redshank, mallard and teal) was roughly similar beneath the

overhead lines compared to the areas either side. The most significant factor contributing to variations in abundance appeared to be the tide and the availability of suitable foraging or roosting habitat at these different times.

5.13.3 Information provided by the local British Trust for Ornithology (BTO) Wetland Bird Survey (WeBS) counter (pers. comm. Lindsay McDougall 5th January 2010) supported this conclusion. Ms. McDougall stated that the local power station and its associated overhead lines had been erected in the 1950s and that the results of annual surveys at this location indicate that birds are not displaced from the area of the estuary directly below the overhead lines.

5.13.4 Consequently, it is concluded that the presence of the overhead cables does not appear to influence the distribution of birds at Blyth Estuary.

5.13.5 The results of the Clackmannanshire Bridge surveys also demonstrated that the abundance and distribution of waterbirds was similar directly beneath the overhead lines and the areas immediately adjacent, with redshank, curlew and wigeon being the most abundant species. As at Blyth, the distribution of birds was observed to be far more dependent on the state of the tide and the availability of roosting or foraging grounds rather than the presence of the overhead lines.

5.13.6 The local BTO WeBS counter for this area, Don Mathews, stated that birds did not appear to be affected by the overhead line or the nearby crossing tower. Rather, birds located in the vicinity of the overhead line crossing were thought to be present or absent because of habitat rather than the presence of the overhead lines (pers. comm. Mr. Mathews 17th January 2010).

5.13.7 On both sides of the river, the crossing towers are the only large structures in the vicinity of the river and birds did not seem affected by the presence of the tower or overhead lines and birds were not displaced from the mudflat and saltmarsh within the vicinity of the tower.

5.13.8 Consequently it was concluded that the presence of the overhead lines at these two locations does not appear to affect the distribution of waterbirds and it is considered that the overhead lines would be similarly non-influential at the River Tees.

5.14 Potential Effects

5.14.1 The design and layout of the development has taken into account areas of ornithological sensitivity identified during the initial scoping survey and during subsequent field surveys.

5.14.2 Without these incorporated measures, the construction and operation of the overhead line corridor could result in the following effects on birds:

- Disturbance to birds as a result of the construction activities;
- Direct loss of habitat;
- Fragmentation and isolation of habitats;
- Changes to key habitat features;
- Death or injury of birds from collision with the overhead lines;
- Displacement of species due to the building of structures close to feeding areas and provision of perching sites for predatory species;
- Barrier effect caused by the location of the overhead lines on habitual flight routes.

5.14.3 The decommissioning of the existing overhead line route (as shown on Figure 5.1) is considered to be part of the overall construction phase as these works will coincide and have similar impacts. The long-term implications of removal of this route are also considered as part of this scheme.

5.14.4 The findings of the survey work undertaken between May 2009 and mid January 2010 has recorded the following SPA qualifying species within the survey area: redshank (mainly associated with the exposed mudflat at the River Tees), sandwich tern (some activity recorded during summer VP work at the Reclamation Ponds) and ringed plover (represented by a single bird on one occasion). Of these species, redshank was recorded in significant numbers at the River Tees (December low tide peak count of 154 birds representing 9.3% of the SPA redshank population) but in low numbers at the Reclamation Ponds (peak count of three birds in October and November representing approximately 0.2% of the population); the other qualifying species were recorded in fairly low numbers, lower than 1% of their SPA population. The most sensitive SPA qualifying species for this scheme is therefore considered to be redshank and predominantly the population roosting on the exposed mud-flat under the proposed overhead line corridor at low tide which in the absence of mitigation could be affected by displacement, disturbance and habitat fragmentation etc. Little tern and knot (the other two SPA qualifying species) have not been recorded during the survey work.

5.14.5 The numbers of SPA qualifying species recorded within the potential Collision Zone of the proposed overhead line are fairly small – maximum of three transits per survey season for redshank and twenty one transits for sandwich tern in autumn only (no transits for ringed plover or other qualifying species). Collision risk is considered further in Section 5.17 (taking mitigation e.g. deflectors into account); in general both redshank and sandwich tern are not considered to be at high risk of colliding with the proposed overhead lines due to their behaviour (redshank tend to stay fairly low to the ground/water) and agility (sandwich tern are highly agile birds which even if flying through a overhead line corridor are likely to take avoiding action).

5.14.6 Survey results have also found that the SPA assemblage is found at over 1% of its Tees Estuary size at the River Tees survey location (recorded above 1% in September, November and December), with redshank and curlew accounting for the majority of this assemblage. At the Reclamation pond the assemblage was found in numbers over 1% of the total Tees Estuary size in each month of survey with a peak count of 1541 birds in October (high tide) representing 7.2% of the overall SPA assemblage. The numbers of waterbirds in the assemblage found along (or adjacent to) the proposed overhead line corridor are therefore considered significant (being over 1% of the assemblage population) and without mitigation may also be at risk of impacts as a result of disturbance and displacement etc. The collision risk for the assemblage species is considered further in Section 5.17 (once mitigation including deflectors has been taken into account). There are a number of factors which will affect collision rates (e.g. agility of certain bird species or behavioural tendencies when faced with obstructions to a flight path).

5.14.7 Section 5.15 below provides information regarding mitigation that has been incorporated into the scheme design and those measures that will be taken during construction to minimise the potential effects. Additional measures (such as installation of deflectors on the existing network off site) are also outlined.

5.14.8 Section 5.17 takes all mitigation into account and provides an assessment of residual impact on bird species, assemblages and on the SPA.

5.15 Mitigation

Ornithological Design Input

5.15.1 The design and layout of the development has taken into account areas of ornithological sensitivity identified during the initial scoping survey and during subsequent field surveys. Although the preferred route crosses the SPA above the mudflat, it avoids other areas of open ground that are likely to be suitable for use by the SPA

populations/assemblages, it avoids the new RSBP reserve at Saltholme and runs alongside existing infrastructure for most of its length, all of which have been designed to minimise impacts on the local bird populations.

5.15.2 Within the parameters of the design, pylon towers will be located as far as possible (within their topple distance from the Sabic plant) from the edge of the Reclamation Ponds, and at the River Tees the northern crossing tower will be placed as far as possible away (approximately 30 m) from the river while still achieving the minimum clearance height of 65 m.

5.15.3 Bird deflectors have been included within the design for the proposed overhead line. Deflectors will be placed on the earth wire (which is the top wire in most overhead line configurations) between each tower span.

5.16 Other Mitigation Measures

Construction Mitigation

Wetland Birds (Associated with the SPA)

5.16.1 Where possible all construction works within the vicinity (approximate 100 m zone) of wetland habitat either at the Reclamation Ponds or on the northern shore of the River Tees will be undertaken outside of the main winter period, to avoid disturbance to species and the assemblage for which the SPA is designated that are most likely to be present in this area (avoiding a slightly extended winter period from early October to early March, given peak counts have been recorded at the Reclamation Ponds in October during this survey work). Only fairly low numbers of sandwich tern and ringed plover have been recorded in this area during the survey work (SPA qualifying species during passage migration) and therefore it is not currently proposed to time works in this zone to avoid the passage migration season for these birds. Should the spring 2010 survey work find more significant use of this area by these species then the working period will be adjusted to also avoid the passage migration season if necessary. Although little tern breeds in the SPA, its breeding sites will not be affected by the proposed construction works.

5.16.2 Temporary visual screening will be installed along the limit of works north of the river to further minimise the disturbance to species using the adjacent mudflat during the construction period. Consideration will also be given to use of screening alongside the Reclamation Ponds; this will depend on the current extent of the ponds, the levels of disturbance from the Thor scheme and land availability. Screening will be high enough to ensure the activity at ground level is not visible and would be of a dense fabric mesh or similar. This will be installed under supervision of an ecologist prior to commencement of works.

5.16.3 The limit of works will be agreed with Natural England with no movement of plant or site personnel outside of this area. This will be strictly controlled during construction through the use of tool-box talks and audits.

Breeding Birds

5.16.4 The above programme will result in works being concentrated over the summer months and as such, pre-construction vegetation removal will need to be undertaken.

5.16.5 All vegetation removal to allow for construction areas or conductors (trees, scrub and any rough grassland) would be carried out as advanced works outside the bird breeding season (taken to be March to August inclusive depending on geographic and climatic variation). This work will be undertaken carefully by hand with supervision by an ecologist as required to ensure the potential impacts on birds within the SPA are

minimised. The proposed visual screening along the River Tees and Reclamation Ponds will be erected prior to commencement of this work if considered appropriate.

5.16.6 If any further vegetation removal is required in the bird breeding season, pre-clearance checks would be carried out by an ecologist and if any nests were found they would be left undisturbed until all young were fully fledged and had left the nest.

5.16.7 No SPA qualifying features are likely to breed in this location. Little tern is the only species listed as a breeding species as part of the SPA and they do not breed in the type of habitat that will be cleared for the works, nesting well away from the proposed overhead line area.

5.16.8 There are no known breeding Schedule 1 birds within the proposed route corridor or construction area. Although peregrine may be breeding on the adjacent Sabic site they already nest in an active and disturbed environment and are unlikely to be disturbed on their nest by the proposed construction activities for this route.

Off-site Bird Deflectors

5.16.9 Bird deflectors will be installed on an additional (approximate 2 km) section of the existing 400kV network from the Sabic plant westwards to around the Saltholme substation (locations are shown on Figure 5.1). The deflectors will be similar to those shown in Photograph 1 above.

5.16.10 This will significantly reduce the risk of collision for birds within the Teesside area, especially those travelling between Saltholme and the various wetland habitats such as Cowpen Marsh and Seal Sands.

Post Construction Monitoring

5.16.11 Following the construction of the proposed overhead line a series of post construction surveys will be undertaken.

5.16.12 These surveys will be carried out to further monitor the use of the River Tees and the Reclamation Ponds by birds and the effectiveness of the bird deflectors. This information will be passed on to Natural England and the RSPB for future use and to gain a better understanding of how the use of bird deflectors can be used to reduce the impacts of overhead lines on birds and to more accurately predict what will be the benefit of using such measures.

5.16.13 The monitoring program will involve VP surveys to observe bird flight activity in the vicinity of the new overhead line at the River Tees and the Reclamation Ponds. Wetland bird surveys will also be carried out at both sites to see whether birds have been displaced from habitat within the vicinity of the new line and its towers, especially at the River Tees where the overhead line will cross above the North Tees mudflat.

5.16.14 The results of the 2009 and 2010 surveys will be used as a baseline for comparison.

5.16.15 The methodology for this monitoring work will be confirmed once the full 12 months of data have been collated and assessed for this scheme. The approach will be prepared in consultation with Natural England and the RSPB.

5.17 Assessment of Residual Effects

General

5.17.1 This impact assessment section takes into account the mitigation measures outlined above including:

- Mitigation incorporated into the scheme design – including layout and deflectors;
- Construction mitigation – including timing of works, use of screens to minimise disturbance and measures to avoid disrupting nesting birds
- Off-site mitigation – to install deflectors on the existing network outside of the limits of this replacement route;

5.17.2 This section has been split into three key areas: Construction Effects (on designated sites, habitats and species); Operational Effects (on designated sites, habitats and species); and a final evaluation of effects on the SPA taking both residual construction and operational effects into account with specific reference to the SPA conservation objectives.

5.17.3 An Appropriate Assessment screening will be submitted to Natural England in early March 2010. This will specifically address the significance of any residual impacts on the SPA. The screening will inform the requirement for full Appropriate Assessment.

5.18 Construction effects (including decommissioning of the existing route)

Designated Areas (and their species)

5.18.1 There will be no direct loss of habitat or work within the footprint of any designated areas during construction activities associated with the proposed asset replacement scheme.

5.18.2 There may be some disturbance and temporary displacement of SPA qualifying species from a small area of mudflat within the SPA along the River Tees and for SPA assemblage species utilising habitat along the length of the proposed overhead line. The provision of visual screening will ensure that this disturbance and displacement will only be temporary in nature and therefore, will not permanently alter the conservation status of any of the species present. The timing of works closest to the SPA and Reclamation Ponds will ensure that disturbance is unlikely to occur during the periods in which the species are qualifying features of the SPA (e.g. redshank on the exposed mudflat over winter) or during the wintering waterfowl assemblage period. If considered necessary following completion of the spring 2010 surveys this avoidance period will also be extended to avoid the passage migration season (for sandwich tern and ringed plover); currently numbers of these species have been fairly low and not significant and this extended avoidance period is not currently considered necessary.

5.18.3 There were no records of little tern or knot at the River Tees or the Reclamation Pond during any of the surveys. These species are understood to occur elsewhere within the Teesmouth and Cleveland Coast SPA with little terns breeding at sites such as South Gare and Coatham Sands located approximately 5 km north-east of the proposed overhead line. Meanwhile knot typically occur in the more expansive areas of inter-tidal sand and mudflats, including locations such as Seal Sands and Bran Sands, located approximately 2 km and 4 km from the proposed overhead line respectively.

5.18.4 No disturbance to birds on Dorman's Pool (part of the SPA) is anticipated due to the presence of screens (existing bunds) and the distance of the proposed construction activities from this location (approximately 200 m at the closest point across the proposed Thor Cogeneration Plant location).

River Tees

5.18.5 The installation of pylon towers close to the River Tees and the spanning of overhead wires over the river is expected to result in some disturbance to wetland birds using the Teesmouth and Cleveland Coast SPA and Ramsar Site and Tees and Hartlepool Wetlands and Foreshore SSSI. The scheme has been designed to ensure a maximum stand-off from the SPA footprint; the closest tower will be at least 30 m from the SPA boundary.

5.18.6 The mudflat is utilised by significant numbers (>1% of the SPA population) of redshank which is an SPA qualifying species (over winter). Other wetland bird species including curlew, cormorant and oystercatcher also utilise the River Tees at this location, although not in significant numbers. Disturbance and possible displacement of birds from the construction area will largely be avoided by the timing of works. Any disturbance that does occur is unlikely to affect qualifying species of the SPA during their qualifying period, will only be temporary and will be minimised through the use of screening. Following the end of the construction process, birds will be able to return without hindrance, see operational section below for long-term implications.

5.18.7 The River Tees system is highly dynamic and also well used by industrial boat traffic with large ships regularly moving up and down the river and mooring at the dock area across the river from VP1. As such, birds are used to regular disturbance from heavy industrial activity at the river and construction activity for the proposed northern crossing will be unlikely to have any long term effects on birds utilising the adjacent SPA mudflat. The mudflat habitat including the area adjacent to the proposed crossing point stretches 1.25 km along the River Tees and when birds are disturbed by boats moving along the river, they have been observed moving to another section of the mudflat further away from the area disturbed, rather than leaving it completely.

5.18.8 The disturbance during construction is therefore considered likely to result in temporary displacement of bird species on the area of the mudflat closest to the construction area; however, it is thought that birds will most likely move to other areas of this habitat rather than being displaced from the area completely.

5.18.9 Effects on the SPA qualifying species using the River Tees are not considered to be significant.

Reclamation Ponds

5.18.10 The installation of pylon towers immediately adjacent to the Reclamation Ponds and the spanning of the corner of the remaining waterbody (if as expected it is half in-filled in spring/summer 2010) by the overhead wires is expected to result in some disturbance of wetland birds using the Reclamation Ponds. Some of these birds are qualifying interests either individually or as part of the assemblage of the Teesmouth and Cleveland Coast SPA and Ramsar Site and Tees and Hartlepool Wetlands and Foreshore SSSI (although the Reclamation Ponds themselves do not form part of the SPA footprint).The timing of works will ensure that this disturbance is restricted to months outside of the qualifying features and assemblage periods (e.g. avoiding passage and winter periods). Little tern (qualifying feature during breeding season) are unlikely to breed in this location.

5.18.11 Following the partial infilling of the Reclamation Pond (likely to be in 2010) it is not clear how important the site will remain for waterbird species. It is unlikely that it will support similar numbers of birds to those recorded during the field surveys. It is however assumed likely that some waterbird species will still utilise the remaining Reclamation Ponds and that these species will be part of the SPA assemblage.

5.18.12 During waterbird surveys in December 2009 and January 2010 the Reclamation Ponds were mostly frozen. During this period birds were confined to a small area of the ponds

that were not frozen and numbers were restricted to only a few species which were present in significantly reduced levels. It is likely that following the reduction in area of the Reclamation Ponds as a result of the Thor power station construction, numbers of species may resemble those recorded during this frozen period.

5.18.13 Birds that remain at the Reclamation Pond following the power station construction may be displaced during the overhead line route construction period to other wetland areas such as Saltholme and nearby Dorman's Pool; however, once construction has been completed, birds will be likely to return to the ponds as they have done throughout Teesside following the end of industrial activity over the last 50 years.

5.18.14 Measures that will be implemented to minimise the construction disturbance will further reduce the impact of this work to fairly minimal and temporary levels.

5.18.15 No significant effects are anticipated on qualifying features of the SPA using the Reclamation Ponds.

Habitats

5.18.16 Construction of the foundations for the towers is expected to result in the temporary loss of several small isolated plots of semi-natural habitat and bare ground staggered along the proposed route corridor. The tower bases will be approximately 10 m^2 with a maximum working area of approximately 60 m x 60 m being disturbed during construction and installation works (60 x 60 m area required for dismantling of existing towers). Given the predominance of this habitat along the proposed replacement overhead line and adjacent areas, this loss and disturbance is not considered to be significant to birds.

5.18.17 Small linear strips of semi-natural habitat (rough grassland and scrub) are to be temporarily lost through the establishment of temporary access tracks for plant and personnel along the route corridor. Again, given the dominance of semi-improved grassland it is likely to be this habitat that will be most affected. However, it should be noted that the existing grassland has developed over disturbed ground and since the access tracks are expected to be relatively narrow, and given the abundance of semi-improved grassland in the surrounding area it is expected that these areas will quickly re-colonise naturally. As such, the effects of temporary habitat loss on birds through the creation of access tracks are not expected to be significant.

5.18.18 The establishment of works compounds will take place off site on industrial land hard standing land only. Any ornithological impacts caused by this will be negligible and temporary.

5.18.19 No significant effects on the nature conservation status of breeding or foraging bird species at national, regional or local levels are predicted as a result of the direct loss of habitat. Habitat removal will also be programmed to avoid effects to nesting bird species.

Species

5.18.20 For potential impacts on SPA populations and assemblages see section 5.18.

5.18.21 Habitat loss is likely to be minimal for other bird species as a result of the pylon towers and the associated overhead line construction. Breeding birds utilising grassland, scrub and other habitat located at the tower bases may lose some of their potential nesting habitat. However, habitat loss will be negligible in the context of the wider site and similarly the effect on the local breeding bird population will also be negligible. No Schedule 1 or BoCC red listed species are thought to be breed along the proposed overhead line route.

5.18.22 Notable bird species including resident peregrine falcons and migratory or wintering species such as marsh harrier, merlin and short-eared owl have all been recorded during site visits and were present in Teesmouth Bird Club records[47]. These species are not associated with the Teesmouth and Cleveland Coast SPA. The peregrine falcons having successfully bred on the Sabic petrochemical site in 2009 are unlikely to be disturbed by construction activities (as they will already be used to heavy plant activity undertaken at Sabic), especially those outside of the Sabic plant. The other species are likely to be present only for a short time annually (as recorded in TBC data records and during field surveys) and as such construction effects for these species are likely to be minimal.

5.19 Operational Effects

5.19.1 During operation, the overhead line could result in the following impacts on birds and their movements:

- Displacement of birds from areas within the zone of influence of the pylon towers and the proposed overhead lines;
- Disturbance during maintenance operations;
- Bird injuries or death through collision with the overhead lines or pylon towers; and
- Barrier effect caused by the location of the overhead lines on habitual flight routes.

5.19.2 The existing line will be decommissioned as soon as the new line is in place and is operational.

Displacement

5.19.3 While it is difficult to predict whether birds will be permanently displaced, an indicative study of two comparative sites where overhead lines crossed estuaries (at the Blyth and the Forth Estuaries) was undertaken to examine whether birds are displaced from habitat within the vicinity of pylon towers and proposed overhead lines. Further indicative survey of the existing overhead lines at the Reclamation Ponds was also undertaken to see whether birds used habitat close to or adjacent to the existing overhead lines or pylon towers at this location. These studies indicate that birds habituate to the presence of overhead lines fairly readily and levels of activity underneath overhead lines is more likely to be influenced by habitat type than as a result of the presence of the infrastructure.

5.19.4 There may also be short-term displacement issues as a result of maintenance works or should cables need to be fully replaced in the future. The effects of this work are likely to be similar to the construction impacts listed above and providing appropriate mitigation and timing of works is implemented the impacts are likely to only be temporary and not significant.

River Tees

5.19.5 As discussed above, there appears to be no evidence to suggest that birds are displaced from any habitat below or adjacent to pylon towers and associated overhead lines.

5.19.6 At the Blyth Estuary redshank were present directly under the overhead lines and birds did not appear to show any different behaviour whether underneath the lines or to one side. At the Forth crossing a number of different species were recorded within the vicinity of the pylon tower and the overhead lines. Curlew, redshank and wigeon were all present in notable numbers and seemed to be habituated to the presence of the pylon tower and overhead lines. The pylon towers at this location were the only large

[47] Teesmouth Bird Club (2009) Bird Data supplied for desk study

structures within at least (2 km) of the survey site and while the towers do provide ideal hunting perches for local avian predators such as peregrine falcons, waterbird species were not obviously displaced from the mudflat and saltmarsh habitat within the vicinity of the crossing.

5.19.7 The only SPA qualifying species recorded in significant numbers on the River Tees was redshank. Historic records (from the BTO) and from field surveys indicate that the mudflat on the river supports a significant proportion (9.3%) of the SPA qualifying population (peak low tide count figure presented as a % of the SPA population). This mudflat is therefore a significant resource for this species. It is possible that use of the river by redshank (and possibly other similar species) is currently changing as the quality of habitat at the new Saltholme reserve improves; Redshank were seen in lower numbers during the field work in 2009/2010 than have previously been recorded by the BTO WeBS counts. Other species at the river including cormorant, curlew and oystercatcher were all regularly present in fairly high numbers.

5.19.8 The current industrial nature of the River Tees adjacent to the proposed crossing point means there are a number of structures already present which could displace birds. Cranes located on the south side of the river at the dock area are up to 50 m in height and the Petroplus site adjacent to the crossing would also provide an ideal hunting perch for peregrine falcons looking to catch birds on the mudflat.

5.19.9 At the River Tees from the current nature of the site and from information gleaned from the indicative comparative studies it is considered that there is likely to be no significant effect on the nature conservation status of redshank (SPA qualifying species) and other SPA assemblage species through displacement as a result of the proposed overhead lines over the mudflat. While these waterbirds may be temporarily displaced during construction, once birds have habituated to the new crossing they will return to utilise habitat within the vicinity of the crossing.

5.19.10 National Grid plan to build the tower on the north side of the river (the one closest to the SPA mudflat) as far as possible away from the river (at least 30 km) while maintaining their minimum distance above the water of 65 m.

Reclamation Ponds

5.19.11 As stated previously in section 5.18 (Construction Effects) the Reclamation Ponds are likely to be significantly reduced in size from the present level as a result of the Thor Cogeneration Plant construction (as shown indicatively on Figure 5.4). While waterbirds which are part of the SPA assemblage will still use this habitat it is unlikely that numbers will be at the same level as those recorded during 2009 and 2010 field surveys.

5.19.12 At the Reclamation Ponds the current overhead lines which pass to the north of the ponds appears to have no effect on bird distribution. Birds still utilise habitat directly underneath the cables and there appears to be no displacement of birds from the top section of the pond into other areas of the pond.

5.19.13 Results from the indicative survey as outlined above and relevant literature also illustrate that comparable power line crossings do not displace birds from habitat within their vicinity.

5.19.14 It can therefore be stated that displacement from the pylon towers and the proposed overhead lines will not cause any significant effect to the nature conservation status of SPA Qualifying and Assemblage bird species.

Collision Risk – along replacement Tees Crossing 400kV overhead line

General information

5.19.15 Appendix 5.C contains details of the Collision Risk Analysis for this scheme; this section provides a summary only.

5.19.16 As part of the scheme design, effort has been taken to minimise the potential effects of the overhead line on local bird populations and assemblages through careful alignment of the route and through incorporating deflectors every 20 m along the earth wire into the scheme design.

5.19.17 Birds are at risk of collision with overhead lines because they are difficult to see. The majority of collisions appear to be associated with earth wires (which are normally installed above the conductors, as is the case for the proposed Teesside scheme). Earth wires are less visible than the conductors and consist of only a single wire rather than a bundle of larger wires which are often present for the conductor cables. Therefore birds seem capable of recognising the supporting towers and conductors, but the earth wire can in certain situations appear almost invisible; in many cases the birds are also able to gain enough height to avoid the conductors but not the highest earth wire[48].

5.19.18 Some species groups (notably those with species which have high wing loading, like swans) appear to be more susceptible to collision with overhead lines[49,50]. Wing loading is the weight of a bird relative to the surface area of its wingspan and is an indication of agility in flight. The bird species for which this collision risk analysis has been undertaken include those from a number of sources, most importantly the Teesmouth and Cleveland Coast SPA (including all waterbird species in the assemblage, other than gulls). Appendix 5.C provides a list of target species for this scheme and the reasoning behind their selection.

5.19.19 Once an overhead line has been erected a number of factors may influence the risk of collision including:

- the location of the overhead line (i.e. is it sited on a regular flight path or main migration route);
- the extent to which birds are flying at heights which put them at risk from collision with the overhead lines;
- the extent to which birds exhibit avoidance behaviour (i.e. alter their flights path to avoid the overhead lines);
- the extent to which some bird species fly at night, a time when overhead lines are much less visible;
- the extent to which the birds' flight patterns change naturally during poorer weather conditions[25] making them more susceptible to collisions;
- the extent of habituation, and;
- the use of bird deflectors to aid birds in avoidance of overhead lines (as incorporated into the scheme design along the overhead replacement route).

5.19.20 Two methods were undertaken within this assessment regarding the application of collision rates, one utilising collision rates as compiled as part of the Beauly to Denny

[48] Paul Bradshaw MBEC. Proposed Beauly to Denny 400kV Overhead Transmission Line, Annex 8, Bird Collision Mortality Assessment 2009.

[49] Janss, G.F.E. 2000 "Avian mortality from power lines: a morphologic approach of a species-specific mortality" Biological Conservation Vol **95**, Issue 3, 353-359

[50] Bevanger, K. 2008 "Bird interactions with utility structures: collision and electrocution, causes and mitigating measures" *Ibis* Vol **136** Issue 4, Pages 412 - 425

ES[35] (Method A) and the second using rates derived from onsite observations (Method B). An additional avoidance rate has also been applied to the results of the CRA to account for the inclusion of bird diverters which is predicted reduce collision rates by at least 50% (this is a conservative estimate, the avoidance rate as a result of the deflectors in reality is likely to be higher).

5.19.21 In reality there are also other factors that will affect the collision rates (e.g. agility of certain bird species or behavioural tendencies when faced with obstructions to a flight path); however, these cannot be quantified so are not included here. It should therefore be noted that the figures resulting from the collision risk analysis are intended as a worst case estimate and it is anticipated that the reality in terms of collision numbers would be significantly lower.

5.19.22 The Vantage Point survey work included counts at dusk and dawn to gather information regarding diurnal and nocturnal flight paths in the area to feed into the assessment.

5.19.23 At present, the collision risk analysis for this scheme has been undertaken on a season by season basis, with completed results for summer 2009 and autumn 2009 and partially completed results for winter 2009/2010 (up until mid January 2010). The analysis has also been undertaken separately for each VP location (River Tees and the Reclamation Ponds). Full collision risk patterns across all seasons for the SPA qualifying species and assemblage will be assessed once the 12 month survey period has been completed in summer 2010.

River Tees – VP1

SPA Qualifying Species

5.19.24 Redshank was the only SPA qualifying species for which an estimate of collisions was calculated at VP1 (as no other SPA qualifying species were recorded in the overhead line corridor at this location during the surveys).

5.19.25 One summer collision is anticipated every 50 years using Method A and every 33 years using Method B. One winter collision is anticipated more than every 100 years using either Method A or Method B. These figures are very low and are not considered to be significant to the SPA population.

5.19.26 No redshanks were recorded passing through the corridor during the autumn work.

SPA assemblage and other species

Summer

5.19.27 The number of collisions estimated for the summer season in Collision Zone 1 and Collision Zone 2 was fairly low for all species, although there is anticipated to be a collision every summer for the assemblage as a whole (using either method) and for the following individual species: black tailed godwit (using either method); common tern (using either method in CZ1 only); and curlew (using Method B only in CZ1 only).

5.19.28 For the overall SPA assemblage within Collision Zone 1 the estimated number of collisions in each summer season was 2 -3 birds per summer using Method A and 4 birds per summer using Method B. Neither of which is considered to represent a significant proportion of the SPA assemblage, representing only 0.01% and 0.02% of the SPA assemblage population respectively

5.19.29 Within CZ2 the number of collisions estimated in each summer season was even lower being under 1 bird per season using Method A and between 1 – 2 birds per season using Method B, again not considered to be significant.

5.19.30 None of these numbers are high and collision risk estimates for all species did not represent over 1% of their respective Tees Estuary populations.

Autumn

5.19.31 Similarly to the summer season the number of collisions in autumn for all species is anticipated to be generally low.

5.19.32 The only species for which a collision is anticipated every autumn is golden plover (using either method in Collision Zone 1 only). Between 3 and 5 golden plover are anticipated to collide with the overhead line each autumn based on this calculation. The estimated number of collisions for golden plover was the result of a single flight of 500 birds through the proposed overhead line corridor at collision height. This flight was unusual for this species (as no other similar flights were recorded all year) and it is likely that result of the collision risk analysis is an overestimation of the actual risk to this species from the proposed overhead line. Furthermore the location where the golden plover flight actually crossed the proposed overhead line was between the Reclamation Ponds and the Sabic petrochemical plant, at this point birds were descending in height back towards roosting sites at Saltholme. If the overhead line was present it is very likely that birds would have simply descended after crossing the overhead line corridor as they did to avoid existing infrastructure in the Sabic site.

5.19.33 Mainly as a result of the golden plover figures (as outlined above) there is anticipated to be a collision every autumn for the SPA assemblage in CZ1, equating to 3-4 birds per season using Method A or 5-6 birds per season (using Method B) every autumn. Even with the golden plover figures included in this, this collision risk is not considered to affect a significant proportion of the SPA assemblage representing approximately 0.03% of the overall SPA population taking the worst case scenario (Method B).

5.19.34 Anticipated collisions within Collision Zone 2 were low for all species and for the assemblage – being every 3 years using Method A or 2 years using Method B.

Winter

5.19.35 The number of potential collisions for all species was low during the winter period (from October to mid January).

5.19.36 For the overall SPA assemblage within Collision Zone 1 it was anticipated that there may be a collision every winter season, however the number of individual birds affected by this ranged from 2 to 3 using Method A and 3 to 4 using Method B every winter season. This is not a significant proportion of the SPA assemblage representing around 0.01% and 0.02% of the SPA population for Methods A and B respectively. Within Collision Zone 2 the number of collisions estimated was even lower with one collision anticipated every fifteen winter seasons using Method A or nine winter seasons using Method B.

5.19.37 The maximum collision rate was estimated for lapwing a collision anticipated every winter in Collision Zone 1 only (using Method A or B) and for mallard in Collision Zone 1 only (using Method B only). The numbers of individual lapwing or mallards anticipated to collide with the overhead lines each winter were very low (no more than 2).

Reclamation Ponds – VP2

SPA Qualifying Species

5.19.38 Redshank (summer, autumn and winter) and sandwich tern (summer only) were both recorded at the Reclamation Ponds within the collision height band of the overhead line corridor. These are both qualifying species for the SPA.

5.19.39 Collisions of individual redshank are only anticipated every: 33 summer seasons (using Method A) or every 20 summers (using Method B); every 82 autumn seasons (using Method A) or every 50 autumn seasons (using Method B); and every 100 winter

seasons (using Method A) or every 50 winter seasons (using Method B). These figures are not significant.

5.19.40 Collisions of individual sandwich tern are anticipated every 5 summers (using Method A) or every 3 summers (using Method B). Although more regular collisions are anticipated than for redshank, these figures are still not considered to be significant.

SPA assemblage and other species

Summer

5.19.41 The number of collisions estimated for the summer season was low for all species.

5.19.42 For the overall SPA assemblage within the Collision Zone it was anticipated that there may be a collision every summer season; however, the number of individual birds affected by this ranged between 2 to 4 birds each season (depending on either Method A or Method B). This represents around 0.01% and 0.02% of the SPA population respectively and is not a significant proportion of the SPA assemblage.

5.19.43 The maximum collision estimate was calculated for common tern with a collision likely every year of between 0 - 2 birds in each summer season. This was the only species recorded with an estimated collision number over one bird per summer.

Autumn

5.19.44 Numbers of potential collisions for all species is anticipated to be fairly low during the autumn at the Reclamation Ponds. For the overall SPA assemblage within the Collision Zone the estimated number of collisions per autumn varied between 4 -5 (using Method A) and 7 – 8 birds (using Method B). This represents around 0.02% and 0.04% of the SPA assemblage for Methods A and B respectively and is not considered to be significant proportion of the SPA assemblage.

5.19.45 There is anticipated to be a collision every autumn at the reclamation ponds for: lapwing (using either method); shoveler (using Method B only) and wigeon (using Method B only).

5.19.46 No species was estimated to have a number of collisions representing over 1% of its Teesside population.

Winter

5.19.47 Numbers of collisions for all species at the Reclamation Ponds were extremely low across the winter from October to mid January. For the overall SPA assemblage, a collision is anticipated every three winter seasons using Method A or every winter season using Method B (but less than one collision is anticipated in each season even using this method). This is not a significant proportion of the SPA assemblage representing less than 0.01% and 0.02% of the SPA population for Methods A and B respectively.

5.19.48 None of the species recorded are anticipated to have collision in every winter season.

5.19.49 It should be noted that the collision estimates for the winter will be an underestimate as surveys have not yet been completed for the remaining four winter visits. Furthermore flight activity at this site was significantly different during the freezing conditions in December and January with very low numbers of birds flying to and from the Reclamation Ponds during this period.

Collision Risk Summary

5.19.50 From the collision risk analysis it can be seen that for the proposed overhead line the number of birds which are anticipated to collide with the overhead lines each season is low overall even when taken as a worst case scenario. Also there is anticipated to be a

low and not significant collision risk for SPA qualifying species that have been recorded (redshank and sandwich tern).

5.19.51 When taken as an overall sum through the 9 month survey period (May 2009 – mid January 2010) for the full length it is anticipated that using this precautionary approach (and worst case scenario) there will be collisions each year for the SPA assemblage with up to seventeen birds colliding per year (using Method A) or up to twenty-six birds colliding per year (using Method B). Based on the figures above, this equates to 0.08% (using Method A) or 0.12% (using Method B) of the SPA assemblage colliding with the overhead lines per year.

5.19.52 Although these figures seem fairly high, it should be re-emphasised that the collision risk analysis has followed a precautionary approach and that these figures are likely to be the worst case scenario; although, when the full year of data has been collated the numbers may increase slightly.

5.19.53 Autumn for both the River Tees and the Reclamation Ponds seems to be the peak activity period throughout the surveyed year (this may change following the further winter and spring surveys); although this is largely a result of a minimal number of flights from large single species flocks of lapwing and golden plover. Both the River Tees and the Reclamation Ponds (sections of the proposed overhead lines) were estimated to have a similar number of collisions per year based on the survey information gathered to date.

Collision Risk – existing network, off-site

5.19.54 The removal of the existing overhead line will reduce the number of collisions for Teesside bird populations including SPA assemblage species at this specific location (closer to the river mouth). Collisions may currently take place at the existing river crossing and also along the northern edge of the Sabic plant where the new line will connect in. It is unknown how many birds collide with the current overhead line; however it may be lower than that anticipated for the proposed replacement line as birds will currently be habituated to the existing overhead lines and also the overhead lines do not run over or immediately adjacent to the SPA or areas of bird interest. The existing lines do not have any bird deflectors present.

5.19.55 No study has been undertaken as part of this assessment of the rates of bird collision on the existing network around the River Tees; however, the addition of deflectors along earth-wires off-site (length of approximately 2 km around the replacement route) as part of this scheme, will reduce the numbers of bird collision in these areas.

5.19.56 When this overall reduction in collision risk across the localised network is taken into consideration along with the removal of the existing risk at the existing Tees Crossing point, there is likely to be an overall net benefit for bird populations in the area. These benefits will compensate for the small number of predicted collisions at the replacement overhead line until birds become habituated.

Barrier Effects

5.19.57 There are unlikely to be any barrier effects as a result of the proposed overhead line. The main movements of birds on Teesside which cross the proposed overhead line include birds travelling up and down the River Tees, birds travelling from the River Tees to Saltholme and birds travelling from the Reclamation Ponds to Seal Sands.

5.19.58 The majority of birds travelling down the River Tees are flying just above the water, very few birds are recorded at the height of the crossing and it is unlikely that any movement of birds will be hindered. Birds travelling between the river and Saltholme will still be able to commute between these two sites and only minor adjustment will be made of flight activity as birds will have to enter or exit the river slightly to the west, as many

already do (as this is in fact more of a direct route between these two areas). Lastly birds travelling between the Reclamation Ponds or the River Tees and Seal Sands already have to navigate across the existing overhead lines. Therefore the new overhead lines are unlikely to pose a barrier effect not already overcome by birds traversing the existing overhead lines. The results of the comparative studies at Blyth Estuary and Clackmannanshire Bridge would appear to also support this conclusion.

5.19.59 It should also be stated that while overhead lines do pose a significant obstacle to bird species, birds can still gain height to fly over them or fly through the wires. So their effects as a barrier are probably to a limited level and as seen north of the Reclamation Ponds when birds do want to traverse overhead lines they do so with little difficulty.

5.20 Evaluation of Effects on the SPA/Ramsar and its components

General Evaluation

5.20.1 No SPA habitat loss or deterioration in habitat quality will result from the proposed scheme.

5.20.2 Effects on the SPA qualifying species and assemblage during construction and maintenance operations are anticipated to be minimal – short-term and localised displacement of birds.

5.20.3 There is also anticipated to be a low and not significant collision risk for SPA qualifying species that have been recorded (redshank and sandwich tern) once the wires are in place.

5.20.4 Of the SPA assemblage (and other target species selected for this assessment) it is anticipated that there will be a collision every year with the replacement overhead line. Using a precautionary approach and figures that give a worst case scenario (i.e. figures used have been selected to give worst case and the reality is likely to be significantly lower – both in terms of birds agility/habituation as well as the predicted baseline conditions at the Reclamation Pond following infilling) it is anticipated that there will be up to seventeen birds (from the target species list, mostly those on the SPA assemblage) colliding per year using Method A or up to twenty-six birds per year using Method B.

5.20.5 Based on the figures above, this equates to around 0.08% (using Method A) or 0.12% (using Method B) of the SPA assemblage colliding with the overhead lines per year. These figures are much less than 1% of the SPA population number and are therefore not considered to be a significant proportion of the assemblage.

Evaluation of Impacts to the Favourable Conservation Status & Conservation Objectives for the SPA/Ramsar

Favourable Conservation Status of SPA Qualifying Populations and SPA Assemblage

5.20.6 An impact on a particular species or the assemblage of the SPA/Ramsar has been judged as being significant where the assessment shows that adverse impacts to the favourable conservation status of a species are likely to occur. This includes restricting a recovering species or habitat from reaching favourable conservation status at a regional, national or international level. The conservation status of a species is defined in the EC Habitats Directive (92/43/EC) as follows:

… the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations.

5.20.7 The qualifying species for this SPA/Ramsar are little tern (breeding), sandwich tern and little ringed plover (on passage) and knot and redshank (over winter). It is not

anticipated that the predicted levels of disturbance/displacement during construction or the levels of collision on these species will be significant or will impact on the current conservation status of these species.

5.20.8 The SPA qualifies by supporting a wintering waterfowl assemblage of European importance consisting of at least 21,406 individuals of various different species including sanderling, lapwing, shelduck and cormorant. Although some waterbird collisions are anticipated with the replacement overhead line (as outlined above) and some minor disturbance may occur during construction, taking the scheme design, use of deflectors and other mitigation measures that will be implemented into account the impacts on the current populations of species present is not anticipated to be significant, affecting at worst only a very small percentage of the assemblage – which is well below the 1% threshold of significance. This assessment is based on existing data (gathered between May 2009 and mid January 2010 and will be reviewed when the full 12 month dataset has been collated).

Conservation Objectives for the SPA/Ramsar

5.20.9 A clear set of conservation objectives have been drawn up by Natural England for each of the SSSIs which make up the Teesmouth and Cleveland Coast SPA[51]. Objectives in this document are given for the species and habitats which are listed on the SPA citation; this document is currently still only available in draft. As such the following criteria have been drawn up from this draft document to define the conservation objectives of this project for which the impact assessment will be undertaken:

- Subject to natural change, to maintain in favourable condition the habitats of the Annex 1 species (little tern and sandwich tern) which contribute to the internationally important populations of Teesmouth and Cleveland Coast SPA, with particular reference to: intertidal sand and mudflats, and; coastal waters.
- Subject to natural change, to maintain in favourable condition the habitats of the migratory species (knot and redshank) which contribute to the internationally important populations of the Teesmouth and Cleveland Coast SPA, with particular reference to: rocky shores; intertidal sand and mudflats; saltmarsh and; freshwater marsh.
- Subject to natural change, to maintain in favourable condition the habitats of the waterbird species (**the assemblage**) which contribute to the internationally important winter assemblage (>20,000 individuals) of the Teesmouth and Cleveland Coast SPA, with particular reference to: rocky shores; intertidal sand and mudflats; saltmarsh, and; freshwater marsh.

5.20.10 There will be no loss of habitats for the species and assemblage listed above and no deterioration in their quality is predicted as a result of the scheme. There are therefore anticipated to be no significant impacts on the conservation objectives listed above as a result of this scheme.

5.20.11 In addition to the above, the draft conservation objectives document outlines a number of specific key attributes for species and the overall assemblage which must be maintained to retain favourable conservation status.

5.20.12 The pertinent conservation objectives to this project are listed below in Table 5.4. Also provided in this table (final column) is an assessment of whether or not this scheme is predicted to impact on the success of achieving these conservation objectives.

[51] Draft Copy of Teesmouth and Cleveland Coast SPA Conservation Objectives at SSSI level. 2009, Natural England

Table 5.4 – Table of Summary of key attributes and targets for the SPA together with impact summary

Criteria Feature	Attribute	Measure	Target	Impact predicted from this scheme
Annex 1 species Migratory species >20,000 Assemblage	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or displacement of birds from an established baseline.	No significant reduction in numbers is anticipated (see collision risk section) and displacement during construction is anticipated to be temporary and localised only within the SPA, timing of works will also avoid key SPA periods.
Annex 1 species Migratory species >20,000 Assemblage	Extent and distribution of habitat	Area (h)	No decrease in extent from an established baseline.	No decrease in area of habitat is predicted.
Annex 1 species Migratory species >20,000 Assemblage	Visibility	Open areas with short vegetation or bare ground	Short vegetation (<10cm) allowing unrestricted views (>200m) at roost sites during the non-breeding season.	The overhead line has been designed to run adjacent to the Sabic plant where it runs through the areas of open grassland, rather than through the open area itself. This will minimise loss of habitat in this area and minimise obstruction in existing areas of opens space.
Redshank	Landscape	Open terrain, relatively free of obstructions (anti-predator, display)	Areas with unrestricted views over >200m and an effective field size of >10ha.	Although the overhead lines will run through existing redshank roosting areas (across the mudflat), it is not anticipated that this species will be significantly affected by the route over the Tees due to its height above ground level and as substantial areas of existing infrastructure are present in the surrounding area. Where the line runs through the grassland area between the River Tees and the Reclamation ponds, it has been designed to run alongside the existing infrastructure of the Sabic plant to minimise the impact on 'views' in this area.

5.20.13 The effects of the proposed Tees Crossing asset replacement scheme are not anticipated to have a significant impact on achieving the conservation objectives outlined above.

5.20.14 Provision of deflectors on the existing network around the new overhead line may in time reduce the collision risk for the SPA assemblage in the overall area (particularly when viewed in conjunction with measures being used in the Saltholme RSPB reserve on the lower voltage wires). Although this may be of benefit, the impact of this is not anticipated to be significant.

5.21 Cumulative and In-combination Effects

5.21.1 Britmag Residential development 6.5 km to the north of the proposed Tees Crossing Asset Replacement Scheme has undergone Appropriate Assessment in relation to the level of impact on the nearby Teesmouth and Cleveland Coast SPA and Ramsar site. The concerns expressed during the assessment of this project related to disturbance of birds for which the European site is designated as a result of increased recreational activities, increased disturbance from dogs and disturbance of birds during construction and land reclamation activities. These concerns were mitigated for by timing the works for the summer months outside the most sensitive season for birds and instituting and monitoring a ban on dogs 'off lead' on the foreshore. As a result of these mitigation measures it was considered that no significant impacts would occur.

5.21.2 As this disturbance/potential impact has been mitigated for and is of a substantially different nature to those within the scope of the Tees Crossing Asset Replacement Scheme, no potential cumulative impacts are foreseen from this development when viewed in conjunction with the overhead lines.

5.21.3 The Teesside Environmental Reclamation & Recycling Centre (TERRC), approximately 5 km to the north of the Tees Crossing Asset Replacement Scheme has also undergone Appropriate Assessment in relation to the nearby Teesmouth and Cleveland Coast SPA and Ramsar. Concerns raised within this assessment included habitat loss due to loss of intertidal mud flat and alteration of tidal propagation, disturbance to birds and pollution and consequent drop in water quality. This disturbance/potential impact was mitigated for as part of this project and the outcome of the assessment was that there would be no adverse impact upon the SPA/Ramsar site. No habitats similar to those affected by the TERRC scheme will be affected by the Tees Crossing Asset Replacement Scheme. No cumulative impact is predicted due to the mitigation measures listed above and the relatively minor level of the works on the Tees Crossing Asset Replacement Scheme and the temporary nature of the disturbance impacts predicted.

5.21.4 Tees Renewable Energy Plant, a biomass fired power station located on the south side of the river approximately 1.2 km north-east of the Tees Crossing Asset Replacement Scheme is proposed on land of very low ecological impact with no adverse effects on ecology predicted and is therefore unlikely to have any cumulative impact with the Tees Crossing Asset Replacement Scheme.

5.21.5 The infill of the Reclamation Ponds as a result of the Thor Cogeneration Project has already been taken into account in the discussion of the effects of this scheme. This development will constitute a considerable loss of habitat in the area for waterbirds. There is also likely to be a disturbance impact associated with the construction of the Thor Cogeneration Project on birds in the area. The Environmental Statement for the scheme found that no significant impacts were predicted (or were considered extremely unlikely) on the nearby SPA (specifically Dorman's Pool closest to the proposed works), on the SPA qualifying or legally protected species using this waterbody, or on the SPA assemblage as a whole. Mitigation to be implemented as part of this scheme includes the provision of bunds between the Reclamation Ponds and Dorman's Pool (already in place), environmental awareness training for site staff and bird monitoring throughout construction and at least one year once operational. While the Reclamation Ponds are not part of the SPA the site supports significant proportions of the SPA assemblage (field surveys recorded 7.2%). When taken in combination with the overhead line construction the Tees Crossing Asset Replacement scheme is considered to contribute little to the overall cumulative impact of the two schemes – the power station construction being the more significant.

5.22 Summary

5.22.1 Ecological input was provided from an early stage of the scheme, to assist in the identification of a preferred route that, where possible, minimised adverse effects on ecological features. Measures (including provision of deflectors every 20 m on the proposed line and 2 km of the existing network) have been incorporated into the scheme design and into the construction programme and method (e.g. appropriate timing of works and use of screening at appropriate locations) to avoid and minimise impacts on the local bird populations.

5.22.2 Following a data collation exercise in April-May 2009, an initial scoping visit was undertaken on 29th May 2009 alongside the first Vantage Point survey. Following this initial visit to site and consultation with Natural England a detailed ornithological survey scope was produced for a 12 month period dating from May 2009 to May 2010. This survey scope included two main survey types: Vantage Point surveys and waterbird surveys. This chapter has been based on information gathered between May 2009 and January 2010 only; a supplementary report will be produced following completion of the full 12 month survey period in May 2010 presenting the full results and a detailed impact assessment. In addition to the surveys at the proposed overhead line location, comparative surveys were also undertaken in winter 2009/2010 at two other locations (the Blyth Estuary in the north-east of England and the Firth of Forth in the south-east of Scotland) to examine the potential issue of displacement (following request by RSPB in December 2009).

5.22.3 An Appropriate Assessment screening will be submitted to Natural England in March 2010 taking into account the bird survey results as detailed in this chapter.

5.22.4 There are considered to be three main potential effects of overhead line installation on birds: disturbance, displacement and collision risk.

5.22.5 Data gathered to date indicates that once mitigation has been taken into account there will be short-term negative impacts on one of the SPA qualifying species (redshank) and on assemblage species at the River Tees through minor and temporary levels of disturbance during the construction phase of the works; however as this work will be restricted to the summer months only (other than small-scale vegetation clearance), this impact is not anticipated to occur during periods for which the SPA assemblage or qualifying features are designated (breeding little tern are not anticipated to be present in this area). Consideration will be given to extending this avoidance period to also include the main passage migration season for sandwich tern and ringed plover if the spring 2010 survey results indicate this is necessary (currently only low numbers of these species have been recorded and this is not considered necessary). Short term displacement from habitat surrounding the crossing may also occur during construction although it is thought that this will not be permanent and displacement will be localised only and that birds will quickly habituate to the new crossing. The visual screening that will be used will reduce this impact.

5.22.6 At the Reclamation Ponds, it is more difficult to predict the likely effects of disturbance as the predicted baseline will be significantly different from the present situation as the waterbody is likely to be infilled for the permitted Thor Cogeneration Plant prior to commencement of construction. It is likely that the effects from the overhead line on birds using the pond will be similar to those at the River Tees, with birds only being temporarily affected by the construction process and no significant impact on the SPA qualifying features being anticipated.

5.22.7 Permanent displacement of birds (including redshank on the exposed mudflat) is considered highly unlikely. An indicative study of two comparative sites where overhead lines crossed estuaries (at the Blyth and the Forth Estuaries) and information gathered regarding bird activity close to the existing overhead lines at Teesside has indicated that

birds habituate to the presence of overhead lines fairly readily and levels of activity underneath overhead lines is more likely to be influenced by habitat type than as a result of the presence of the infrastructure.

5.22.8 It is likely that there will be some bird collision associated with the proposed overhead line, although data gathered to date indicates that this is unlikely to be significant and in particular, only low numbers of collisions are anticipated for the SPA qualifying species in the area.

5.22.9 The impact of the scheme on the habitats within the nearby designated sites is considered to be neutral. Whilst there will be some effects on bird species and assemblages present, there are not considered to be any effects that will be significantly detrimental to fulfilment of the SPA conservation objectives for this site or that will affect the ability of the populations to survive at their current conservation status.

6 LANDSCAPE AND VISUAL

6.1 Introduction and Terms of Reference

Background

6.1.1 ASD Atkins was commissioned to undertake a Landscape Assessment in November 2009 to establish the potential landscape effects of the proposed asset replacement scheme, by National Grid. This assessment will form part of the Environmental Statement being prepared by Atkins.

6.1.2 This Landscape and Visual assessment has been undertaken in accordance with standard recommended methodologies as referenced under 'Methodology' section 6.6.

6.1.3 The proposed works are to be undertaken within an area that crosses the River Tees between Middlehaven Dock and Tees Dock, north east of Middlesbrough in the North East of England. The site in its regional and local context is shown respectively on the Context Plan (Figure 6.1) and on the Site Location Plan (Figure 6.2).

6.2 Proposed Scheme

6.2.1 The proposed scheme assessed for this Environmental Statement is for the diversion of a section of National Grid's 275/400kV overhead line running between Saltholme, on the north bank of the River Tees and Grangetown on the south bank of the river.

6.2.2 The proposed route alignment considered as part of this assessment is shown on the Site Location Plan (Figure 6.2).

6.2.3 The proposed route alignment would require the construction of approximately 16 towers, with connecting overhead lines. The existing route has 12 towers.

6.2.4 The proposed towers would be approximately 50-55m in height, with the exception of the two towers connecting the overhead lines crossing the River Tees which would be approximately 112-116m high. No fencing will be in place once the towers are constructed. The existing towers are between 51-63m high with the two crossing towers being 113m and 116m high respectively.

6.3 Construction Phase

6.3.1 The construction of the new route would be undertaken prior to the dismantling of the existing route. The construction period is expected to be from January 2011 to March 2013, with all work in connection with the erection of the new route completed by October 2012, and for the remaining period being dismantling only.

6.3.2 Work areas of approximately 40m x 40m will be demarcated around each tower location during the construction of the towers.

6.3.3 The location of the site compound is not confirmed at this time, however the preferred location is adjacent to the access road off the A178 leading east towards the most northern extent of the proposed new route alignment.

6.3.4 Temporary access roads will be required to all new tower positions, the approximate locations of these towers are shown on the Site Location Plan (Figure 6.2).

6.4 Previous Studies, Scoping and Consultation

Proposed Routeing Study

6.4.1 A Proposed Routeing Options Study was published in July 2008. The report was based on a primarily desk based study of the constraints and opportunities influencing potential options for the diversion of the overhead line. Its purpose was to inform the National

Grids choice in the selection of a preferred route alignment for the asset replacement / refurbishment of the overhead line. The report has also provided a basis for consultation with all of the relevant parties having an interest in, or affected by, the proposed route alignment selected for National Grid.

6.4.2 In terms of landscape baseline the Options Study considered a 2km study area. The following summarises the features identified during this study.

- Residential Properties
- European Long Distance Footpath
- Public Rights of Way
- Cowpen Bewley Woodland Country Park
- Middlesbrough Conservation Area
- Dormanstown Conservation Policy
- Coatham Sands Special Landscape Area
- Public Open Spaces
- Registered Park and Garden

6.4.3 The following recommendations were included within the study for consideration in any further assessment:

- Determination of a specific Zone of Visual Influence
- Assessment of Landscape Character Impacts

6.4.4 It was stated within the Options report that an arboricultural survey to be undertaken to identify the constraints posed by trees – this has not been deemed necessary due to the lack of trees identified at the proposed tower locations (Phase1 Habitat Plan). However, please refer to the ecology chapter for reference to any nearby trees and hedgerows of ecological significance that were identified during the Phase 1 Habitat Survey.

Consultation and Scoping

6.4.5 Scoping consultation was undertaken with the following organisations for their comments on the preferred route; their responses in relation to landscape are contained within Appendix 6.1:

- Natural England
  Scoping response January 2010
- Redcar and Cleveland Borough Council
  Scoping response December 2009

6.4.6 These comments have be taken on board and considered within this study where appropriate.

6.5 Study Area

6.5.1 The study area subject to this landscape and visual impact assessment is based on an area radiating 5km around the proposed route alignment and the existing route, the extent of the study area is delineated on Figure 6.2. This has been increased from the 2km Study Area considered within the initial study undertaken by others, to accommodate the Theoretical Zone of Visual Influence that has been calculated for the proposed route alignment and the existing, which is shown in Figures 6.3 and 6.4.

6.5.2 The Theoretical Zone of Visual Influence does extend beyond 5km in some places, generally as a result of the visibility of the two towers that will cross the Tees, these would be twice as high as the rest of the towers proposed.

6.5.3 However, based on the following reasoning that;

- the visual impact of an object as viewed in the landscape diminishes at an exponential rate as the distance between the observer and object increases. The visual impact at 1000m would be approximately a quarter of the impact viewed from 500m and impacts at 2000m would be one sixteenth of that viewed at 500m[52].
- also based on research in respect of perceptibility of pole diameters and viewing distances; *that the acuity of the human eye to view objects decreases with an increase in distance and a reduction of the diameter of the object* [53] it is not inconceivable that in the terms of human perception of the object that would be viewed for this assessment, an Overhead Power Line tower made up of a lattice frame structure, that these conclusion in terms of perceptibility and distance is relevant to consider when delineating the study area for this assessment.

6.5.4 It was assessed that at a distance of 5km the towers would not be discernable in the context of the existing views and that the perceptibility to the human eye would be substantially decreased. From certain locations there could be the potential for the 2 crossing towers to be discernible at a greater distance than 5km, however this is only likely to occur from certain locations where they break the skyline. Therefore, it is considered that any potential visual impacts would not be significant and that the distance of 5km would form an appropriate radius for the delineation of the study area for the landscape and visual assessment.

6.6 Methodology

Assessment Approach and Limitations

6.6.1 The work was undertaken in accordance with methodologies contained within the '*Guidelines for Landscape and Visual Assessment'* (GLVA) second addition, published jointly by The Landscape Institute and The Institute of Environmental Management and Assessment (2002) guidance and Landscape Character Assessment Guidance for England and Scotland published by the Countryside Agency and Scottish Natural Heritage in 2002. Consideration of guidance within the '*Design Manual for Road and Bridges'* (DMRB) Volume 11, Section 2, Part 5 HA 205/08 (August 2008) and Volume 11, Section 3, Part 5 (June 1993) *Landscape Effects,* has also been considered as due to the linear nature of the proposed scheme it is felt that appropriate techniques can be applied to this assessment. The Countryside Agency and Scottish Natural Heritage, Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity (2004) has also be utilised within this assessment.

6.6.2 In accordance with the above recommended methodologies the following approach was taken:

[52] HULL, R.B. and BISHOP, I.D. (1988). Scenic Impacts of Electricity Transmission Towers: the Influence of Landscape Type and Observer Distance.

[53] University of Newcastle (2002) Visual Assessment of Windfarms Best Practice. *Scottish Natural Heritage Commissioned Report* F01AA303A.

- qualitative assessment of the baseline conditions, including designated sites and elements, features and characteristics of importance and sensitive receptors;
- systematic identification of impacts and their location;
- estimation of the magnitude of potential construction and operational impacts;
- evaluation of significance of effects; and
- identification of appropriate mitigation.

Viewshed Modelling

6.6.3 Viewshed analysis modelling had been used to determine the extent of the theoretical visibility of the proposed towers. The Theoretical Zone of Visual Influence for the proposed towers is shown on Figure 6.4. The Viewshed modelling was calculated using a Digital Surface Model (DSM) with a resolution of 2m x 2m laid over an Ordnance Survey base map at 1:50,000. The extent of visibility of the tower locations is based on the visibility from 1.6m above ground level (average adult eye line). The Viewshed Models do not include the extent of the visibility of the overhead lines between the towers (just the towers), however it has been assumed that when more than 1 tower is visible then connecting overhead line is visible.

6.6.4 The viewshed model has been used to delineate the extent of the Theoretical Zone of Visual Influence of the proposed route alignment.

6.6.5 As the proposals are assets renewal and are the replacement of existing towers in different locations the establishment of the extent of the current visibility of the tower locations has been established through viewshed analysis (Figure 6.3) to enable a comparison between the current and proposed visibility.

Photomontages

6.6.6 Photomontages have been produced for proposed route alignment to assist in the assessment of changes in views from 4 identified viewpoints. These 4 viewpoint locations were agreed with Redcar & Cleveland and Stockton-on-Tees Borough Councils. These photomontages are included in Appendix 6.2. The photomontages have been compiled in line with Landscape Institute advice note 01/09[54].

Desk Top Study

6.6.7 A search for landscape character assessments and landscape designations on a national, regional and local basis was made.

6.6.8 Mapping on both local and a wider area was obtained in order to evaluate topography, vegetation and land use and to identify public rights of way and potential viewpoint locations. Aerial photographs were also obtained to supplement the mapping.

6.6.9 Baseline data collection for Landscape and Visual Effects involved reference to the following documents:

- Middlesbrough Core Strategy – adopted February 2008
- Middlesbrough Council Draft Public Rights of Way Improvement Plan 2007 – 'Middlesbrough Moving Forward'
- Stockton on Tees Local Plan Alteration (Saved Polices) – adopted march 2006
- Stockton on Tees Public Rights of Way Guide 2008
- Stockton on Tees Rights of Way Improvement Plan 2008-2018

[54] Landscape Institute Advice Note 01/09: Use of Photography and Photomontage in Landscape and Visual Assessment.

- Hartlepool Local Plan – adopted April 2006
- Hartlepool Borough Council Public Rights of Way Improvement Plan 2007 – 'Countryside Access; Our Way Forward'
- Hartlepool Local Character Assessment – 2000
- Redcar and Cleveland Core Strategy – adopted July 2007
- Redcar and Cleveland Landscape Character Assessment, April 2006
- Tees Valley Structure Plan – adopted February 2004
- OS Landranger (93) 1:50 000;
- The Countryside Commission (1996), Countryside Character Volume 1: The character of England's natural and manmade landscape.
- Natural England (2005). The Character of England Landscape, Wildlife and Cultural Features Map.
- North East Regional Spatial Strategy – July 2008

6.6.10 The following were contacted for confirmation on baseline data information:

Redcar and Cleveland Borough Council
Public Rights of Way
Tree Preservation Orders

Stockton on Tees Borough Council

Public Rights of Way
Tree Preservation Orders

Hartlepool Borough Council

Public Rights of Way

Field Study

6.6.11 To supplement and verify information an assessment in the field was undertaken by Chartered Landscape Architects. The field study was undertaken during December 2009 and January 2010, when the majority of vegetation was devoid of leaves allowing clear views of the study area. The weather was dry with cloud cover and intermittent sunshine.

6.6.12 Existing site features were recorded and 'baseline' conditions of the surrounding area were established to form a qualitative assessment and identify important features and potential sensitive receptors. Photographs were taken from key, publicly accessible, viewpoints. A photographic record is appended as Appendix 6.3.

The Identification and Classification of Potential Impacts

6.6.13 This appraisal considered potential impacts on the landscape and visual amenity that may arise as a result of the proposed route alignment. Potential impacts have been considered for the construction and operational phases and also during the period in which the overlap of the existing and the proposed route would both be present, where appropriate.

6.6.14 A Zone of Visual Influence (ZVI) has been delineated (shown on Figure 6.4) to show the potential extent of visual influence of the proposed towers. The ZVI is indicative of the part of the landscape from which views of the proposals might be gained. It is theoretical and therefore does not imply that views would be possible from all points within the area delineated, nor does it indicate that all the development would be visible.

6.6.15 In order to make an assessment of the significance of impacts identified the value or sensitivity of the receptor has been determined and the magnitude of the impact evaluated.

6.6.16 No night time working is required during construction or destruction.

6.6.17 An environmental impact is the process whereby change is brought about on existing or any potential future receptors (identified as relevant) as a result of a proposed scheme. An environmental effect is the consequence(s) of the environmental impacts on identified receptors.

Environmental Value and Receptor Sensitivity

6.6.18 Value is the classification of a receiving landscape's ability to accommodate change as a result of a development without detrimental effects on landscape elements and landscape character[55].

6.6.19 Sensitive visual receptors, in short, are classed as those who are engaged in activities whose attention in focussed on the view or on no other activity, for example users of public rights of ways and residential properties. A receptor is classed as an element or assemblage of elements that could be affected (directly and indirectly) by a proposed development.

6.6.20 An assessment of the landscape quality and sensitivity within the study area has been determined using the criteria found in Table 6.1.

Table 6.1 – Environmental Value and Receptor Sensitivity

Value/Sensitivity	Criteria	
	Description	Examples
Very High	Very high importance and rarity, international scale and very limited potential for substitution	Internationally or Nationally recognised e.g. World Heritage Sites, National Parks and AONBs. Long distance or national recreation routes
High	High importance and rarity, national scale and limited potential substitution. Users of footpaths used for recreation purposes. Residential properties.	Nationally and regionally recognised e.g. part of National Park, AONB all or great majority of other non statutory landscape designated areas. Routes used for recreational purposes.
Medium	High or medium importance and rarity, regional scale, and limited potential for substitution. Users of recreational routes, whose main objective is not the appreciation of views achievable.	Nationally, regionally recognised e.g. localised areas within National Park, AONB or other landscape designation area. All or great majority of area of local landscape importance.

[55] Guidelines for Landscape and Visual Impact Assessment (second edition), the Landscape Institute, Institute of Environmental Management and Assessment 2002

Low	Low or medium importance and rarity, local scale. Properties used for commercial and industrial uses.	Areas identified as having some redeeming features and or features identified for improvement.
Negligible	Very low importance and rarity, local scale.	Areas identified for recovery

(Based on Guidelines for Landscape and Visual Impact Assessment 2nd Edition 2002 and DMRB V2 Section 2 Part 5, August 2008)

Evaluating Magnitude of Potential Impact

6.6.21 In addition to the identification of receptor value and/or sensitivity, Impact Assessment also requires that the magnitude of potential impacts be determined. The magnitude of the impacts identified within this appraisal are classified using the criteria and grading system found in Table 6.2.

Table 6.2 – Magnitude of Impact Classification

Magnitude (size, extent, degree, angle and duration)[56]		Criteria
Major	*Beneficial*	Large scale or major improvement/restoration of key elements/features/characteristics quality.
	Adverse	Total loss of, or a major alteration to key elements/features/characteristics of the baseline i.e. pre-development landscape or view and/or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape. Development would form a dominant/major and immediately apparent part of the scene. Changing the overall character of the scene.
Moderate	Beneficial	Partial improvement in quality/addition of one or more key elements/features/characteristics.
	Adverse	Partial loss of, or alteration to one or more key elements/features/characteristics of the baseline i.e. pre-development landscape or view and/or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape. Development would form a visible and recognisable new element within the scene and would be readily noticed by the observer.
Minor	Beneficial	Minor improvement in quality/addition of one key element/feature/characteristic.
	Adverse	Minor loss of, or alteration to, one key element/feature/characteristic of the baseline i.e. pre-development landscape or view and/or introduction of elements that may not be considered uncharacteristic when set within the attributes of the receiving landscape. Development would be a minor component of the wider view and scarcely appreciated or missed by the casual observer. Awareness of the proposals would not have a marked effect on the scene.

[56] Guidelines for Landscape and Visual Impact Assessment (second edition), the Landscape Institute, Institute of Environmental Management and Assessment 2002

Negligible	Beneficial	Very minor improvement in quality of one or more elements/features/characteristics. Change would be barely perceivable.
	Adverse	Very minor loss or alteration to one or more key elements/features/characteristics of the baseline i.e. pre-development landscape or view and/or introduction of elements that are not uncharacteristic with the surrounding landscape. Change would be barely perceivable. Development would be scarcely appreciated and, on balance, would have little effect on the scene.

(Based on Guidelines for Landscape and Visual Impact Assessment 2nd Edition 2002 and DMRB V2 Section 2 Part 5, August 2008)

Evaluating the Significance of Potential Impacts – Classification of Effects

6.6.22 The significance of potential impacts is assessed by combining the value/sensitivity of the asset or receptor and the anticipated magnitude of the impact. The table below (Table 6.3) states the outcomes of these combinations and will be referred to as the significance of the predicted impacts, for the purposes of this report.

Table 6.3 – Significance Matrix of Potential Effects

VALUE/SENSITIVITY	**Very High**	Neutral	Slight	Moderate/ Large	Large or Very Large	Very Large
	High	Neutral	Slight	Moderate/ Slight	Moderate/ Large	Large/ Very Large
	Medium	Neutral	Neutral/ Slight	Slight	Moderate	Moderate/ Large
	Low	Neutral	Neutral/ Slight	Neutral/ Slight	Slight	Slight/ Moderate
	Negligible	Neutral	Neutral	Neutral/ Slight	Neutral/ Slight	Slight
		No Impact	**Negligible**	**Minor**	**Moderate**	**Major**
		MAGNITUDE OF IMPACT				

(Based on Guidelines for Landscape and Visual Impact Assessment 2nd Edition 2002 and DMRB V2 Section 2 Part 5, August 2008)

Assessing Cumulative Landscape and Visual Effects

6.6.23 Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity that may result from the proposed development in conjunction with other developments, including those likely to occur in the foreseeable future.

6.6.24 Cumulative effects can also arise from the intervisibility of a range of developments or from the combined effects of individual components of the proposed scheme. Potential short term effects that may arise during the period in which the proposed route and existing route would both be present.

6.6.25 The above potential sources of cumulative effects are considered within this assessment where appropriate.

Limitations

6.6.26 Comments made in terms of receptors located within private land, such as residential properties, are based on assumptions of what could be visible from any vantage points within the properties made from the nearest publicly access place.

6.6.27 The field assessment was undertaken during the winter months, when leaves are devoid of trees and visibility of structure and landscape features are not screened by trees in full leaf.

6.6.28 The Viewshed modelling is based on what would be visible from a height of 1.6m (the recognised average eye level of an adult). The theoretical ZVI produced indicates how many Towers would be visible but does not indicate whether all or just a part of the Tower would be visible. This judgement has been made by experienced Landscape Architects based on desk study information and field study observations.

6.7 Baseline Description of the Existing Landscape and Visual Resources of the Area

6.7.1 The section below includes a review of the existing landscape and visual resources of the area in the vicinity of the proposed overhead line based on a desktop study, field survey and analysis. The value attributed to the relevant planning designations for the purposes of this assessment are identified within the Landscape and Visual Assessment Schedule (Appendix 6.4).

Relevant Planning Policy and Designations

6.7.2 The assessment study area lies to the northeast of Middlesbrough and falls within the administrative areas of Stockton-on-Tees, Middlesbrough, Hartlepool and Redcar & Cleveland. The proposed development would be located within two administration areas, Redcar and Cleveland Borough Council and Stockton-on-Tees Borough Council.

Regional Planning Policy

6.7.3 Regional Spatial Strategy for the North East, July 2008

Policy 31 – Landscape Character

Strategies, plans and planning proposals should:

- have regard to landscape character assessments; and
- promote integrated management initiatives to sustain nationally, regionally and locally valued landscapes

Local Planning Policy of the Assessment Study Area

6.7.4 The site is located within two administration areas, Redcar and Cleveland Borough Council and Stockton-on-Tees Borough Council. A further two authorities cover parts of the area located within the Assessment Study Area, Middlesbrough Council and Hartlepool Borough Council.

6.7.5 The following are the relevant Local Plans for the Study Area: Stockton-on-Tees Local Plan Alteration (adopted March 2006), the Middlesbrough LDF (Core Strategy DPD adopted February 2008), the Redcar and Cleveland LDF (Core Strategy DPD adopted July 2007) respectively and the Hartlepool Local Plan, (adopted April 2006).

6.7.6 Both Middlesbrough and Redcar and Cleveland have adopted Core Strategies, in February 2008 and July 2007 respectively, as part of the Local Development Framework. Proposals Map Development Plan Documents are yet to be adopted and therefore, for this assessment, the proposals plans as part of the Local Plan have been referred to. The following general policies are considered relevant to the development.

6.7.7 All administrative areas are covered by the Tees Valley Structure Plan (adopted February 2004). General policies that relate to the landscape issues associated with the development site include the following:

Stockton-on-Tees Borough Council

6.7.8 The Stockton-on-Tees Local Plan Alteration, adopted March 2006, is the current document for Stockton-on-Tees. In September 2007, the Secretary of State agreed the following relevant policies to be saved from the Local Plan, to be carried forward whilst the Local Development Framework is in the process of being adopted.

6.7.9 Policy: GP I

Proposals for development will be assessed in relation to the policies of the [Tees Valley] structure plan and the following criteria as appropriate:

- The external appearance of the development and its relationship with the surrounding area;
- The effect on the amenities of the occupiers of nearby properties;
- The contribution of existing trees and landscape features;
- The need for a high standard of landscaping;
- The effect upon the public rights of way network.

6.7.10 Policy: ENV11 Cleveland Community Forest

Tree planting of relevant species will be encouraged within the area designated as Community Forest.

6.7.11 Policy: ENV14 Green Wedges

Within green wedges, development will not be permitted that detracts from the open nature of the landscape.

6.7.12 Policy: ENV15 Urban Open Space

Development will not be permitted on urban open space

Redcar and Cleveland Borough Council

6.7.13 Policy: CS22 - Protecting and Enhancing the Borough's Landscape

The overall approach will be to protect and enhance the Borough's landscape based on the character areas identified through the Landscape Character Assessment.

6.7.14 Policy: ENV3

Any development in Dormanstown should have regard to the origins of the town in terms of layout.

6.7.15 Policy: ENV24

Special consideration will be given to the protection and conservation of the visual character and quality of the special landscape areas.

6.7.16 Policy: ENV35

Support will continue to be given to a long term strategy to create a community forest within the areas defined on the proposals map.

6.7.17 Policy: LD3

Development within green wedges must maintain the open character of the spaces.

Middlesbrough Council

6.7.18 Policy: DC1 – General Development

In the determination of planning applications, unless there is a specific and acceptable reason for an exception to be made, all development proposals will be required to take account of, or satisfy, as a minimum the following principles:

- the visual appearance and layout of the development and its relationship with the surrounding area in terms of scale, design and materials will be of a high quality;
- the effect upon the surrounding environment and amenities of occupiers of nearby properties will be minimal both during and after completion;
- the effect on protected open space within the urban area, Green Wedges, the countryside beyond the limit to development, and the best and most versatile agricultural land is limited both during and after completion

6.7.19 Policy E2: Green Wedges

Green wedges will be retained as open space. Planning permission will not be granted for developments that harm visual amenity or impair public access.

6.7.20 Policy: E7 Primary Open Space

Land designated as primary open space will be safeguarded from development.

6.7.21 Policy: E26 Community Forest

Support will be given to the creation of the Community Forest and proposals will be assessed as to what extent development realises the objectives of this.

6.7.22 Policy: E41 Development within or adjoining a Conservation Area

Development will be permitted only where the proposed use, location, design layout, scale, materials, colours and other factors contribute to the preservation or enhancement of the character and appearance of the area.

6.7.23 Policy: E48 Historic Parks, Gardens and Landscapes

Development proposals should not significantly affect the character or appearance of a site which appears on the register of historic parks and gardens or is in an area of other historic landscape value

Hartlepool Borough Council

6.7.24 The Hartlepool Local Plan, adopted April 2006, is the current document for Hartlepool. Relevant landscape policies and designations from the landscape and visual study area are identified in Appendix 1.E.

6.7.25 Policy: RUR14 Tees Forest

Development proposals considered appropriate in the countryside and which are located within the area of the Tees Forest should seek to include tree planting, landscaping and improvements to the rights of way network.

6.7.26 Policy: REC3 Neighbourhood Parks

The development of neighbourhood parks will be sought.

6.7.27 Policy: REC9 Recreational Routes

A network of recreational routes linking areas of interest within the urban area of Hartlepool will be developed. Proposals which would impede the development of the routes will not be permitted.

Tree Preservation Orders

6.7.28 Redcar and Cleveland Borough Council and Stockton-on-Tees Borough Council confirmed in January 2010, that there are no Tree Preservation Orders within or adjacent to the proposed scheme location that falls within their administrative boundary.

6.8 Landscape Character

National Landscape Character Assessments

6.8.1 The Character of England's Landscape, Wildlife and Cultural Features map produced in 2005 by Natural England with support from English Heritage, was an update to that produced by the Countryside Commission in 1996. This map subdivides England into 159 NCA's (National Character Areas). It provides a picture of the differences in landscape character at the national scale.

6.8.2 A set of eight regional volumes were published describing the 159 NCA's. These character descriptions of each NCA highlight the influences which determine the character of the landscape, for example land cover and buildings and settlement.

6.8.3 The regional volume that applies to this study area is the North East. The NCA within the North East that encompasses the majority of the study area is NCA 23, Tees Lowlands. In addition NCA 25, North Yorkshire Moors and Cleveland Hills will apply to the South Eastern side of the study area on the boundary line.

Tees Lowlands

6.8.4 The Tees Lowlands form a broad, low-lying plain framed by the Cleveland Hills to the south east, by the Pennines Fringes to the West and Merging in to the Durham Magnesian Limestone Plateau to the north. To the south of the river Tees, low hills form a more subtle transition into the Vale of Mowbray beyond. The slow-moving river Tees meanders through the heart of the area, dividing the lowlands to the north and south

6.8.5 The Teesside conurbation forms an extensive area of urban and industrial development which spreads around the margins of the Tees estuary as an almost continuous built up area from Redcar to Billingham, with Hartlepool as a discrete settlement to the north. Minor valleys and open strips of land form 'green corridors' linking rural farmland into the heart of the Teesside conurbation. High-rise buildings, large-scale chemical works and oil refining works, dockside container terminals, a power station and other installations, all clustered on land reclaimed from the estuary at Teesmouth, form a distinctive and dramatic skyline which is highly visible across this low lying landscape day and night.

6.8.6 This extensive area of industry is starkly juxtaposed with the natural elements of the Tees estuary. Areas of open water, mud flat, salt marsh and meadow, including Seal Sands and the Cowpen Marshes, survive in amongst the industrial installations and are protected as habitats of outstanding importance for birds as well as offering an important archaeological resource.

6.8.7 The key characteristics of the Tees Lowlands applicable to this study area are:

- A broad low lying plain of gently undulating, predominantly industry and residential development with wide views to distant hills.
- Meandering, slow-moving River Tees flows through the heart of the area dividing the lowlands to north and south.
- Contrast of quiet open areas with extensive urban and industrial development concentrated along the lower reaches of the Tees, the estuary and coast.
- Large-scale chemical and oil refining works, dock facilities and other heavy plants along the Tees estuary form a distinctive skyline by day and night (inc. Teesport and Hartlepool Nuclear Power Station).
- Overhead transmission lines and towers, highway corridors (inc. A66, A174 & A178), railway lines and other infrastructure elements are widespread features.
- Woodland cover is generally sparse but with local variation to parkland and managed estates (e.g. Cowpen Bewley Woodland Country Park; Flatts Lane Country Park, which are all on the boundary of the study area).

- Extensive areas of mud flats, saltmarsh wetlands and dunes at mouth of the river Tees which support valuable wildlife habitats.
- Minor valleys and linear strips of open land extend as 'green corridors' from rural farmland into the heart of the Teesside conurbation (e.g. Spencer Beck and Greatham Creek).

The North York Moors and Cleveland Hills

6.8.8 The North York Moors and Cleveland Hills are a very clearly demarcated block of high land in the North East of the counties of Yorkshire and Cleveland. To the North East the boundary is the North Sea while to the North and West there is a steep scarp slope rising above the Tees Valley and the Vale of Mowbray.

6.8.9 The key characteristics of the North Yorkshire Moors and Cleveland Hills applicable to this study area are:

- Upland plateau landscape underlain mainly by sandstone and mudstone of Middle Jurassic age,
- Plateaux dissected by a series of dales, often broad and sweeping, but with steep-sided river valleys in places, and floored by Lower Jurassic shales.
- Sparsely settled, with population concentrated in the dales and around the fringes.
- Valley landscapes characterised by predominantly pastoral farming with clear demarcation between the enclosed fields, farms, settlements and the moorland ridges above. The transition is often marked by bracken fringes.
- Panoramic views over moorland ridges, dales, surrounding lowland vales and the sea.
- Rich archaeological heritage from many different periods, especially on the high moorland plateaux.

Regional Landscape Character Assessments

The Cleveland Community Forest Landscape Assessment

6.8.10 The Cleveland Community Forest Partnership (now the Tees Forest Partnership) produced a landscape assessment for the Tees in 1992. The aim of the Cleveland Community Forest is to establish across much of the Borough's rural area, a mosaic of woodland, farmland and open spaces which will substantially improve the landscape. The Cleveland Community Forest Plan sets out the vision, strategy and implementation programme to achieve this. The forest plan sub-divides the rural area into different management zones and sets out appropriate targets for tree planting expressed as a percentage tree cover for different areas.

Local Landscape Character Assessments

Redcar and Cleveland Landscape Character Assessment

6.8.11 Redcar and Cleveland Borough Council produced a Landscape Character Assessment for their administrative area (April 2006). However, the character assessment does not categorise the immediate area adjacent to the proposed towers due to its urban nature. The Redcar and Cleveland district has been divided into 4 characters areas / tracts of which 2 are covered within the study area, Eston Hills and Redcar Flats. These represent recognisable areas of landscape, determined by a particular combination of physical and land cover characteristics and geographical contact. The characters areas / tracts have been further divided into landscape types and landscape units. The relevant character areas / tracts and types are described below:

Eston Hills

6.8.12 The Eston Hills are characterised by a complex of prominent steep-sided hills linked by low saddles which form a parallel series of foothills, or outliers, to the main Escarpment of the Cleveland Hills, which lie within the North York Moors National Park. Open moorland and wooded hillsides and escarpments contribute to the distinctive character of this area and give it an identity unlike any other part of the Borough. An area of parkland at Wilton is important within the tract.

6.8.13 Extensive and contrasting views are available from many Locations; to the south there is the backdrop of the Cleveland Hills. To the north there are views over the Urban and industrial developments of Teesside and Redcar.

6.8.14 The landscape types that cover this study area within the Eston Hills character area / tract are:

E1 – Upland (landscape unit - Eston Hills / Eston Moor)
E2 - Escarpment (landscape unit – Eston Hills)
E3 – Parkland (landscape unit – Wilton)

Redcar Flats

6.8.15 The Redcar Flats are contained by the escarpment of the Eston Hills to the south and the coast of the north. Over the inland part of the tract, the presence of high quality farmland has encouraged intensive arable cultivation and the enlargement of fields. The hedgerow pattern is sparse and there are few landscape features to interrupt the open, gently sloping landscape.

6.8.16 Long views predominate in this landscape, and skyline features take on particular importance. The industry at Wilton Works, and the abrupt urban edge of Redcar, the A174 and railway corridors have a strong local influence on landscape character.

6.8.17 The landscape types that cover this study area with the Redcar Flats character area/ tract are:

R1 – Urbanised farmland (landscape unit – East of Wilton)
R2 – Lowland farmland (landscape unit – South of Redcar and Markse)
R3 – Park and estate land (landscape unit – Kirkleatham)
R4 – Coastal Marsh (landscape unit – Coatham Marsh)
R5 – Sandy Shoreline (landscape unit – Coatham Sands)

Hartlepool Landscape Character Assessment

6.8.18 Hartlepool Borough Council produced a Landscape Assessment for their administrative area (2000). This report is an assessment of the landscape, not the landscape character. This assessment identified 7 different landscape types within the Hartlepool district of which all 7 lie within the study area. The division of the Borough into these different landscape types enabled a more accurate and objective appraisal of relative site values to be made. The landscape types identified that cover the study area are as follows:

- Coastal Fringe
- Estuarine
- Undulating Farmland
- Woodland
- Rural Fringe
- Urban Green space
- Transport Corridor

6.8.19 At present, there are no published landscape character assessments for the Middlesbrough and Stockton-on-Tees areas.

Landscape Character of the Study Area

6.8.20 Several Character Assessments (prepared by others) cover the study area, but none do so in entirety and are produced at varying levels. Therefore an assessment of the character in the study area has been undertaken for this assessment and is contained below.

6.8.21 In terms of character sensitivity reference has been made to information within The Countryside Agency and Scottish Natural Heritage, Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity, 2004.

6.8.22 The study area covers central / northeast Middlesbrough, east Billingham, Cowpen Marsh, Saltholme Marsh, Tees Mouth, west Redcar, Eston and Teesport, and is divided by the River Tees.

6.8.23 The character of the study area is industrial in nature, characterised by landfill sites, large petrochemical works, a brine field, nuclear power station and an oil terminal (Figure 20, Photograph V3, Appendix 6.4). Numerous lines of overhead power lines and over ground pipeline routes form a network through the landscape, forming dominant features in the landscape (Figure 23, Photograph V9, Appendix 6.4).

6.8.24 The area is generally flat with some minor localised undulations. Further afield to the southeast and northwest land begins to rise. Intervisibility within the study area is extensive. Views across the study area consist of the tall stacks of the chemical works and oil terminal, large oil storage drums, cooling towers and overhead power lines and towers. Landfill sites create mounds within the virtually flat landscape; heavy machinery is visible working on the summits of the mounds.

6.8.25 Cowpen Marsh and Saltholme Marsh are large wetland areas within the centre of the study area. These form key elements of the local landscape. This is a landscape managed for its wildlife benefits. Cowpen Bewley (Woodland) Country Park (including Greatham Creek) is located to the northwestern boundary of the study area. A small section of Flatts Lane Country Park falls within the southern limits of the study area. Several recreational routes, including the Teesdale Way, run through the study area.

6.8.26 There is little tree cover within the study area, with much of the land between the works areas used for grazing cattle. The land cover in these locations is grassland with some presence of scrub vegetation (Figure 19, Photograph V1 and Figure 21, Photograph V6, Appendix 6.4).

6.8.27 Mud and sand flats dominate the landscape as the River Tees joins the Tees Bay. The character of the River Tees is dominated by the adjacent on land industrial uses. Part of this northeastern extent of the study area is designated within Local Plan Policy as a Special Landscape Area.

6.8.28 There are several residential areas that are present within the study area forming scattered smaller settlements to the north of the proposed site. Several residential settlements form a large presence of residential properties to the southwest and south of the site. The edge of Redcar is also with the most eastern extent of the study area.

6.8.29 Whilst it is difficult to attribute a value to character. Taking into consideration the current features presence within the site and the lack of features identified as importance through relevant landscape designations such as National Park, AONB and TPOs, the constant activity within the landscape and the highly managed and disturbed nature of the general character within the Study Area it is assessed that the landscape has a good ability to absorb change. The overall sensitivity of the character area is considered to be Low. However it may be considered that small parts of the study area are more sensitive, notably the section of Special Landscape Area (sand flats) and the Marshes (Cowpen and Saltholme). Their ability to cope with change may be considered to be reduced.

Landscape Fabric and Landscape Features

6.8.30 There are a limited number of features within the vicinity of the Towers, none are considered to be significant elements in terms of landscape fabric and it is considered that they are replaceable. They are therefore assessed as Low.

6.8.31 It was confirmed that none of the trees present within the site boundaries or adjacent to the site boundaries of the Towers are designated by Tree Preservation Orders.

6.9 Visual Context

6.9.1 The visual receptors within the study area include the views experienced by the following groups of people, who are considered to be those most likely to be affected by any change in visual character:

- People residing at properties within the study area;
- Travellers on roads and railways within the study area; and
- Those using public facilities, such as footpaths, where user enjoyment is considered.

Settlements and Properties

- Marsh House Farm, an isolated property located to the north of the scheme.
- Port Clarence a linear/ribbon development located to the west of the scheme.
- Greatham (including allotments) a village located to northern extents of the study area to the north.
- Eston, settlement located to the southeast of the scheme, including Grangetown.
- The Clarences, community farm located on the outskirts of Port Clarence.
- Cowpen Bewley (including the Cowpen Bewley Street Conservation Area)
- Middlesbrough, including Conservation Area, settlement located to the southwest including North Ormesby
- Dormanstown, Redcar located to the edge of the study area to the east.
- The smaller settlements of Wilton (Conservation Area), Yearby (Conservation Area) and Kirkleatham (Conservation Area) are all located to the southeast of the site.

Transport Corridors

6.9.2 There are numerous transport corridors within the study area, including roads and railway lines and the River Tees. Of particular note are:

- A66, A178 and Normanby Road.
- South Bank railway station.

Recreational Sites and Routes

- Teesdale Way (European Long Distance Route E2 – Atlantic - Mediterranean), which mainly follows the banks of the River Tees.
- Tees Link, which links Middlesbrough and the Teesdale Way with the Cleveland Way. This route runs generally in a southern direction to the south of the site.
- There are also other numerous Public Rights of Way (PROW), footpath, bridleways and National Cycle Routes, that run through the study area. These are shown on Figures 6.13 and 6.14.
- The Clarences Community Farm, Port Clarence.
- Middlesbrough Football Stadium, Middlehaven Dock.
- Caravan and camping site near Warrenby.

6.9.3 Two groups of visual receptors have been discounted from the assessment stage due to their activities and potential for the perception of any changes in visual amenity, this

does not mean that no change in views would occur but rather that they would not lead to significant effects:

- Industrial uses
- Users of the River Tees (Boats)

6.10 Prediction of Impacts and Evaluation of Effects

6.10.1 This section identifies the potential impacts that could occur to the receptors identified above. This assessment is based on the proposed route alignment. The classification of sensitivity of each receptor based on Table 6.1 is contained within the Landscape and Visual Assessment Schedule (Appendix 6.4). This schedule also includes the magnitude of the impacts (as defined in Table 6.2) and identifies the significance of the effect. The receptor identification numbers, prefixed with LV, are referred to within the following text where applicable.

Assessment on Landscape Policy and Designations

6.10.2 Potential impacts have been considered as part of this assessment in terms of any impacts that may occur on the delivery of designations or policy objectives.

Landscape Designations

6.10.3 There are no Statutory Designated Sites within the study area. There are several none designated sites within the study area, including Cowpen Bewley Woodland Country Park (LV 2.1), Flatts Lane Country Park (LV 2.2), Special Landscape Area (Coatham Sands) (LV2.4) and Albert Park (Grade II Listed Park) (LV 2.10). There are several Conservation areas within the Study Area. The locations of these are shown on Figure 6.10.

6.10.4 A detailed assessment on all landscape designations is contained within the Landscape and Visual Assessment Schedule (Appendix 6.4). In summary due to the distance of these areas from the location of the proposed route alignment no impacts would occur. It is considered that as the proposed route would be located at a greater distance from the Special Landscape Area (Coastal Coatham Sands) than at current, resulting in a potential benefit in terms of intervisibility with the development. Whilst the magnitude of this impact is assessed as negligible due to the sensitivity of the receptor (medium) the significance of the effect is evaluated as neutral to slight beneficial.

Landscape Policies

6.10.5 There are no site specific landscape policy allocations on the site or within the vicinity of the site. A detailed assessment of all relevant landscape policies are contained within the Landscape and Visual Assessment Schedule (Appendix 6.4). In summary no impacts have been identified.

Assessment on Landscape Character, Elements and Features

6.10.6 This section considers the impacts that are anticipated on the individual landscape elements and features and the landscape character (receptors) of the study area and includes the assessment of significance of the effects.

6.10.7 None of the elements and features identified are classified as sensitive receptors. The overall sensitivity of the character area is considered to be Low. However it may be considered that small parts of the study area are more sensitive, notably the section of Special Landscape Area (sand flats) and the Marshes (Cowpen and Saltholme). Their ability to cope with change may be considered to be reduced.

Construction Impacts on Landscape Elements and Features

6.10.8 Direct impacts would occur on a limited number of landscape elements, scrub and broadleaved trees, during the construction phase, the location of these features are shown on the Phase 1 Habitat Survey. These would have to be removed for the construction of towers 2, 3, 4 and 5. These could not be replaced however this is not considered to be significant as they are not importance landscape features. The significance of this effect has been assessed as neutral.

Operational Impacts on Landscape Elements and Features

6.10.9 No direct or indirect impacts on retained landscape elements are anticipated as a result of the operational development. Therefore it is assessed that there would be no impact on landscape features.

Construction Impacts on Landscape Character

6.10.10 It is not anticipated that the construction activities would have direct or indirect impacts on the landscape character of the study area. The level of activity and loss of localised landscape features would not alter the character or result in the damage or loss of major character attributes. The combination of the proposed and existing route being present in the landscape for temporary period is not considered to have a significant adverse impact on landscape character, as the landscape would be able to absorb this temporary addition of an attribute that would not be incongruous. At worst temporary impacts would occur on localised character in the vicinity of the towers, but these areas are not considered sensitive and are able to deal with the change brought about by construction activities.

Operational Impacts on Landscape Character

6.10.11 Overhead power lines and features in connection with the industrial activities are key visual features within the landscape at present. The proposals would not result in the introduction of new features and the net addition of approximately a further 4 Towers, would not be perceived within the current character (Figure 20, Photograph V3, Appendix 6.3).

6.10.12 The potential for indirect impacts on adjacent Landscape Character Areas as indentified by others has also been considered as part of this assessment. The proposed route does fall within the Redcar and Cleveland Landscape Character Assessment, however it has not been characterised as part of said assessment due to its industrial nature. No direct impacts are anticipated on local character areas identified by others. The visibility of the site and surrounding area is currently high due to the topography of the area and the height of the features present along the River Tees. It is considered that the change of route and additional Towers would not be perceived in views from these character areas and that the effect would be neutral.

6.10.13 The overall significance of the effect on landscape character is assessed as neutral.

Impacts on Visual Receptors

Construction Impacts on Visual Receptors

6.10.14 The construction of the towers would be phased, with each tower going up in sequence. It is therefore anticipated that impacts would generally be localised, with the greater chance of impacts occurring in close proximity to the tower sites. The existing route will have to be retained to ensure the continuation of power supply, so for a temporary period the existing and proposed towers would be visible until the time of deconstruction of the existing route. As with the construction of the proposed towers it is anticipated that any impacts during the deconstruction phase would be limited to the localised area. In

general terms the plant and activities may be visible from greater distances but it is not considered that this would give rise to any significant effects on visual receptors.

Views from Settlements

6.10.15 Generally it is not anticipated that the construction activities would be visible due to intervening features and no impacts are expected (settlements of Eston (LV 3.19), Cowpen Bewley (LV 3.20), North Ormesby (LV 3.21) and Grangetown (LV 3.22)). From some locations, Marsh House Farm (LV 3.16), properties in Port Clarence (LV 3.17) and the settlement of Greatham (LV 3.18), construction would be visible but not be greatly perceived in views from residential properties. It is assessed that the indirect impacts would be temporary and viewed at distance in the context of a currently active landscape. It is assessed that no significant visual effects would occur on residential properties during the construction phase.

Transport Corridors (Roads and Railway Lines)

6.10.16 It is considered that views of the construction activities would generally be screened by intervening features or would not be perceived within views gained from transport corridors. However it is assessed that the construction activities for the erection of the majority of the Towers and the deconstruction of existing Towers would be visible at close distance from passengers on the railway (through Grangetown/South Bank Station (LV 3.34)). This impact would be temporary and achieved within the context of the existing industrially active landscape, from a moving receptor. This temporary impact is assessed as moderate adverse. It is not considered that it would result in a significant effect.

Recreational Sites and Routes

6.10.17 No direct or indirect impacts on the level of accessibility on any recreation routes or areas used for recreation would be impacted upon as a result of the development.

6.10.18 Generally from along recreation routes and from within recreation areas/sites it is considered that the views of construction activities would be limited or not readily perceived. However it is considered that the construction of several towers and the deconstruction of several towers would be visible, at close distance, in views from the Teesdale Way (LV 3.1). The Teesdale Way forms part of the European Long Distance Route E2 and is therefore considered to be a very high receptor. The temporary impacts on views during the construction phase area assessed as moderate adverse in magnitude. This activity would be viewed in the context of the existing industrial activities.

'In combination' Impacts of the existing and proposed route

6.10.19 For a short period of time it will be possible to view the proposed towers approximately 16 together with the existing 12 towers. This would only be for a period of approximately 5 months, as the deconstruction would commence once the replacement scheme was operational. In both landscape and visual terms it is not considered that this temporary accumulation of towers would result in significant effects as the towers would not be perceived within the context of the current industrial and active landscape.

Operational Impacts on Visual Receptors

6.10.20 The following assessment comments are based on a combination of desk study work, field study and analysis of photomontages and Viewshed modelling. The main emphasis has been on the visibility of the proposed towers as these are the feature that is considered to arise in potentially significant effects on visual receptors. The extent of cables between these towers has been considered in connection with tower visibility, when more than 1 number tower would be visible. Impacts of viewing these cables only has not be considered in this assessment as it is not considered that any significant

effect would occur as a result of the visibility of these on their own. It is anticipated that views of the towers, excluding the crossing towers, would generally become less discernible when they are gained at a distance greater than 2km, as they become hard to perceive against the backdrop of the existing buildings. A detailed assessment of operational impacts and identification of receptor sensitivity is contained within the Landscape and Visual Assessment Schedule (Appendix 6.4). An assessment of the change between the existing and proposed routes is also included within the assessment schedule.

6.10.21 A series of Figures, used as a basis for the visual aspect of this assessment, are included with this chapter. These illustrate the theoretical extent of and any changes in visibility within the Study Area:

Figure 6.3: ZVI of Existing Towers
Figure 6.4: ZVI of Proposed Towers
Figure 6.5: ZVI of Newly Affected Areas Only
Figure 6.6: ZVI Comparison between Existing and Proposed Towers
Figure 6.7: ZVI of Existing (two) Crossing Towers
Figure 6.8: ZVI of Proposed (two) Crossing Towers
Figure 6.9: ZVI Comparison between Existing and Proposed Crossing Towers

Views from Settlements

6.10.22 Detailed descriptions of the views that are anticipated from each of the identified receptors are provided in the Landscape and Visual Assessment Schedule (Appendix 6.4). Through viewshed modelling it has been achievable to provide an approximate indication of the number of towers that would be visible; this is indicated in the assessment schedule.

6.10.23 It has been established that the development would be visible from several groups of and individual residential properties. These are all considered to be classified as 'high' sensitive receptors.

6.10.24 It is assessed that an impact magnitude of minor adverse is anticipated on residential properties in Port Clarence (LV 3.17) (Figure 22, Photograph V8, Appendix 6.3), Eston (LV 3.19), North Ormesby (LV 3.21) (Figure 14, Photomontage 4, Appendix 6.2) and Grangetown (LV 3.22) (Figure 16, Photomontage 3, Appendix 6.2). It is anticipated that an increased number of towers (and connecting cables) would be visible from these locations. The towers and connecting cables would form an elevated continuous horizontal feature within the majority of these views. The proposed towers would be located at a greater distance from Greatham (LV 3.18). The greatest increase in the number of towers visible is from some properties in North Ormesby (LV 3.21) (approximately an additional 11 – 12 Towers).

6.10.25 It is anticipated that views of proposed towers, from properties within Port Clarence (LV 3.17), North Ormesby (LV 3.21) and Eston (LV 3.19) that currently experience no views of the existing route, would be achieved.

6.10.26 The proposed route would bring the towers closer to the residential receptors at Port Clarence (LV 3.17), Cowpen Bewley (LV 3.20) (Figure 21, Photograph V6, Appendix 6.3), North Ormesby (LV 3.21), Eston (LV 3.19) and Grangetown (LV 3.22).

6.10.27 Some long term moderate to slight adverse effects are anticipated on the receptors identified.

Transport Corridors

6.10.28 Overall the impacts of the proposed route are not assessed to lead to any significant effects on users of transport corridors. It is anticipated that additional Towers would be visible from some locations along transport corridors (Figure 25, Photograph V13,

Appendix 6.3), however due to distance of and the current nature of the views gained together with the speed of receptor travel that these would not be perceived. In some locations along the corridors views would be reduced so on balance it is considered that the magnitude of the impact would be negligible with a neutral effect.

6.10.29 However a greater effect is anticipated on Railway users to the south of the site (LV 3.34). Generally 7 - 10 towers (approximate) are visible at current. Up to an additional 9 towers would be visible from the section of the railway located near to South Bank Railway Station. This impact would be long term and achieved within the context of the existing industrially active landscape, from a fast moving receptor. The significance of this effect is assessed as slight adverse.

Recreational Sites and Routes

6.10.30 It is assessed that negligible impacts would occur on Middlesbrough football stadium (LV 3.23) (Figure 23, Photograph V10, Appendix 6.3) at Middlehaven Dock and a caravan and camping site (LV 3.24) near Warrenby. No significant effects would arise as a result of the proposed route options.

6.10.31 A number of locally identified viewpoints, Photographs V2 and V3 (Figures 19 & 20), Appendix 6.3 (contained within the Hartlepool Borough Council Landscape Assessment) have been considered. It is anticipated that all the towers would be visible from these viewpoints and would be viewed, along with connecting cables, as an elevated continuous horizontal feature. Additional towers are anticipated to be visible from these locations, however the existing towers are currently visible and the development would be viewed at a greater distance. The long term effect on these receptors is evaluated to be neutral to slight adverse.

6.10.32 On the receptors identified it is anticipated that slight adverse effects would occur on the following: identified sections of the Tees Link (LV 3.2) (Figure 26, Photograph V16, Appendix 6.3), PROW - Greatham to Creek route (LV 3.3), PROWs within Cowpen Bewley Woodland Country Park (LV 3.4) (Figure 21, Photograph V5, Appendix 6.3), PROW – Cowpen Bewley to Marsh Lane route (LV 3.5), PROW – Greatham to Cowpen Bewley Woodland Country Park Route (LV 3.6) (Figure 20, Photograph V4, Appendix 6.3). Generally towers and cables are currently visible on views from these receptors and the proposed development would lead to an increase in the number of towers achievable. In areas within Cowpen Bewley Woodland Country Park, a high number of the existing towers are visible (12 towers). Overall the level of tower visibility within the park is anticipated to experience no degree of change, with some areas experience a reduced visibility of 12 towers and some areas experiencing an increased visibility of 12 towers (including the Visitor Centre and area nearby).

6.10.33 From Eston Moor (LV 3.12), a viewpoint (Figure 27, Photograph V17, Appendix 6.3) located approximately 5km from the site in a southerly direction; the towers and connecting cables would be visible and would form a linear feature in the landscape. Due to the distance of the view the magnitude of this impact is assessed to be minor adverse. The significance of the effect is assessed as moderate to slight adverse.

6.10.34 A moderate to slight adverse effect is anticipated to users of the Community Farm The Clarences, Port Clarence, (LV 3.25) (Figure 22, Photograph V7, Appendix 6.3). Views of the existing towers are limited from this receptor location. However, in certain places from this location the majority of the existing towers are visible. Generally the number of proposed towers visible to the users of the Community Farm would be increased, in the worst case by an additional 7. The proposed towers would be located at a closer distance to The Clarences Community Farm.

6.10.35 A viewpoint was identified at the Mound, off Dockside Road (LV 3.11). This is a local area of high ground adjacent to the River Tees and located in close proximity to the proposed routes. This viewpoint (Figure 24, Photograph V11, Appendix 6.3) used to be,

but is not currently connected to the Teesdale Way. However there is the possibility that this link may in the future be re-established. All existing towers are currently visible from this viewpoint and would form a continuous elevated horizontal feature in the view. An additional 3- 4 towers would be visible from this location. This increase would not be greatly perceived by the viewer. The re-routing would bring the towers closer to this receptor. It is assessed that the visibility of the towers would be increased than as current and would result in an impact magnitude of moderate adverse. The significant of the effect is assessed to be moderate adverse.

6.10.36 Localised effects on users of the Teesdale Way (LV 3.2) (part of the European Long Distance Route E2) are anticipated to be significant (large) in some locations. This receptor is classified as 'very high'. Approximately 11-14 towers would be visible from the section on the Teesdale Way closest to the proposed route (within 1km of a tower) (Figure 24, Photograph V12, Appendix 6.3D, and Figures 14 & 15, Photomontages 1 and 2, Appendix 6.2). Some of these would be viewed as a continuous elevated horizontal feature. This would be gained in the context of a backdrop of heavy industrial units and with the railway line in the foreground. Generally an additional 7 - 10 towers would be visible. In some locations 2 less towers would be visible. An additional 14 towers would be visible from the Teesdale Way section located near to South Bank Railway Station. The overall magnitude of the impact is assessed as moderate adverse.

6.10.37 A beneficial effect is anticipated as a result of the scheme on users of the PROW near Tees Dock (LV 3.7). It is considered that the reduction in tower visibility would result in a slight beneficial effect.

Visibility of Crossing Towers

6.10.38 The two towers that would cross the River Tees are approximately 112-116m in height (approximately twice the height of the other towers) and potentially more visible from distances away from the site; therefore the visibility of these towers has also been assessed separately to establish if any significant effects are predicted to occur. Potential receptor locations at a distance of greater than 1km have been considered for the purposes of this element of the assessment as the difference in scale between the towers and crossing towers would not be perceived in closer distance views.

6.10.39 Overall level of visibility of the towers, including any requirements for high feature warning beacons, in their proposed locations in comparison is the same. However changes in the locations from which the towers are visible will alter. Generally the area to the north and east of the site would result in a reduction of visibility and the areas to the south and west would experience a greater degree of visibility. The visibility of the crossing towers increases in the locations from which they are viewed breaking the skyline; however from the remainder of the locations and especially at a distance greater than 2km they become indiscernible in the views as they blend into the backdrop of other buildings present.

6.10.40 It is anticipated that continuous views of the crossing towers would be visible from the cycle link (Sustrans Route number 1) (LV 3.8) as it travels through the green space to the south of the site and to the west of the residential area to the west of Normanby Road, Eston (Figure 26, Photograph V15, Appendix 6.3). The existing crossing towers are not visible from this location. It is anticipated that both crossing towers would be viewed when travelling north along this route. The extent of the tower visibility is anticipated to vary as the receptor travels along the route due to intervening features, such as buildings and vegetation.

Potential Future Receptors

Potential Tees Link Extension

6.10.41 There is a possibility that the 'Mound' on Dockside Road (LV 3.11) may form section of the Tees Link route (LV 3.2). Both the mound and the Tees Link are considered as part of this assessment, and are considered as high and very high sensitive receptors, respectively. If the Mound does become formerly connected with the Tees Link it is not considered that the assessment evaluation made would alter.

Future Land Uses

6.10.42 This section is based on the information made available within the Land Use Chapter, information from Stockton-on-Tees Borough Council and Redcar and Cleveland Borough Council.

6.10.43 Land to the south west and south of the scheme is proposed to be reclaimed and used for industrial uses including uses relating to port, steel and chemical activities. Whilst views of the asset replacement scheme are likely to be achievable from potential future receptors, none are considered to be sensitive. Existing industrial uses have been scoped out of this assessment and it is considered that this is also appropriate for potential future users of this nature. Therefore these are not considered further as part of this assessment.

Secondary or Related Development

6.10.44 There are no requirements for any secondary or related aspects of development for the scheme, therefore no impacts would occur.

6.11 Mitigation and Enhancement

6.11.1 The potential for landscape mitigation measures are limited for this scheme and are generally not considered appropriate.

6.12 Residual Impacts

Construction, deconstruction and operational impacts

6.12.1 Mitigation measures would not result in a change in significance of the anticipated effects.

Cumulative Impacts of Aspects of the Scheme

6.12.2 The potential for cumulative effects as a result of the proposed asset replacement scheme together with the following potential development identified have been considered as part of this assessment.

6.12.3 Tees Renewable Energy Plant, located approximately 1.2km northeast of the Asset Replacement Scheme.

6.12.4 Planning permission for the reclamation of the unoccupied land to the southwest of the asset replacement scheme for industrial use was granted in 2004 subject to a number of conditions.

6.12.5 Land to the south of the River Tees within the administrative area of Redcar and Cleveland is allocated for the future development of port, steel and chemical related uses by virtue of Core Strategy Policies CS03 and CS10.

6.12.6 In addition to the above planning permission, a review of planning applications (Stockton on Tees Borough Council and Redcar and Cleveland Borough Council) was also been undertaken as identified within the Land Use chapter.

- R/2008/0671/EA - A 300MW Biomass Plant at Tees Port;

- 07/2984/EIS – Construction and operation of waste recovery park for the recycling, recovery treatment and storage of waste including the construction of buildings, the erection of plant, the construction of an extended access road and construction of a screening bund;
- R/2007/0595 FFM – Development of an advanced digestion facility;
- R/2009/0343/CL Certificate of lawfulness for use of land as a waste transfer and skip hire facility;
- R/2008/0799 FF Mobile Concrete batching plant (Temporary Consent for 12 months only);
- R/2007/0498/FF Erection of a Gas Plant for Electricity Generation – Bran Sands Landfill Site Teesside Works; and
- R/2009/0196/FF Erection of Steel Framed Storage Building.

6.12.7 The proposals would not result in the introduction of new features and the net addition of a further 4 Towers, would not be perceived within the current character or views gained. It is not considered that any cumulative impacts would occur as the proposals would not lead to a significant increase in this type of development within the study area as this is a replacement scheme.

6.13 Conclusions

6.13.1 Detailed assessments on all identified receptors are contained within the Landscape and Visual Assessment Schedule appended to the document (Appendix 6.E).

6.13.2 No significant effects are anticipated on landscape character, designated sites or relevant landscape policies.

6.13.3 Long term slight adverse effects have been evaluated for several visual receptors, including residential properties, viewpoint locations and recreation uses.

6.13.4 A permanent loss of scattered scrub and broadleaved trees would occur during construction; this is not considered to be significant. Short term impacts as a result of construction activities are anticipated on users of the railway near South Bank and the Teesdale Way. It is assessed that generally no impacts or negligible impacts would arise as a result of the construction phase.

6.13.5 A moderate to large adverse effect has been evaluated on a section of the Teesdale Way (European Long Distance Route E2), due to the number of towers that would be visible at close distance and the sensitivity of the receptors. However, this must be balanced with the existing features currently visible along the stretch and adjacent sections, including chimneys, towers and railway line. The significance of the effect is considered to be moderate adverse. The effect on the Teesdale Way overall is not considered to be discernible and evaluated as to be neutral.

6.13.6 No mitigation is suggested for landscape and visual amenity.

6.13.7 Overall the effects of the proposed Tees Crossing Asset Replacement Scheme on landscape and visual amenity are not considered significant.

REFERENCES

- The Countryside Agency and Scottish Natural Heritage, (2004). Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity.
- The Landscape Institute and The Institute of Environmental Management and Assessment (2002). '*Guidelines for Landscape and Visual Assessment'* (GLVA) second addition.
- The Countryside Agency and Scottish Natural Heritage, (2002) Landscape Character Assessment Guidance for England and Scotland.
- The Countryside Commission (1996), Countryside Character Volume 1: The character of England's natural and manmade landscape.
- Natural England, (2005). The Character of England Landscape, Wildlife and Cultural Features Map.
- Landscape Institute Advice Note 01/09: Use of Photography and Photomontage in Landscape and Visual Assessment.
- Highways Agency (Aug 2008) Design Manual for Road and Bridges, Volume 11 Sections 1 and 2 replacement for DMRB inc Vol 11, Section 1 Part 1 HA200/08; Vol 11 Section 2 Part 1 HA 201/08; Vol 11 Section 2 Part 2 HA 202/08, Vol 11 Section 2 Part 3 HD 47/08; Vol 11 Section 2 Part 4 HA 204/08; Vol 11 Section 2 Part 5 HA 205/08;Vol11 Section 2 part 6 HD 48/08;Vol 11 Section 2 Part 7 HA 218/08.
- HULL, R.B. and BISHOP, I.D. (1988). Scenic Impacts of Electricity Transmission Towers: the Influence of Landscape Type and Observer Distance.
- University of Newcastle (2002) Visual Assessment of Windfarms Best Practice. Scottish Natural Heritage Commissioned Report F01AA303A.

7 LAND USE

7.1 Introduction

7.1.1 This chapter examines the impact of the proposals on land use, in particular the industrial and chemical works which are the principal land uses within the area. It describes the baseline conditions, identifies potential impacts of the proposals on the existing land use giving consideration both during operation and construction phases; predicts the magnitude of potential impacts and assesses the likely significant effects of the development proposals.

7.1.2 This section does not consider the impacts of the proposed development upon the Tees mouth and Cleveland Coast SPA, the Tees mouth and Hartlepool Foreshore and Wetlands SSSI or Ramsar site. The impacts of the development upon the Tees mouth and Cleveland Coast SPA, SSSI and Ramsar site are fully considered in Chapter 4 of this Environmental Statement.

7.1.3 The proposed alignment has had due regard to the variety of land uses, planning permissions and land allocations within SoTBC and RCBC and this Chapter examines the impact of the proposals on land use.

7.2 Initial Studies, Scoping and Consultation

7.2.1 A Routing Options Study was undertaken by White Young Green in July 2008, a copy of the Study can be found in Appendix 1.H. The study was commissioned by National Grid to assess the potential constraints and opportunities of a number of routing options for a new overhead power line running between Saltholme, on the northern bank of the River Tees and Grangetown on the south bank of the River.

7.2.2 Parts 4.2 and 4.3 of the Study identify the existing and likely future land uses within the area of the proposed Asset Replacement Scheme. The study concluded that the areas of land occupied by industrial and commercial development are of high value and any proposed routing should avoid occupied land. The Study also highlighted a number of major planning applications and land allocations within the administrative areas, identifying these as high and medium respectively.

7.2.3 In November 2009, National Grid, in accordance with Regulation 7 of The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 (as amended), made a formal request to the Secretary of State for his Scoping Opinion with regard to the proposed Asset Replacement Scheme (Appendix 1.C). As part of this exercise, copies of the Scoping Request were issued for consultation purposes to Stockton – on – Tees Borough Council, Redcar and Cleveland Borough Council and Middlesbrough Borough Council. Copies were also issued to Natural England, the Environment Agency, English Heritage, the Government Office for the North East and the North East Assembly. Details of the submitted Scoping Report can be found in Chapter 1 of this Environmental Statement. The following responses were received in relation to land use issues:

- Natural England (letter dated 4th January 2010). Natural England has requested that in the course of carrying out the ES their objectives in terms of landscape, access and recreation are to be met. Landscape is discussed in Chapter 6 of this Environmental Statement. As requested by Natural England the effect on access to the countryside and its enjoyment through recreation should also be considered as well as indirect impacts on Public Rights of Way and open access to land.
- Environment Agency (letter dated 6th October 2009) requests that flood resistance measures are incorporated into the design to ensure safety and that is no increased risk to flooding as a result of the proposed development. The Agency also recommended that further study is undertaken with regard to the proposed

movement of ground water. Both of these issues are discussed in Chapter 9 of this Environmental Statement and are therefore not discussed within this section.

- Redcar and Cleveland Borough Council (letter dated 1st December 2009). The Planning Officer stated that the land to the south of the River Tees and its future development for port, steel and chemical related uses should be considered in the ES. The impact of the proposed route and how it affects the land and access to it should also be taken into account.

7.2.4 At the time of drafting no other consultation responses had been received.

7.3 Methodology

7.3.1 The Assessment process consists firstly of establishing the existing or baseline conditions with regards to land use. Secondly, the Assessment considers the impact of the proposed Tees Crossing Asset Replacement Scheme upon the baseline conditions, and finally the mitigation of these impacts and the identification of residual impacts.

7.3.2 The Assessment identifies the magnitude and significance of changes to the baseline conditions which would arise for the construction and operation of the proposed Asset Replacement Scheme. Key receptors would be the industrial and chemical works owned by Petroplus/SABIC Refining Teesside Ltd, Impetus Remediation Ltd, Tees mouth and Cleveland SPA and Ramsar site and the land owned by Corus Steel UK Ltd to the south of the River Tees.

7.3.3 The Magnitude of the Impact (assessed as high, medium, low or negligible) predicts the degree to which impact or benefit to receptors would occur as a result of the development of the proposed Asset Replacement Scheme, as detailed below.

7.4 Assessment of Effects

7.4.1 The assessment methodology is based on guidance given in the IEMA publication "*Guidelines for Environmental Impact Assessment*" (November 2006).

7.4.2 In assessing the significance of potential effects of the proposed overhead line modification works, three key factors have been taken into account:

- The likelihood of that impact occurring, based on a scale of certain, likely or unlikely;
- The sensitivity and/or importance of the receiving environment, i.e. the ability to absorb an impact without perceptible change; and
- The potential magnitude of the impact, the scale of the predicted change to baseline conditions resulting from a given effect taking into account the duration of the effect i.e. temporary or permanent and whether it is direct or indirect.

7.4.3 In order to assess the overall significance of a potential impact; the impact significance criteria listed in Table 7/1 have been developed. The criteria have been used when determining the significance of both temporary and permanent effects of the development.

Table 7/1 – Magnitude of Effects

Impact Significance	Description
Major Adverse Impact	Land take to the extent that it precludes existing or intended use. Activity to the extent that it permanently precludes use. Loss of amenity to an extent that deters use.

Impact Significance	Description
Moderate Adverse Impact	Land take to the extent that it compromises but does not preclude use. Activity to the extent that it precludes use for an extended period of time. Loss of amenity to an extent that it compromises but does not deter use.
Minor Adverse Impact	Land take peripheral to use. Activity to the extent that it temporarily precludes use. Loss of amenity that does not compromise use.
Negligible Impact	Limited or no land takes. Existing or intended land use can continue. No discernible loss of amenity.

7.4.4 The results of this assessment are presented as residual impacts; i.e. the impact remaining taking into account the mitigation measures that would be adopted through construction and operation of the proposed Asset Replacement Scheme.

7.4.5 The location of the corridor within which the route of the proposed Asset Replacement Scheme would be confined is identified and documented in Chapter 2 of the ES (Figure 1.1). To summarise, the corridor is located within an established heavy industrial area within Teesside and straddles the River Tees at Seal Sands. The site straddles both SoTBC and RCBC administrative areas, and bisects a Tees mouth and Cleveland Coast SPA and Ramsar site on the northern bank of the River Tees. Petroplus/SABIC Refining Teesside Ltd are a major landowner to the north east of the proposed corridor, to the north west the land is owned and operated by Impetus Remediation Ltd for the purposes of waste management and landfill. Land to the south east and west beyond the River Tees is in the ownership of Corus Steel UK Ltd, large pockets of this land appear to be vacant hard standing and scrubland. However, this land remains within the operational area of the Teesside Cleveland Works.

7.4.6 In order to complete the assessment the following tasks have been completed:

Desk Study

7.4.7 The following specific tasks have been undertaken in order to inform the baseline data collection:

- Review of aerial photography;
- Review of Land Ownerships taken from a site visit and Land Registry searches;
- Review of the Stockton on Tees Borough Council (SoTBC) Local Plan (1997) Saved Policies;
- Review of the Stockton on Tees Borough Council (SoTBC) Submission Core Strategy (incorporating proposed changes) (2009);
- Review of the Redcar and Cleveland Borough Council (RCBC) Core Strategy Adopted 2007
- Review of the RCBC Development Policies DPD Adopted 2007;
- Review of the Tees Valley Joint Minerals and Waste Development Plan (Publication Draft) 2009;
- Review of the North East Regional Spatial Strategy (RSS); and
- Review of present planning applications and other development proposals in the vicinity of the scheme.

Field Survey

7.4.8 A field survey of the study area was undertaken on 7th of December 2009 focusing on land use within the immediate vicinity of the site. The field survey identified key existing land uses, highlighting in particular the more sensitive uses and activities such as the chemical and industrial works. Table 7/2 below describes the land use categories that were used during the field survey and that form the basis of the land use description.

Table 7/2 - Land Use Categorisation

Land Use	Description of Land Use Category
Education	Schools, colleges, etc., including their grounds.
Vacant Land	Land that at the time of the survey had no obvious use. This land may be built on or unoccupied.
Recreational and Amenity Areas	Facilities used for recreational purposes and local amenity areas, for outdoor relaxation and enjoyment, have been put into this category. For example, playing fields, golf courses and associated clubhouses, allotments, cycleway, parkland and open green space.
Industrial	This category broadly includes areas of an industrial nature, for example refineries, power stations, factories, scrap yards, quarries and waste transfer stations.
Residential	All types of residential properties and their land boundaries. This includes bungalows, semi-detached, detached, terraced, multi-storey flats and tenements including hotels, B&Bs and their associated facilities and grounds.
Commercial	Retail, office and business areas including restaurants.
Mixed Use	All buildings that have a combined use for residential and commercial purposes.
Woodland Scrub	Woodland planting including indigenous regeneration planting as well as low or thin woodland cover.
Nature Conservation	Areas afforded protection either internationally, nationally or locally.
Agricultural	All land used for agricultural purposes, both pastoral and arable.
Transport Infrastructure	All types of major transport infrastructure. This includes airports, train and bus stations.

7.5 Baseline Conditions

7.5.1 The proposed Asset Replacement Scheme extends from Seal Sands, Teesside, in a south easterly direction to the west of the Petroplus/SABIC Refining Teesside Ltd Chemicals Oil Refinery. The proposed Asset Replacement Scheme would cross the River Tees and then broadly follow the alignment of Smith's Dock Road until it meets the Darlington – Middlesbrough – Saltburn Railway Line. At this point the replacement overhead power lines are directed in a south easterly direction and along the northern side of the Darlington – Middlesbrough – Saltburn Railway Line in a north easterly direction until the replacement line reaches that of the existing overhead power line at Tees Dock Road. A second extension is proposed over the Railway Line where the proposed Asset Replacement Scheme separates into two, at the Teesside and Cleveland Works and connects to the existing overhead power line to the south of the Darlington – Middlesbrough – Saltburn Railway Line (see Figure 1.1).

7.5.2 Seal Sands is a major area of heavy industrial development and activity located on the northern bank of the River Tees. It comprises a range of facilities including chemical works, oil refineries, petrochemical and gas processing plants, storage facilities and heavy engineering. Historic maps show that much of the industrialised area is located on reclaimed land which, until the early 20th century, was part of the Tees Estuary. An area of landfill and waste management also characterises the area to the North and South of the River Tees. The land to the north is owned and operated by Impetus Remediation Ltd and comprises undulating areas of landfill and made ground. However, the Petroplus/SABIC Refining Teesside Ltd is the dominant land use to the north of the River Tees. The land is relatively flat and the majority of land within their ownership is covered by gas piping, cylinders and refining equipment. Beyond the Impetus Remediation Ltd land to the west and on the northern bank of the River Tees lies the Tees mouth and Cleveland Coast Special Protection Area and Ramsar Site and the Tees and Hartlepool Foreshore and Wetlands SSSI.

7.5.3 The southern side of the River Tees is also occupied by heavy industries and port uses of a similar nature to that at Seal Sands. Corus Steel UK Ltd are a major land owner to the south of the river, however pockets of the land in their ownership appear to be unoccupied and overgrown scrubland with a small concrete mixing depot within the centre of the site . The Teesside and Cleveland Works dominates the southern half of their land, in which there is an area of landfill to the south east.

7.5.4 The Darlington – Middlesbrough – Saltburn Railway Line bisects the Corus Steel UK Ltd land to the south, the railway line and associated sidings are owned and operated by Network Rail.

7.5.5 Existing land use is illustrated in Figure 7/2.

7.5.6 Other than the SSSI and Ramsar Site which are currently used by Tees mouth Bird Club for bird watching there are no formal recreation or amenity areas present in the vicinity of the proposed Asset Replacement Scheme. Potential effects on ecology including bird interests are examined within Chapter 9 of this Statement. An assessment of Ordnance Survey Map 'Middlesbrough and Hartlepool – 306' has revealed that there is one Public Right of Way within site of the proposed Asset Replacement Scheme. The Public Right of Way follows the alignment of the Darlington – Middlesborough – Saltburn Railway Line to the south of the Railway Line and is referred to as The Teesside Way. The Proposed Asset Replacement Scheme would cross the Public Right of Way in a broadly similar location to the existing situation. Once complete, the proposed Asset Replacement Scheme would not affect the accessibility of this route.

7.5.7 Within and on the periphery of the proposed Asset Replacement Scheme, heavy industrial and chemical land uses are prevalent. There are a range of industrial and engineering facilities, whilst in the wider area, there are sites occupied by lighter industry such as depots and warehouses. Land to the far south of the Darlington – Middlesbrough – Saltburn Railway Line is occupied by the residential community of Grangetown. However, there are no residential settlements within 1km of proposed Asset Replacement Scheme. The nearest major conurbation, Middlesbrough, is approximately 2 - 3km to the south of the site on the southern bank of the River Tees. Smaller settlements within the area include Port Clarence 2.5km south west of the scheme, Billingham and Cowpen Bewley 3 – 4km west, and Red Car 4km east (as the crow flies).

7.5.8 No land classified as agricultural is present within the immediate area.

7.6 Future Land Use

7.6.1 Land to the south of the River Tees within the administrative area of Redcar and Cleveland is allocated for the future development of port, steel and chemical related uses by virtue of Core Strategy Policies CS03 and CS10. It should be noted that the proposed Asset Replacement Scheme would be located on land that is currently vacant

in a position that would not prejudice the future use or access to the land or access to the River Tees. Furthermore, the only loss of land would occur where the individual towers are located; however, the area below them would remain open. Construction would still be permitted underneath the conductors to a certain level but it is not encouraged. The existing towers are also situated on land allocated by Core Strategy Policies CS03 and CS10. These towers would be dismantled and the land would be restored.

7.6.2 Land to the north of the River Tees adjacent to the Petroplus/SABIC Refining Teesside Ltd is allocated for Industry, Business and Storage and Distribution by virtue of the planning policies in the approved SoTBC Local Plan (1997). The land is also protected by a number of environmental policies that seek to protect and enhance the Tees mouth and Cleveland Coast SPA, Ramsar site and the Tees mouth and Hartlepool Foreshore SSSI. It is important to note that the proposed Asset Replacement Scheme would not prejudice the future use of the land to the north of the River Tees. The majority of the land would remain open and development to a certain degree would be acceptable under the overhead powerlines.

7.6.3 In addition to the above, a review of planning applications lodged in the Stockton on Tees Borough Council (SoTBC) and Redcar and Cleveland Borough Council (RCBC) has also been undertaken. This focused on applications lodged and/or consented in the last three years.

7.6.4 The review has identified a number of proposals of an industrial nature located within the area including:

- SoTBC - 07/2984/EIS – Construction and operation of waste recovery park for the recycling, recovery treatment and storage of waste including the construction of buildings, the erection of plant, the construction of an extended access road and construction of a screening bund – Port Clarence Landfill Site - which was permitted on 4th February 2008;
- SoTBC – 07/0388/FUL – Application under Section 36 of the Electricity Act 1989 for consent to construct and operate a natural gas fired combined cycle gas turbine power station and associated substation – Land at Seal Sands – whereby on 10th May 2007 SoTBC confirmed they as the Local Planning Authority had no objections to the development proposals.
- SoTBC – 08/2867/OHL – Application under Section 37 of the Electricity Act 1989 for proposed overhead line works to connect the Thor Co –Generation Ltds proposed 1020Mw Combined Cycle Gas Turbine Power Station – Land at Seal Sands – permitted 6th November 2008;
- SoTBC – 09/3057/FUL – Erection of an advanced bio ethanol and production plant – INEOS Nitrate Seaton, Carew Road, Port Clarence – Decision Pending; and
- SoTBC - 09/3050/EIA – Erection of a 49MWe Biomass Fuelled Power Station – Land West of Koppers UK Ltd, Port Clarence Road, Port Clarence – Decision Pending.
- RCBC - R/2007/0595 FFM – Development of an advanced digestion facility, permitted on 22nd August 2007;
- RCBC - R/2007/0498/FF Erection of a Gas Plant for Electricity Generation – Bran Sands Landfill Site Teesside Works which was permitted on 3rd August 2007;
- RCBC - R/2008/0671/EA - A 300MW Biomass Plant at Tees Port; which was made by the Secretary of State on 15th July 2009;
- RCBC - R/2008/0799 FF Mobile Concrete batching plant (Temporary Consent for 12 months only), which was permitted on 4th November 2008, the consent has subsequently been extended for an additional 12 months (31st December 2010)_ on 11th December 2009

- RCBC - R/2009/0343/CL Certificate of lawfulness for use of land as a waste transfer and skip hire facility, which was refused on 29th July 2009; and
- RCBC - R/2009/0196/FF Erection of Steel Framed Storage Building, which was permitted on 11th August 2009.

7.6.5 None of these development proposals are close to the proposed works and, given their industrial nature, none are considered to be sensitive in the context of the proposed Asset Replacement Scheme.

7.7 Construction Effects

Potential Effects

7.7.1 In the context of the site and existing land use potential, adverse impacts, relating to temporary land take and potential disturbance to adjacent industrial land uses, will be limited to effects on the industrial land and vacant land immediately surrounding the length of the Asset Replacement Scheme. The construction period is programmed from January 2011 to March 2013, and all built work will be completed by October 2012. Works undertaken post October 2012 would be restricted to the dismantling of the existing towers.

7.7.2 Temporary working areas measuring approximately 60m x 60m would be established at the locations of the proposed towers. Upon completion of the construction works, these temporary working areas would be removed and the land restored to its current condition. All of the proposed tower locations are situated within vacant land. Access to the site will be taken from existing accesses to the vacant land and internal access would cause minimal disruption to the land form and follow the alignment of the proposed and existing overhead power lines.

7.7.3 Potential impacts resulting from the construction of the Asset Replacement Scheme are considered to be **neutral,** as the scheme would be temporary in nature and located on vacant land. A construction compound would be required for the storage of plant and materials and locating of site offices and facilities. This is likely to be sited adjacent to tower ZZA229 on unoccupied land. The storage area would be temporary in nature and removed upon the completion of construction works, consequently no significant impacts are predicted.

7.7.4 Construction of the Asset Replacement Scheme may result in short periods where access to the Petroplus/SABIC Refining Teesside Ltd land off Huntsman Drive is reduced; however, this would be temporary in nature during the construction of this section of the Asset Replacement Scheme and would not affect the ongoing operation of Petroplus/SABIC Refining Teesside Ltd. Access may also be temporarily reduced along the River Tees, again this would not affect the ongoing operation to the River, and the temporary reduction in access would be evident during the construction of this section of the Asset Replacement Scheme and the dismantling of the relevant section of the existing overhead power line.

7.7.5 Access along the Teesside Way may be restricted for temporary periods of time during the construction phases of the proposed Asset Replacement Scheme. In order to mitigate the impacts of the re-routing a temporary diversion of the footpath would be required, if this could not be achieved then the appropriate safety mechanisms will be put in place to ensure that The Teesside Way remains accessible throughout the development proposals.

7.7.6 The construction and dismantling of the proposed Asset Replacement Scheme and the existing overhead power line over the Darlington – Middlesbrough – Saltburn Railway line will be undertaken in accordance with Network Rail to ensure that there is no disturbance to the use of the Railway Line during the construction period.

7.7.7 The effects of the dismantling of the existing overhead replacement line are therefore considered to be **neutral**. The majority of the existing overhead power line is located on vacant land, with exception of the northern bank of the River Tees where the existing overhead power line crosses the operational land of Petroplus/SABIC Refining Teesside Ltd, again the existing access points would be used and there would be minimal disruption to the existing landform as a result of vehicle movement. A temporary working area of 40m x 40m would be established at the locations of the existing towers. All of the existing towers are located on vacant land. A compound and/or lay down area may be required for the storage of plant materials and locating site offices and facilities. Again this would be located on vacant land and as a result there are no significant impacts predicted.

7.7.8 None of the land owned or operated by Network Rail would be affected by the construction or dismantling phases of the proposed Asset Replacement Scheme.

7.7.9 The distances between the proposed Asset Replacement Works and sensitive land uses such as residential or recreational land are such that they will remain unaffected by construction activities. As stated previously, measures will be implemented to ensure that access and use of The Teesside Way to the south of the Railway Line would not be affected by the proposed Asset Replacement Scheme and would remain accessible throughout the construction period.

Mitigation

7.7.10 Whilst construction effects are considered to be neutral, mitigation will be put in place during construction.

7.7.11 The working areas required for the towers will be minimised as far as is practicably possible in order to minimise disturbance to existing land use. The construction compound will be located on unoccupied land such that it will cause the least disturbance to existing industrial land use. Following construction, the compound or lay down area will be fully reinstated to an appropriate level.

7.7.12 Construction activities will be undertaken in such a manner so as not to result in long term reduced accessibility to the Petroplus/SABIC Refining Teesside Ltd from Huntsman Drive or the River Tees.

7.7.13 The appropriate mitigation measures will also be put in place to ensure that The Teesside Way remains accessible throughout the construction phase.

Residual Effects

7.7.14 All of land affected by the proposed Asset Replacement Scheme is currently vacant.

7.7.15 As all land temporarily affected by construction will be reinstated, the residual impacts resulting from temporary land take are considered to be **neutral.**

7.7.16 Access to the Petroplus/SABIC Refining Teesside Ltd land off Huntsman Drive, to Corus Steel UK Ltd and access along the River Tees would be maintained. Overall potential effects on industrial land are considered to be **neutral**.

7.8 Permanent Effects

Potential Effects

7.8.1 Permanent and operational effects on land use relate to the location and overall land take resulting from the proposed Asset Replacement Scheme and the dismantling of the existing overhead power lines. The proposed Asset Replacement Scheme would be located to the west of the existing Petroplus/SABIC Refining Teesside Ltd industrial and chemical works on vacant land in their ownership, it will cross the River Tees and then broadly follow the alignment of Smith's Dock Road to the south of the river, where it would be diverted to the west of the Teesside and Cleveland Works on land within the

ownership of Corus Steel UK Ltd which currently appears to be vacant. The route would then follow the alignment of the Darlington – Middlesbrough – Saltburn Railway Line in an easterly direction remaining on land within the ownership of Corus Steel UK Ltd. The proposed Asset Replacement Scheme would then cross the Darlington – Middlesbrough – Saltburn Railway Line and the Teesside Way at the Teesside and Cleveland Works. The proposed Asset Replacement Scheme will be located to adjacent to the boundaries of the relevant land ownerships, it would not affect the operations of Network Rail nor would it affect the access to the Teesside Way as such it would not affect the future development and use of the land. Permanent effects are considered to be **neutral**.

Mitigation

7.8.2 No mitigation is proposed to reduce or offset the loss of land required for the Asset Replacement Scheme.

Residual Effects

7.8.3 The permanent impact relates to the loss of land as a result of the construction of the proposed Asset Replacement Scheme. Overall there is a **negligible** increase in the amount of land permanently lost; however, as it is unoccupied ground with no current use residual effects considered to be **neutral**.

7.9 Summary

7.9.1 This section of the Environmental Statement is concerned with the effects that the proposed Asset Replacement Scheme will have on land use.

7.9.2 A general desk and field survey of the area was undertaken focusing on the proposed route of the Asset Replacement Scheme in particular existing and future land use within the vicinity of the proposed works. The area is dominated by industrial development including petrochemical plants, chemical works, area of landfill and waste management and heavy engineering. Proposals for development close to the proposed works are also of an industrial nature.

7.9.3 In the vicinity of the proposed works all of the land is vacant. The existing overhead power lines also currently cross vacant land and it is on vacant land where the majority of the works will occur and the proposed Asset Replacement Scheme will be located.

7.9.4 Given the site of the proposed route is vacant and currently undeveloped, the construction of the Asset Replacement Scheme is considered to result in neutral effects on land use. No significant effects on land use, current or future, are predicted.

8 CULTURAL HERITAGE

8.1 Introduction

This chapter assesses the potential effects on the cultural heritage resource of the proposed removal and relocation of the overhead line that crosses the River Tees between Middlehaven Dock and Tees Dock, north east of Middlesbrough.

8.1.1 The assessment considers the full range of cultural heritage assets along the line of the proposed route and in the surrounding area. This includes designated and non-designated assets such as listed buildings, archaeological remains, conservation areas, scheduled monuments and registered parks and gardens.

8.1.1 The purpose of this assessment is to identify and characterise the cultural heritage resource known within the study areas (see Section 8.3 below) and to determine the potential for previously unknown remains within the footprint of the proposed overhead line route. Baseline historic environment information is provided and the significance of the predicted impact of both the construction and the operational stages of the proposed overhead line on the archaeology and the historic landscape of the study area is assessed. Impacts on the cultural heritage resource of the area that would have a significant bearing on the project are identified, as are appropriate mitigation measures.

8.2 Initial Studies, Scoping and Consultation

8.2.1 A Proposed Routing Options Study was prepared on behalf of National Grid in July 2008. The report was based on a primarily desk based study of the constraints and opportunities influencing potential options for the diversion of the overhead line. Its purpose was to inform the National Grid's selection of a preferred route alignment for the asset replacement/refurbishment of the overhead line. The report has also provided a basis for consultation with all of the relevant parties with an interest in, or affected by, the preferred option selected for National Grid.

8.2.2 The Routing Options Study considered that a desk based assessment of archaeology and cultural heritage was necessary although predicted that archaeology was unlikely to present a significant constraint. The Study considered that the visual impact of the towers on the Grade II* Transporter Bridge and associated and nearby Listed Buildings presented a significant issue. It advised a landscape assessment of the backdrop of the towers.

8.2.3 A response to the scoping report was received from Redcar & Cleveland Borough Council on 1st December 2009. No concerns were expressed with regard to the potential impacts of the scheme upon archaeology and cultural heritage.

8.3 Methodology

8.3.1 This assessment has been prepared in accordance with *Standard and guidance for archaeological desk-based assessment* published by the Institute for Archaeologists (2008). The assessment has been prepared from a synthesis of published materials, documentary evidence, historic mapping, and records held in the Tees Historic Environment Record and the National Monument Record. A site visit was also undertaken along with a review of the visual setting of designated assets in the area around the proposed development.

8.3.2 This assessment was undertaken in order to:

- Identify and locate recorded cultural heritage sites;
- Identify and assess the potential for previously unknown sites of archaeological or palaeoenvironmental interest within the route corridor;

- Identify any features or areas that require further evaluation in order to fully understand their nature and the nature of the potential impact of the overhead line;
- Assess the potential impacts of the proposals on known and potential sites and the settings of designated assets;
- Suggest a programme of mitigation or enhancement measures in order to avoid or reduce potential adverse effects;
- Identify the residual effect of the scheme on the cultural heritage resource following mitigation.

8.3.3 Three different study areas were used to gather different types of baseline data (see Figure 8/1):

1. 5km Study Area – data on designated assets was collected for an area of 5km radius around the existing and proposed route. This data was predominately captured to inform the assessment of potential impacts on setting.
2. 2km Study Area – in addition to the data collected for the 5km area, full Historic Environment Record data including archaeological data and archaeological events was collected for a 2km radius area. This has enabled the development of a robust understanding of the prehistoric and historic development of the proposed route line.
3. 500m study area – in addition to the above, further data was collected and analysed for the area immediately around and within the proposed route corridor. This data included historic maps, documentary sources and geotechnical data.

8.3.4 The 5km study area reflects English Heritage's guidance on Wind Energy Developments (*Wind Energy and the Historic Environment*, English Heritage, 2005) and the guidance outlined in the Landscape and Visual Impact Assessment chapter of this ES. The other study areas reflect standard practice for cultural heritage assessments

Assessment Methodology and Significance Criteria

8.3.5 The impact assessment methodology used in this chapter reflects current UK practice and is based upon the standard and regularly used methodology set out in the Highways Agency's Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 2, Cultural Heritage. This methodology assesses the value of resources that may be affected, identifies and assesses potential impacts (taking into account mitigation measures) and then determines the significance of effect by combining the magnitude of the impact and the value of each asset. The criteria for assessing value and the scale of potential impacts are presented in Appendix 8/1. The assessment process also draws on guidance in Planning Policy Guidance Note 15 – Planning and the Historic Environment (PPG15) and Planning Policy Guidance Note 16 – Planning and Archaeology (PPG16).

8.3.6 The significance of effect is determined by combining the magnitude of the impact and the value of each asset using the table below (taken from DMRB). The matrix is not intended to lead to a formulaic assessment, and professional judgement is used at all stages in the process. The effects can be adverse or beneficial.

Table 8.1 Significance of Effect

Value						
	Very High	Neutral	Slight	Moderate / Large	Large or Very Large	Very Large
	High	Neutral	Slight	Moderate / Slight	Moderate / Large	Large / Very Large
	Medium	Neutral	Neutral / Slight	Slight	Moderate	Moderate / Large
	Low	Neutral	Neutral / Slight	Neutral / Slight	Slight	Slight / Moderate
	Negligible	Neutral	Neutral	Neutral / Slight	Neutral / Slight	Slight
		No change	Negligible	Minor	Moderate	Major
		Magnitude of Impact				

8.4 Baseline Description of the Cultural Heritage Features

Planning Policy Context

National Legislation

8.4.1 Relevant legislation includes the following (see Appendix 8/2 for further details):

- Ancient Monuments and Archaeological Areas Act 1979 (AMAA);
- Planning (Listed Buildings and Conservation Areas) Act 1990;
- Environmental Impact Directive 85/337/EEC as amended by 97/11/EC and 2003/35/EC.

National Planning Policy

- Planning Policy Guidance Note 15: Planning and the Historic Environment (1994) including Circulars 01/01, 09/05 & 01/07
- Planning Policy Guidance Note 16: Archaeology and Planning (1990)

Regional Policy

8.4.2 The Regional Spatial Strategy for the North East was issued in July 2008. Key policies within the document include:

- POLICY 34: Historic Environment: Strategies, plans and programmes and planning proposals [PC10 P] should seek to conserve and enhance the historic environment of the Region by:

  a) clearly identifying and assessing the significance of any heritage assets and their vulnerability to change;

  b) using the process of characterisation to understand their contribution to the local environment and to identify options for their sensitive management;

  d) seeking to preserve, in situ, archaeological sites of national importance and, where appropriate, other archaeological remains of regional and local importance;

Local Policy

8.4.3 The site is located within two administrative areas, Redcar and Cleveland Borough Council and Stockton-on-Tees Borough Council. Middlesbrough Council and Hartlepool Borough Council cover parts of the 5km study area.

8.4.4 The following are the relevant Local Plans for the 5km Study Area: Stockton-on-Tees Local Plan Alteration (adopted March 2006), the Middlesbrough LDF (Core Strategy DPD adopted February 2008), the Redcar and Cleveland LDF (Core Strategy DPD adopted July 2007) respectively and the Hartlepool Local Plan, (adopted April 2006).

8.4.5 Policies from the above documents that relate to cultural heritage include the following:

Stockton-on-Tees Local Plan Alteration No.1 (adopted March 2006)

8.4.6 Set out below are the relevant saved policies of the Stockton Local Plan:

- En 28: development which is likely to detract from the setting of a listed building will not be permitted.
- En 29: development which will adversely affect the site, fabric or setting of a scheduled ancient monument will not be permitted. The Council will also protect all other sites where archaeological remains exist. Developers of such sites will be required to ensure that archaeological features of the site are recorded prior to development and, wherever possible, that any remains are preserved 'in situ'. To meet this obligation, developers should establish in their initial site assessment whether the site is likely to contain archaeological remains. If important remains are known to exist, proposals must demonstrate that the remains will not be disturbed. Where this is not practicable, the Council will require the developer to enter a legal agreement to ensure that, prior to development, an excavation is carried out and a record of the archaeological evidence made. The cost of this will be borne by the developer.
- En 30: development which affects sites of archaeological interest will not be permitted unless:

  (I.) An investigation of the site has been undertaken; and

  (ii.) An assessment has been made of the impact of the development upon the remains; and where appropriate;

  (iii.) Provision has been made for preservation 'in situ'.

  Where preservation is not appropriate, the local planning authority will require the applicant to make proper provision for the investigation and recording of the site before and during development

Middlesbrough Core Strategy DPD (adopted February 2008)

- Spatial Objective 4: Protect Middlesbrough's historic assets. Middlesbrough has few historic sites, so what are left take on an added significance. This will be achieved by ensuring that criteria are contained within policies that protect Middlesbrough's historic assets and, where possible, maximises their contribution to achieving a sustainable environment.
- Policy CS4: Sustainable Development: all development will be required to contribute to achieving sustainable development principles by, where appropriate:

  k. protecting and enhancing Middlesbrough's historic heritage and townscape character.

- Policy CS5: Design: All development proposals will be required to demonstrate a high quality of design in terms of layout, form and contribution to the character and appearance of the area. Proposals will be required to contribute to achieving the following:

  h. the preservation or enhancement of the character or appearance of conservation areas and other areas of special interest and character;

  i. safeguarding buildings identified as being of special historic or architectural interest, and ensuring that any adaptation or reuse is undertaken sympathetically and protects, or, where possible, enhances, the special characteristics of the building;

Redcar and Cleveland Core Strategy DPD (adopted July 2007)

- Policy CS25 Built and Historic Environment: development proposals will be expected to contribute positively to the character of the built and historic environment of the Borough. The character of the built and historic environment will be protected, preserved or enhanced. Particular protection will be given to the character and special features of:

  a) Conservation areas;

  b) Listed buildings;

  c) Historic parks and gardens;

  d) Archaeological sites; and

  e) The historic landscape of the Eston Hills.

  Development which preserves or, where appropriate, enhances the character of important historic buildings and sites and their settings will be encouraged.

Hartlepool Local Plan (adopted April 2006)

- Policy HE3: developments in vicinity of Conservation Areas: The design and materials used in new developments which would affect the setting of Conservation Areas should take account of the character of those neighbouring Conservation Areas. Where there are important views into and out of the Conservation Area these should be preserved or enhanced.
- Policy HE10: developments in the vicinity of listed buildings: The siting, design and materials of new developments in the vicinity of listed buildings should take account of the listed building and its setting. New development which adversely affects a listed building and its setting will not be approved.
- Policy HE14: protection of archaeological sites: The borough council will seek to protect archaeological sites and, where appropriate, their setting.
- Where development proposals affect sites of known or possible archaeological interest the borough council may require that an archaeological assessment / evaluation is carried out prior to any planning application being determined. This is intended to indicate whether the development is likely:
  - to be subject to archaeological recording,
  - to be subject to a requirement to preserve remains in situ, or
  - to be refused.

- Where nationally important remains are found to exist then their preservation in situ will be required. Where this cannot be achieved by sensitive design then planning permission may ultimately be refused.
- When physical preservation is not required, and where appropriate, the council will, by means of conditions, require the applicant to make proper provision for the investigation of the site before and during development.

Tees Valley Structure Plan (adopted February 2004)

8.4.7 ENV10: The archaeological interest of the Tees Valley will be protected and preserved by:

- not permitting development which would have an adverse effect on scheduled ancient monuments, protected wreck sites and other sites of national importance and their settings; and
- protecting other sites of archaeological interest from development where possible by providing detailed policies of preservation in situ, evaluation prior to planning determination and archaeological excavation and recording.
- Where appropriate, the Tees Valley authorities will encourage and assist in the investigation of sites of archaeological interest.

8.5 Known Cultural Heritage Assets

Designated Assets

8.5.1 Figure 8/2 plots the known designated assets within 5km of the proposed development. Identified assets include listed buildings, conservation areas (see Appendix 8/2), scheduled monuments (on the edge or slightly outside of study area) and a registered park and garden (see Appendix 8/2). No other designated assets were identified in the 5km Study Area.

8.5.2 Data for all of these assets was collected as part of the EIA process. For brevity, not all of the data is presented in this report as the majority of assets are not affected. Data on Conservation Areas and registered park and gardens can be found in Appendix 8/2. Details of listed buildings that may be affected are discussed in the impact assessment below and listed in Appendix 8/3; they are also labelled on Figure 8/2.

Undesignated Assets

8.5.3 Figure 8/3 plots the locations of known undesignated assets within 500m of the proposed and existing routes. The HER entries for these assets and events are presented in Appendix 8/4.

8.6 Overview of the area

8.6.1 The following summarises the historic development and current character of the area around the proposed route corridor. A more detailed overview of the development of the area can be found in Appendix 8/5.

8.6.2 The proposed scheme straddles the River Tees and runs through areas dominated by relatively modern industrial activity and buildings in varying states of activity, decay and regeneration. The area is predominately urban and industrial in character although there are extents of historically open land to the west of the northern part of the scheme (the landscape and visual impact chapter contains a more detailed overview of the wider area's modern character).

8.6.3 Views from the surrounding areas to and across the proposed route line are dominated by modern industrial structures and activity. Views over the wider city and riverscape are

also dominated by urban and industrial forms with the Grade II* Listed Transporter Bridge being a notable and characteristic feature.

8.6.4 The Teesside area is an archetypal example of industrial growth, built on natural transport links and resources, and enhanced by the entrepreneurial industrialism of the Victorian Age. Its subsequent history of consolidation and industrial decline is also typical and both these stories are very apparent in the material remains of the area.

8.6.5 The prehistory of the area is much less clear. The fast industrial growth of the area means that there is little obvious trace of the pre-industrial Tees. Very little evidence survives in the North East of the Palaeolithic period, and the study area is no exception. Similarly, the Mesolithic period is not represented, though evidence of habitation upriver in Yarm has been recorded. Climactic changes and coastal erosion have also contributed to the early prehistoric period being so badly represented archaeologically. Some evidence survives in the study area from the Neolithic period, during which a more sophisticated agricultural culture emerged. Agricultural evidence from the period at Eston Nab (south of the study area) is enhanced by further Bronze Age indications of wheat cultivation. On the north side of the Tees in the marshes at Cowpen, a number of finds indicating livestock farming have survived within waterlogged marshy deposits.

8.6.6 The transition from the Iron Age to the Roman annexation in AD78 seems to have been a continuation of site usage although no such remains are known in the study area. By this point land clearance had been significant, perhaps accounting for the denuded landscape recorded by Roman observers. The uninterrupted continuance of life following the Roman withdrawal was incrementally interrupted by the arrival of the Anglo-Saxons though no evidence of the early Anglo-Saxon period remains in the study area, possibly because of continued use of sites. The North East's strong identification with the Christian evangelists is represented at Hartlepool and Billingham, thought to have grown up around religious sites.

8.6.7 The Danish presence is indicated in placename evidence: particularly in the suffix *–by*, so widespread in the area. By the time of the Norman 'Harrowing of the North' (a punishment for an attempt from the North to reconquer Britain), the area contained a number of small rural settlements – some of which may well have been laid to waste by the Conqueror. Following the arrival of the Normans, a period of depopulation seems to have occurred, hastened by Danish and Scottish raids, land reorganisation, and the advancement of the Plague.

8.6.8 The rurality of the area was spectacularly interrupted by the arrival of the Stockton & Darlington Railway, the world's first stretch of railway. It prompted the further opening up of the Tees and the promotion of the river as a major docks to rival the coal port of Newcastle. Competing interests meant both sides of the Tees were developed, first as port interests, and following the discovery of ironstone nearby, and then rock salt, as major iron, steel and chemical industries, alongside ship- and house-building enterprises. The growth of Middlesbrough and its nearby towns was phenomenal, with among the highest immigration levels of the 19th century. By the 1960s however, the decline of heavy industry and loss of competitiveness in a global market meant a significant period of depopulation which continues in the former heavily industrial areas today. Teesport is currently one of the UK's largest cargo ports, and significant chemical works continue, although the area's steel industry has recently experienced major setbacks.

8.6.9 The historic urban area of South Bank – a settlement whose origins lie in the clay building industries and the iron and steel boom – is situated close to the scheme. This consists of 19th century/early 20th century terraced housing and more modern developments along with historic and modern ancillary structures such as churches (Grade II and II* listed buildings – see Figure 8/2 and Appendix 8/2), shops and civic buildings. The South Bank area is currently undergoing regeneration and the majority of

historic housing is empty and awaiting demolition or has already been demolished. Whilst many of the larger civic/religious buildings survive the overall historic character over the area has been heavily degraded.

8.6.10 A particular phenomenon of the industrial growth of the Tees was the transformation of the tidal river. Throughout the 19th and early 20th century, operations to improve links to the river meant substantial land reclamation on both sides of the river. Within the study area, this reclamation, alongside the effects of heavy industrial construction, demolition and usage has limited the amount of archaeological evidence known. Although the possibility of archaeological evidence surviving beneath reclaimed land remains, there is also a strong possibility that little survives from the estuarine Tees.

8.7 Prediction and Evaluation of Impacts

Impacts as a result of construction

8.7.1 The impact on the cultural heritage resource as a result of construction activities are not limited to the immediate vicinity of the construction. They include the following:

- Land take (temporary or permanent)
- Ground disturbance through excavation or topsoil stripping (through construction itself, layout and use of access roads, layout and use of compounds)
- The visual impact of the construction; and
- The noise impacts of these works.

8.7.2 The effect of such impacts on the cultural resource is also varied:

- Damage or partial damage to a heritage asset, site or group of assets or sites
- Damage or other alteration or change to the setting, amenity or special interest of a heritage asset, site or group of assets or sites
- Damage or partial damage to a heritage asset, site or group of assets or sites through compaction, excavation
- Loss of physical or visual integrity of a heritage asset, site or group of assets or sites through compaction, excavation.

Physical impacts on known or potential cultural heritage assets

8.7.3 The proposed line as currently suggested comprises 16 new towers, one replacement, and the maintaining of one existing. These towers vary in height from (based on current heights) 50m to 116m (for the crossing towers). Due to the nature of the ground, they are likely to have piled foundations which are likely to go beyond the made ground (currently thought to be upwards of 3m in depth). The land take for each tower will be 40m square. An access road for the route will be necessary and an adjacent compound will also be required. The sites of these are to be determined. Neither of these ancillary works will require ground disturbance below made ground.

8.7.4 Construction works are unlikely to have any significant impact on the archaeological resource of the proposed route area.

8.7.5 Due to the fact that the exact location of the pylons has not yet been determined the impacts of the construction works are as yet partially uncertain. Much of the landtake for the route is reclaimed, a practice that is likely to have started in the 18th century, and continued throughout the 19th and early 20th centuries. The river and its marshes were reclaimed to maximise the use of land for industrial purposes and also to improve access to the shipping channel of the river. Reclamation was also a way of getting rid of slag and other by-products of industry. Much of the reclaimed land on both sides of the

Tees is founded on industrial waste. The 19th and early 20th century Ordnance Survey maps show the extent of reclamation on the Tees. On the south side, the highwater mark of the 1st edition Ordnance Survey (1857) (Figure 8/4) follows the line of the railway, while the 2nd edition OS (1895) clearly shows the riverbank's reconstruction and use by industry (Figure 8/5) (HER 5632, 5634, 31, 39) and the reclamation wall (HER 4). Beyond it, mudflats are shown. By the publication of the 1931 Ordnance Survey map, the mudflats themselves have become an industrial site, marked as slag reduction works (Figure 8/6). On the north side, the 1st edition OS shows 'sand and mud' within the route corridor, though channels to the west indicate water management (Figure 8/7). Subsequent maps show further channelling and by the 1952 edition (Figure 8/8), vegetation is shown in place of mud, and channels, ponds and revetment works indicate the level of water management.

8.7.6 There is however, a very low possibility of early and late prehistoric evidence existing in deep strata within the route corridor, below the reclaimed land. It is possible that the towers will be unable to gain purchase in the reclaimed ground in which case they may require piling, or fixing to the rockhead below underlying silts. The made ground has been estimated at a depth of 3m or deeper (see Contaminated Land and Geotechnical chapters of this report). It is therefore possible that the foundations of the towers may penetrate potential alluvial layers containing archaeology on both sides of the Tees. The magnitude of any impact on these remains would be minor, while the significance of such an impact would be slight. Borehole data from tower sites will indicate any archaeological potential and the need for further mitigation measures which may include excavation. This will reduce the potential impact on the archaeology to neutral.

8.7.7 The land reclamation of the areas both north and south of the Tees means that there is little chance of the proposed works affecting archaeological remains of the pre-industrial period. However, there is a very low potential that remains of the medieval period may survive in the route corridor, in alluvial deposits beneath the reclaimed land. The magnitude of impact on these remains would be minor. The significance of the impact would be slight. Borehole data from tower sites will indicate any archaeological potential and the need for further mitigation measures which may include excavation. This will reduce the potential impact on the archaeology to neutral.

8.7.8 On the southern side of the Tees, the route may encounter remains of the industrial period, including those associated with the iron industry and with the transport of industrial products. The potential of such remains in the area is high, though their value is negligible - low. It is also likely that the continued industrial operation of the site has caused extensive damage to whatever remains have survived. Although the HER (see Appendix 8/4) contains many references to the industrial remains of the area, most of these refer to documentary evidence rather than known survivals. The magnitude of impact on such remains would be minor, and the significance of effect slight/neutral.

Impacts on the setting of designated assets

8.7.9 The potential impacts on the setting of the listed buildings, conservation areas and registered park and garden within the 5km study area are reviewed below. Reference should be made to figures 8/2 to 8/12 inc. within the Landscape and Visual Impact Assessment Chapter:

8.7.10 **Wilton Castle, Yearby, Kirkleatham and Dormanstown Conservation Areas** (see Figure 8/2): these four areas lie between c.3.5km and 5km to the east of the proposed development. Views of the current pylons are minimal and glimpsed in nature, they are also foregrounded and read in the context of extensive areas of industrial development. The proposed pylons would feature no more significantly in views than the current pylons, i.e. minimally. Views of the conservation areas from the higher ground to the south and from nearby localities would also not be altered by the repositioning of the

pylons c.1.5km to southwest. Overall there would be no impact on the setting of these four conservation areas

8.7.11 **Ormesby Hall Conservation Area**: this lies c.4km to the south of the proposed development. The area is dominated by parkland with a robust woodland screen around its edge. There would be no meaningful views of the proposed development from the conservation area and views of the area from the high ground to the south would not be altered by the repositioning of the pylons. There would be no impact on the setting of this conservation area

8.7.12 **Middlesbrough Conservation Area**: this lies c.3.5km to the west of the proposed development. The urban nature of the conservation area and its environs mean that there will be no significant views of the proposed pylons and the relocation of the pylons will not affect the industrial character of the landscape around the conservation area. Overall, there would be no impact on the setting of the conservation area.

8.7.13 **Cowpen Bewley Conservation Area** (including listed buildings within): this lies c.4km to the northwest of the proposed development. The proposed pylons could be glimpsed from the edges of the conservation area (see figures in Landscape and Visual Impact Chapter) but such glimpses would be seen in the context of the intervening pylon runs and the industrial nature of views from the conservation area towards the proposed and existing pylons. The relocation of the pylons would also not affect the industrial character of the landscape in which the conservation is situated. Overall, there would be no impact on the setting of the conservation area.

8.7.14 **Albert Park Registered Park and Garden:** this lies c.4km to the southwest. The park is situated within an urban area and there would be no meaningful views from the park of the pylons. The pylons would have no impact on the setting of the park.

8.7.15 **Scheduled Monuments on Eston Nab and Eston Moor**: a substantial group of scheduled monuments area situated on the high ground of Eston Nab c.5km to the south-southeast of the proposed development. The proposed development would not affect views to the monuments and the relation of the pylons within the industrial landscape of the study area would not affect views from the scheduled monuments as the view would essentially remain the same i.e. an urban/industrial landscape and the pylons would only form a minor component of that view. The pylons would therefore have no impact on the setting of the monuments

8.7.16 **Listed Buildings in Eston**: a cluster of 12 listed buildings within Eston/Normanby c. 3 to 3.5km south of the proposed development (see Figure 8/2). These buildings, including churches and vernacular structures, lie in an urban / suburban location. Whilst it is theoretically possible that glimpsed views of the pylons may be achieved from the upper floors of some buildings and from the surrounding streets, these views would be fragmentary in nature and the presence of the pylons would be read as part of the wider industrial landscape. Overall, the pylons would not form a noticeable component of any views (partly by virtue of the distance), they would also be largely screened in views by intermediate urban development and would have no impact on the setting of these buildings.

8.7.17 **Listed Buildings at Lackenby**: a group of three listed buildings c.3km to the southeast of the proposed development. This group of vernacular farm buildings is situated in a highly altered landscape locally dominated by pylons, substations and industrial infrastructure. Views of the current pylons from the buildings and in views of the buildings from the south are possible but they are a minor component of such views, particularly given the dominating presence of other pylons only a few hundred metres to the north. This situation will not change as a result of the proposed development as visually, the pylons will be positioned a little to the west of their former position in the views, and there will consequently be no impact on the setting of the buildings.

8.7.18 **Listed Buildings in the centre of Middlesbrough**: there are numerous listed buildings in the centre of Middlesbrough (see Figure 8/2) c.3 to 4km from the proposed development. The setting of these buildings would not be affected by the proposed development given its distance, intervening urban / industrial development and the fact that the pylons would only be a very minor component in any views.

8.7.19 **Transporter bridge:** this Grade II* listed structure lies c.3km to the west of the proposed development. There would be no significant views of the pylons for users of the bridge, partly due to the fact that the structure of the transporter itself restricts views up and down the river although glimpsed views with an industrial backdrop may be possible form the north side. The pylons would not challenge or diminish the visual prominence of the bridge. Overall, the pylons would not affect the setting of the bridge.

8.7.20 **Holy Trinity Church, North Ormesby**: this Grade II church lies c.3km from the proposed development. Views towards the principal church tower from the car parking area to the west may be very slightly altered by the addition of the tall bridging pylons to the left of the main church buildings. Whilst the pylons may be visible they would not be dominant and would be seen as part of the existing industrial landscape that forms the major component of the distant parts of the church's setting. As such the pylons would not significantly affect the setting of the church and any impact would be negligible in effect.

8.7.21 **Listed Buildings in South Bank** – six listed buildings are situated in South Bank approximately 600m from the nearest point of the route (see Appendix 8/3 and Figure 8/2). The potential impact on the setting of these buildings is outlined below:

- **King George's Sq. War Memorial, Grade II (810)** – views to and from the War Memorial would not be significantly altered as intervening development would largely screen the pylons. The local setting has also been heavily altered in recent times creating a modern context for the memorial. The exact scale of any impact would depend on the final siting of any pylons and their exact height. Based on current information the development would only slightly change the setting (negligible impact) of this medium value asset, this would result in, at most, a slight adverse impact, but more likely a neutral impact.

- **Baptist Church, Redcar Road East, Grade II* (1253)** – the pylons / overhead line would be visible (depending on final siting) from Henry Street and possibly Miller Street, which border this high value building. The presence of the pylons in views of the building and probably in views from the upper parts of the building (note: access not gained) would slightly increase the dominance of the industrial landscape that largely dominates to the north. They would not however dominate the building nor fundamentally change its setting; which has been largely degraded by recent local developments and demolition. The pylons would therefore only have a negligible impact on this high value asset; this is a slight adverse effect. The magnitude of this change is not considered contrary to PPG15.

- **Church of St. John the Evangelist, Grade II (5630)** - the pylons / overhead line may be visible (depending on final siting) from neighbouring streets. The possible presence of the pylons in views of the building and probably in views from the upper parts of the building (note: access not gained) would slightly increase the dominance of the industrial landscape to the north. They would not however dominate the building nor fundamentally change its setting; which has been largely degraded by recent local developments and demolition. The pylons would therefore only have a negligible impact on this medium value asset; this is at most a slight adverse effect. The magnitude of this change is not considered contrary to PPG15.

- **Church of St. Peter, South Bank, Grade II (879)** and **No. 1 Milbank Street, South Bank, Grade II (5399)** – the pylons / overhead line would be clearly visible in views

north and northwest from the rear of these buildings. The pylons / overhead line would also probably be visible in views of these buildings from the south (i.e. they would appear in the back drop). The presence of the pylons / overhead line would not fundamentally alter the setting of these buildings as they already lie in an urban and industrial landscape with visible tall structures. The pylons could however be visually quite prominent (depending on final siting) and would noticeably change the visual setting of these buildings. This is a minor impact on a medium value assets resulting in slight adverse effects. The scale of possible impacts is not of significant enough magnitude to be considered as being contrary to PPG15, particularly given the widespread alteration to the setting of the buildings caused by the recent demolitions in the area to the south.

- **War Memorial of St. Peter's Church, Grade II (4706)** – this lies in front of the Church of St. Peter (879). There would be no views from the memorial towards the pylons, but the pylons may appear in the backdrop of views from the south looking towards the church and memorial. This would slightly alter the visual setting of the memorial. This is considered to be a minor impact on a medium value asset resulting in slight adverse effect.

8.7.22 Overall, the proposed development would have relatively slight and localised impacts on the setting of a small number of listed buildings, but it would not significantly degrade the setting of these or any other designated assets.

Impacts as a result of operation

8.7.23 The operation of the proposed overhead line (i.e. the running of electricity through it) would have no impact on the cultural heritage resource.

8.8 Cultural Heritage Mitigation Measures Incorporated into the Scheme

8.8.1 This assessment, undertaken in line with current accepted guidance, has examined the potential, value and character of any archaeological remains likely to be encountered during construction of the scheme. This assessment concludes that it is highly unlikely that any nationally important (high value) archaeological remains worthy of preservation *in situ* are present within the route options. Consequently, archaeological mitigation, in the form of a programme of archaeological investigation is considered suitable for all areas of the proposed route.

8.8.2 Due to the nature of the made ground into which the proposed towers will be constructed, archaeological mitigation in the form of watching brief, geophysical survey, trial trenching, and other preliminary archaeological techniques would not provide helpful data for the further understanding of the nature of the potential archaeological resource.

8.8.3 Borehole testing where tower foundations are likely to go into alluvial deposits is recommended in order to ascertain whether archaeological deposits are likely to be present. The results of these tests will dictate the need for further archaeological investigation or the need to address archaeological issues through the design process (as below).

8.8.4 Through the detailed design process it may be possible to mitigate or reduce impacts on the setting of the listed building identified above through careful siting and design of the pylons.

8.9 Residual Effects

8.9.1 There are unlikely to be any significant residual impacts on the archaeological resource of the area.

8.9.2 The slight adverse effects on the setting of the listed buildings in South Bank and potentially at Trinity Church (described above) are likely to be residual in nature, although it may be possible to mitigate or reduce them through the process of determining the exact locations of the pylons.

8.10 Conclusions

8.10.1 The proposed overhead line will replace an existing line albeit on a different course. The line, like its predecessor, will be constructed in an area of intense industrial development that has occurred since the mid-19th century. The nature of this industrial development means that the line will be part of an existing landscape of industrial construction.

8.10.2 The proposed line is marginally closer to some of the Conservation Areas within the 5km study area, but the existing industrial and infrastructural landscape means that the visual impact of this is nil. The proposals may however slightly adversely impact on the visual setting of a small group of listed buildings in South Bank.

8.10.3 The archaeological resource as it is currently known will not be affected by the proposed overhead line. There has been a high level of land reclamation on both the north and south sides of the River Tees to a depth of at least 3m, and it is unlikely that any archaeology is contained within the topsoils. Potential palaeobotanical deposits within deeper strata remain possible, and there remains a very low potential that unrecorded remains of prehistoric and medieval date may potentially be affected by the construction works. These remains should they exist would increase knowledge and understanding of periods not well understood, especially in the Tees area. A programme of archaeological evaluation through borehole analysis is proposed to mitigate the potential of damaging such remains.

9 CONTAMINATED LAND, GEOLOGY AND GROUND CONDITIONS

9.1 Introduction

9.1.1 This chapter considers the effects of the proposed Tees Crossing Asset Replacement Scheme on geology and ground conditions. The assessment of the geology and ground conditions identifies the nature of the superficial and solid geology underlying the route, as well as the extent, nature and depth of any Made Ground or fill materials, which could potentially be contaminated and which may have an impact on the development and the environment. The purpose of the assessment is to collate background historical and geo-environmental data to identify, where possible, ground-related development constraints including the potential for contamination.

9.2 The Study Area

9.2.1 The study area concentrates on the length of the proposed new route and the land which is considered to be within influencing distance of the route from an environmental impact viewpoint.

This includes:

- The land adjacent to the route to check for the presence of industrial/commercial premises, mining activity etc. (both current and historic) which could be considered to constitute a contamination source and may have an environmental impact on the route. These are considered on a case by case basis depending on the potential contamination pathways;
- Watercourses, water bodies, residential properties, groundwater abstraction points, public open spaces etc. which could be considered to become affected by potential contaminants originating from within the route. These potential contamination 'targets' are considered on a case by case basis.

9.3 Methodology

9.3.1 A geo-environmental assessment reported in a Desk Study (Appendix 9.1) has been carried out and information of relevance to the proposed development has been obtained and summarised. Sources of information and consultation where relevant include those listed below:-

- Landmark Envirocheck report – searches on databases held by the Environment Agency, Coal Authority, Ordnance Survey, BGS, Natural England and National Radiological Protection Board: Appendix for Envirocheck Report
- British Geological Survey (BGS) – borehole records, published geological maps, web based Lexicon of Rock Units
- Environment Agency – Environmental Information including pollution incidents and water quality data: response not received to date;
- Coal Authority website www.coalminingreports.co.uk;
- Website for review of recent aerial photographs www.bing.com.

9.3.2 A walkover of the route had been planned, however due to extremely poor weather conditions it was not undertaken. Where possible, evidence of the following has been gained from aerial photograph websites:

- Layout of the surrounding area, including presence and condition of above ground buildings and structures (where present), surface covering, drainage, evidence of below ground services;
- General topography;
- Evidence of ground disturbance, subsidence etc;
- Vegetation type, evidence of distress;
- Significant discharges, visual evidence of contamination;
- Land uses in the vicinity of the route, presence of watercourses;
- Access constraints for the intrusive phase.

9.4 Assessment of Alternatives

9.4.1 Assessment of alternatives is not within the scope of this chapter.

9.5 Route Appraisal

Route History

9.5.1 The available information, including historical mapping dating back to 1857 and British Geological Survey (BGS) publications, has been reviewed. Copies of Ordnance Survey maps inspected are as follows:

- 1:10,560 scale plans dated 1857; 1859-1861; 1895; 1899; 1898-1899; 1919; 1919-1931; 1923; 1931; 1938; 1938-1951.
- 1:10,000 scale plans dated 1953-1955; 1954-1955; 1973-1976; 1976; 1990-1994; 1990-1995; 1993; 2000; 2006; 2009.
- 1:2,500 scale plans dated 1894; 1894-1895; 1929; 1940-1941; 1954-1969.
- 1:1,250 scale plans dated 1915; 1953; 1953-1975; 1959-1974; 1971-1976; 1972-1988; 1993-1994.

A summary of the route history, including the history of the land surrounding the route, is included in Table 9.1 below.

Table 9.1 – Summary of Historical OS Maps

	Land Use On Route	Surrounding Land Use
Date: 1857; 1859-1861 Scale: 10,560 Durham	***Northern Section:*** The route north of River Tees comprises sand and mud. ***Southern Section:*** No mapping available for area south of River Tees.	***Northern Section:*** The area surrounding the northern section of the route is mapped as *Sand and Mud.* No development. ***Southern Section:*** North of the southern section of the route is largely mud, sand and shingle. East of the southern section is bounded fields. South of the southern section of the route are bounded fields named as *The Pastures* and *Low Pastures*. The *Middlesbrough and Redcar Railway* passes approximately 50m south of the south eastern section of the route trending west to north east. A *Brick Field* is located 75m south of the far south eastern end of the route. *Tees Tilery* is immediately south of the railway approximately 50m south west of the southern section of the route. *Eston Iron Works* are located approximately 200m south of the southern section of the route.
Date: 1895; 1899 Scale: 10,560 Yorkshire Date: 1898-1899 Scale: 1:10,560 Durham Date: 1894; 1894-1895 Scale 1:2500 Yorkshire	***Northern Section:*** No change ***Southern Section:*** *Eston Jetty* and *Clay Lane Jetty* in sand and mud flats on south bank of River Tees with *Water Column* immediately to the south. South of the jetties the route passes across an area of shingle. East of the shingle is an area of railway sidings and the *South Bank Iron Works* with associated buildings, structures and two reservoirs. To the east of the works are a series of slag heaps.	***Northern Section:*** 300m west of the northern section of the route is the *Port Clarence Rifle Ranges.* 700m west of the northern part of the route is a mound. There are a series of *Brine Wells* associated with a *Salt Works* approximately 950m north west of the northern section of the route. ***Southern Section:*** Significant industrial and residential development has taken place south of River Tees. *South Bank Iron Works* present immediately north of the route. There is a *Clay Pit* north of the route, approximately 800 m south of the River Tees. *Sluices* north of the route, approximately 1200 m south east of the River Tees. An *Iron Works* is present

	Land Use On Route	Surrounding Land Use
		approximately 500m east of the far south eastern end of the route. *Antonien Works (Phosphate Manure)* are located immediately north of the south eastern section of the route. *Salt Wells are situated* 50m north and a *Reservoir* 250m north east of the south eastern end of the route. *Annealed Concrete Works* is 140m east of the far south eastern end of the route. To the immediate south of the route is *Cleveland Steel Works.* *Ironopolis Cricket and Football Ground* present 230m south of the route. A *Gas Works* is located approximately 400m south of the south eastern section of the route. *Clay Lane Slag Works* is present 250m south west of the southern section of the route. A *Brick Works (Disused)* is 400m south west of the south of the route. The railway is named as *N.E.R. Darlington and Saltburn* rail line with *South Bank Station lying* approximately 500m west of the southern part of the route. Residential areas of *South Bank* and *Grangetown* extend from 300m south west and from 750m south east respectively.
Date: 1915 Scale: 1:1250 Yorkshire	***Northern Section:*** No change ***Southern Section:*** *Concrete Works* present immediately south of the *jetties*. 1.3km south of River Tees a *shaft* is present on the route within an area occupied by the *Cleveland Salt Works* and *South Bank Iron Works* immediately east.	***Northern Section:*** No change ***Southern Section:*** *Annealed Concrete Works* no longer present. *Shafts* are noted 100m and 150m south of the route within the land occupied by the *South Bank Iron Works*. There is a *Reservoir* east of the southern part of the route approximately 350m south of the River Tees.
Date: 1919; 1919-1931 Scale: 1:10,650	***Northern Section:*** No change in land use North of River Tees. ***Southern Section:*** *Eston Sheet and Galvanising Works* on south bank of River Tees in	***Northern Section:*** No change in land use North of River Tees. ***Southern Section:*** *Slag Brick Works* present 80m north of the route. North of the *South Bank Iron Works*

	Land Use On Route	Surrounding Land Use
Yorkshire	location of Eston Jetty. Towards south eastern end of route there is an *Engine House* and *Tar Macadam Works*.	is a *Basic Slag Works*, a *Metal Breakers* and a *Slag Reduction Works* on the area of former mud flats. *Iron Works* east of the south eastern end of the route now named *Lackenby Iron Works*. *Grangetown Power Station* and an *Engineering Works* are located 200m south of the far south eastern end of the route. *Cleveland Steel Works* are located immediately south of the railway line towards the far south eastern end of the route. *Cleveland Iron Works* approximately 250m south of the route. *Allotment Gardens* 400m, 480m and 530m south. West of the southern part of the route are a *Basic Slag Works* and *Tar Manufactory* at 100m, 170m distance respectively.
Date: 1923; Scale: 1:10,560 Durham Date: 1929 Scale: 1:2500 Yorkshire	***Northern Section:*** No change in land use north of River Tees. ***Southern Section:*** There is a *Saw Mill* 30m south of the River Tees. Approximately 800m south east of the river is a *Brine Tank* and *Brine Wells*. *Engine House* and *Tar Macadam Works* no longer present at south eastern end of route. *Cleveland Salt Works with associated shaft* is now noted as *Disused*.	***Northern Section:*** *Port Clarence Rifle Range* is shown as *Disused*. ***Southern Section****: Riverside Pumping Station* is present 500m north east of the route on the southern bank of the River Tees. *Reservoir* 200m west of the southern part of the route. *South Bank Works* are located to the north of the southern part of the route. Unnamed works with *Reservoirs, Chimneys* and *Tanks* 150m south east of the route. There are three *Reservoirs* extending south of the route from 220m. A railway *Goods Shed* is located 500m west of the route by South Bank railway station. 200m south west of the route on the southern bank of the River Tees are two *Dry Docks.* 100m further south west are *Smith's Dock* and two *Slipways*. Some residential development south of the railway station in an area named as *South Bank.*

	Land Use On Route	Surrounding Land Use
Date: 1931 Scale: 1:10,560 Yorkshire Date: 1938; 1938-1951 Scale:1:10,650 Durham Date: 1940-41 Scale:1:2500 Durham	***Northern Section:*** Area on north bank of River Tees mapped as shingle. ***Southern Section:*** No change in land use south of River Tees	***Northern Section:*** No change ***Southern Section:*** *Smith's Dock* is now *Shipbuilding Berths*. *Lackenby Iron Works* now *Tees Slag Wool Works*. *Saw Mill* and *Timber Yard* present 450m south west of the route on the southern bank of the River Tees. There is a *Fire Station* 500m south of the southern part of the route.
Date: 1952; Scale: 1:10,650 Durham 1953-1955; 1954-1955 Scale: 1:10,000 Ordnance Survey Plan Date: 1953; 1953-1975 Scale: 1:1250 Ordnance Survey Plan Date: 1954-69 Scale: 1:2500 Ordnance Survey Plan	***Northern Section:*** The flats north of River Tees are now named *Seal Sands* with rough grassland and a pond to the north. ***Southern Section:*** *Saw Mill* and *Eston Sheet and Galvanising Works* are no longer present on south bank of River Tees. *Travelling Cranes* on rail track present immediately south of River Tees. *Kiln* approximately 85m south east of the River Tees possibly associated with the adjacent *Eston Refinery (Iron).* Approximately 300m south of River Tees extending southwards the route passes over rough pasture. Numerous *tanks* present as part of the *South Bank Iron Works*.	***Northern Section:*** Approximately 700m west of the northern section of the route are two *Brine Wells.* ***Southern Section:*** *N.E.R. Greatham Creek Branch* rail line is shown as *Dismantled*. *River Tees Dockyard* is in the location of former *Shipbuilding Berths*. *Reservoir* 250m north east of the route no longer present. *Lackenby Brick Works* present approximately 420m south east of the south eastern end of the route. *Electricity Substation, Reservoirs* 140m south east of the route are *Disused.* *Tar Manufactory* now named *Tar Distillation Works*. *Riverside Pumping Station* no longer on south bank of River Tees. *Ore Grading Plant* and *Conveyors* extending eastwards north of the route. *Electricity Substation* approximately halfway along the southern part of the route.
Date: 1973-1976; 1976 Scale: 1:10,000 Ordnance Survey Plan Date: 1958-1974; 1971-1976 Scale: 1:1,250 Ordnance Survey Plan Date: 1959-	***Northern Section:*** No change ***Southern Section:*** The area of rough pasture is now covered by extensive railway track. *Electricity Substation* present approximately halfway along the southern part of the route. *Concrete Works* no longer present.	***Northern Section:*** No change ***Southern Section:*** *Pipelines* and *Lackenby Tank Farm* extending northwards from far south eastern end of the route. *Oil Depot* with numerous tanks present 240m north of the far south eastern end of the route. *Teesside Works, Lackenby* located between 400m and 1km south east of the south eastern end of the route. *South Teesside Works, Lackenby* present 220m south east of the

	Land Use On Route	Surrounding Land Use
1974 Scale: 1:1,250 Ordnance Survey Plan Date: 1972-1988 Scale: 1:1,250 Ordnance Survey Plan		southern section of the route extending southwards. *Tar Distillation Works* and *Basic Slag Works* now named as *Works* with a *Spoil Heap* extending west from 300m south of the route.
Date: 1990-1994; 1990-1995; 1993 Scale: 1:10,000 Ordnance Survey Plan Date: 1993-1994 Scale: 1:1,250 Large-Scale National Grid Data	***Northern Section:*** No change in land use north of River Tees. ***Southern Section:*** *South Bank Iron Works* now *Teesside* Works, Cleveland; extensive rail lines no longer present; area of slag heaps now a refuse heap (landfill).	***Northern Section:*** Significant industrial development has taken place north of the River Tees with construction of the associated infrastructure. *Pipelines* and a *Track* pass immediately north of the route trending west to east. The *North Tees Works (Oil Refinery)* is located east of the northern section of the route, 150m away at its closest point. It comprises numerous buildings, structures, *Tanks*, *Chimneys,* several *Reservoir*s and an *Electricity Substation* 250m to the east of the route. A *Brine Field* is located 3350m north west of the northern part of the route at its closest point with numerous *Pipelines*, *Drains* and structures. An associated *Electricity Substation* is located 300m north west of the route. A series of *Pipelines* run north to south 750m west of the northern part of the route. ***Southern Section:*** The majority of the railway lines formerly present south of the River Tees associated with the industry are no longer present. *Oil Depot* and *Lackenby Tank Farm* are no longer present. *South Bank Iron Works* and associated slag heaps north of the southern part of the route are now a refuse tip (landfill). There is a *Settling Pond* 50m north of the far south eastern end of the route at its closest point. *Clay Lane Commercial Park* has been built 420m south of the southern part of the route at its

	Land Use On Route	Surrounding Land Use
		closest point. *South Bank Railway Station* and *Goods Shed* are no longer present. *Saw Mill* and *Timber Yard* are no longer present. This area is now named as *Offshore Base*.
Date: 2000, 2006, 2009 Scale: 1:10,000 10k Raster Mapping	***Northern Section:*** No change ***Southern Section:*** No change	***Northern Section:*** Unspecified *Works* are present 450m and 600m north of the northern section of the route with buildings, chimneys and a pond. ***Southern Section:*** *South Tees Freight Park* present 150m south of the southern part of the route. Area on south bank of River Tees south of *Offshore Base* is a *Commerce Park.*

Geology

9.5.2 The geological conditions along the route have been assessed with reference to the British Geological Survey (BGS) Sheet 33, Stockton, 1:50,000 Scale.

9.5.3 The BGS Map indicates Made Ground along the entire length of the route and the surrounding area.

9.5.4 Estuarine and Marine Alluvium is present across the majority of the route, and Laminated Clay is present south of the Tees, in the far south and south east of the route. The BGS lexicon describes Estuarine and Marine Alluvium as sand, silt and clay with gravel and possible peat formed in the marine or estuarine environment. Laminated Clay is described as clay, generally brown and yellow, laminated; grain-thick silt laminate may be present.

9.5.5 The route is indicated to be underlain by the Mercia Mudstone Formation which is described in the BGS lexicon as dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite widespread; sandstones are also present.

Ground Conditions

9.5.6 No information has been made available from previous ground investigations undertaken along the route.

Hydrogeology

9.5.7 The groundwater vulnerability of the route has been assessed with reference to the Groundwater Vulnerability Map prepared by the Environment Agency. The underlying geology is classified as a Minor Aquifer. The Environment Agency describes a Minor Aquifer as:

'*fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits. Although not producing large quantities of water for abstraction, they are important for local supplies and in supplying base flow to rivers'*.

9.5.8 The soils in the area are classified as being soils of high leaching potential (HU).

9.5.9 The route does not lie within groundwater source protection zones (SPZ).

Hydrology

9.5.10 Parts of the route are areas at risk from *"flooding from rivers or sea without defences".* The areas are the northern half of the Northern Section, the area immediately adjacent to the River Tees, and the far south east of the route in the Southern Section.

Landfill Sites and Ground Gases

9.5.11 Details provided in the Envirocheck Report consulted indicate that there are four landfill sites immediately adjacent to the route boundary. These create the potential for ground gases in the land underlying the route.

Contaminated Land

9.5.12 One of the aims of the Desk Study (Appendix 9.1) is to highlight potentially contaminative historic or current land uses and the range of contaminants which could affect or have an impact on the environment. Based on the review of data made during the Desk Study the potentially contaminative uses (historic and present) within 250m of the route which could have an environmental impact on the route, are:

- Made Ground
- Landfills, registered and informal
- Various works including:
    - Iron & Steel Works with resulting slag; Sheet and Galvanising Works;
    - Tanks
    - A (brine?) shaft
    - Oil Refinery with associated Settlement Lagoons/ Remediation Ponds;
    - Concrete Works;
    - Salt Works, Agro-Chemical Works;
    - Tar Macadam Works;
    - Railway;
    - Brick Works;
    - Power Station;
    - Dockyards;
    - Effluent discharge from local Sewage Treatment Works

9.5.13 Potential contaminants likely to be present in soils and groundwater comprise organics and inorganics including:

- metals;
- heavy metals;
- hydrocarbons;
- phenols;
- VOCs;
- PCBs; and

- asbestos.

9.5.14 Ground gas from areas of landfill, Made Ground and potential natural alluvial deposits should also be assumed.

The contaminants identified are likely to pose risks to:

- site operatives in the route corridor;
- occupants in adjacent areas;
- controlled waters;
- flora and fauna (specifically the RAMSAR site on north bank);
- structures and in-ground services

Archaeology

9.5.15 Consultation should be undertaken prior to the intrusive investigation to ensure the site works do not disturb any recorded archaeological remains.

9.6 Assessment of Potential Risks

9.6.1 Based on the Desk Study, it is considered that a number of potential effects will need to be considered prior to development. These effects and the significance of the impact on the environment are summarised as follows:

Contamination

9.6.2 Contamination along the route corridor is considered likely, as a result of historic and current industrial land use including landfilling activities.

9.6.3 Contaminants likely to be present comprise organics and inorganics including metals, heavy metals, hydrocarbons, phenols, VOCs, PCBs and asbestos, as well as ground gas from areas of landfill, Made Ground and natural alluvial deposits.

9.6.4 Potential risks from these contaminants are posed to workers in the route corridor, occupants in adjacent areas, controlled waters, flora and fauna together with structures and in-ground services.

9.6.5 Site workers and adjacent site occupants are at risk from ingestion, inhalation and dermal contact with soil derived dust, outdoor inhalation of vapours from contaminated soil and groundwater, and inhalation of asbestos fibres on disturbance of asbestos-containing material.

9.6.6 Controlled waters (including the River Tees over which the route passes, and the underlying minor aquifer) are at risk from preferential flow paths which may be created during the site works and from the leaching of contaminants.

Extensive Made Ground & Remnant Foundations

9.6.7 The route to the north of the Tees crosses reclaimed land and in some locations this could be deep, ie greater than 3m. Some is known to be foundry waste, but all superficial material will be potentially contaminated.

To the south, the northernmost 800m nearest the river has also been reclaimed.

Further, on the Southern Section deep remnant foundations, likely to relate to former heavy industrial plant, are evident.

The former shaft, potentially a brine shaft associated with the Cleveland Salt Works is noted on the 1915 OS Sheet. By 1929 the Salt Works are noted as disused, and while

the shaft likely to have been capped/ infilled, it may require further treatment if structures are likely to be located over or in close proximity of it.

Flood Risk

9.6.8 The northern end of the Northern Section of the route, the area immediately adjacent to the River Tees and the far south eastern end of the Southern Section of the route are at risk from 'flooding from rivers or sea without defences'.

High Water Table

9.6.9 A high water table, especially close to the river should be anticipated. It is also likely that the ground adjacent to the Tees will be in hydraulic continuity with the river and some tidal influence cannot be precluded.

9.7 Potential Issues for Further Investigation

Intrusive Investigation

9.7.1 Prior to any development along the proposed route, intrusive investigation will be necessary at proposed tower locations to determine the types and quantities of contaminants in the ground and groundwater, and the geotechnical properties of the ground in order to identify any areas which may present engineering challenges.

9.7.2 It is recommended that a series of trial pits and boreholes are excavated and installed with groundwater and gas installations in order to monitor the ground conditions including any tidal variation. Samples should be obtained from the boreholes for contamination and geotechnical testing.

9.7.3 On completion of contamination testing and groundwater and gas monitoring, results should be screened against Generic Assessment Criteria (GAC) to assess risks to Human Health and Controlled Waters. The Preliminary Conceptual Site Model for the route should be revised and updated as appropriate.

The route passes over an area on the north bank of the River Tees classified as a SSSI, SPA, and RAMSAR site which will have significant implications on access to that area of the route, the programming of any work and the type of work permitted.

9.8 Summary

9.8.1 This Chapter has highlighted a number of potential factors related to the geology and ground conditions within the route and surrounding area which could potentially impact the route.

9.8.2 The principal constraints considered to be of relevance to the proposed development comprise contamination from current and historic land use, a former brine shaft, extensive Made Ground, existing deep foundations and the potential for flooding and high groundwater table.

10 SUMMARY AND CONCLUSIONS

10.1 Introduction

10.1.1 This Environmental Statement (ES) has been prepared to accompany an application submitted to the Secretary of State for Energy and Climate Change under Section 37 of the Electricity Act 1989 to construct and operate a new 400,000 volt (400kV) overhead transmission line to replace an existing double circuit 400,000 volt/275,000 volt (275kV) overhead transmission line between Towers ZZA229 and ZZA241 on land at Seal Sands, Stockton-on-Tees and Tees Dock Road, Redcar and Cleveland. It has been prepared in accordance with the requirements of the relevant environmental impact assessment (EIA) regulations. It also allows National Grid to demonstrate how its amenity responsibilities under Schedule 9 of the Electricity Act 1989 will be met in relation to this proposal.

10.2 Background and Consent Process

10.2.1 National Grid Electricity Transmission plc (National Grid) owns the high voltage electricity transmission system in England and Wales and operates the electricity transmission system across Great Britain. The Company is responsible for operating the high voltage network, carrying power between power stations and the local electricity supply networks of the regional distribution network operators.

10.2.2 The high voltage electricity transmission system in England and Wales, which operates at 275kV and 400kV, comprises some 7,000 route kilometres (km) of overhead lines, over 600km of underground cable and over 320 substations. At the substations, generation is connected to the system, and the primary transmission voltage of 400kV or 275kV is transformed to lower voltages to companies with direct connections, and to the Distribution Network Operators who take supplies and distribute electricity at lower voltages to factories, offices and homes.

10.2.3 Through the terms of its transmission licence and obligations under Section 9 and Schedule 9 of the Electricity Act 1989, National Grid is required to develop and operate its transmission system in an efficient, co-ordinated and economical manner whilst having regard to desirability of the preservation of amenity.

10.2.4 Section 38 and Schedule 9 of the Electricity Act 1989 requires National Grid to '*have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographic features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest*'; and to do what it '*reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites buildings or objects*' of any relevant proposals. National Grid interprets its amenity responsibilities to include those for the natural environment, cultural heritage and landscape and visual quality, the impact of works on communities and the effects of noise and disturbance due to construction. Included in 'works' are the construction of new infrastructure, the refurbishment of infrastructure and the dismantling of any parts of the system. To achieve these aims the Company has to balance technical, economic and environmental considerations to reach reasonably practicable development proposals.

10.2.5 National Grid has submitted its Section 37 application to the Department of Energy and Climate Change (DECC) supported by this Environmental Statement. In accordance with the consent application and EIA Regulations, a Public Notice of the application will be advertised in one or more local newspapers and in the London Gazette for two successive weeks. This statutory consultation provides an opportunity for

representations on the proposal to be made directly to the Secretary of State within the specified 28 day period, commencing on the day of the last Public Notice.

10.2.6 As is normal practice when making a Section 37 consent application, National Grid has requested that a 'tolerance' be granted on either side of the overhead line route to provide some flexibility in the final positioning of the towers. The tolerance applied for would extend to 100 metres either side of the centre line of the overhead line, but would not include residential properties. The tolerance is required to overcome engineering or construction difficulties, or to minimise potential damage to archaeological or ecological interests revealed by any subsequent survey work. The tolerance also allows for the precise positioning of towers to be agreed with landowners so as to avoid or reduce effects on their use of the land. The objective, however, would be to construct the overhead line on the route applied for unless there is a good reason to do otherwise.

10.2.7 Before making a decision on an application, the Secretary of State is required under Schedule 8 of the Electricity Act 1989 to give the relevant local authorities an opportunity to comment. The views of Stockton-on-Tees Borough Council and Redcar and Cleveland Borough Council would therefore be sought through a consultative process known as Form B Procedure. If the planning authorities wish to register a formal objection concerning the application, they have two months in which to do so. During this time, they may make any further consultations they feel necessary.

10.2.8 When the planning authorities have given their views on the Form B, it is sent to the Secretary of State. Should a planning authority object to the proposal the Secretary of State will hold a Public Inquiry to hear all objections before any decision is reached.

10.3 The Proposed Overhead Line

10.3.1 The route of the proposed replacement overhead line was identified following a two stage process, which first looked at potential overhead line corridors, and secondly, looked at potential route alignments within the preferred corridor. Environmental consultants were commissioned to identify all key constraints within a defined study area and to advise upon the selection of a preferred route corridor. This process has been described in Chapter 3 and the report provided at Appendix XX. The preferred route corridor identified has been chosen to avoid, as far as is practicable, high value interests of acknowledged importance.

10.3.2 The proposed route has been designed to minimise its landscape and visual impact whilst also avoiding as far as possible significant impacts on nature conservation, cultural heritage and land use interests, whilst remaining efficient on cost and technical grounds.

10.3.3 The proposed overhead line would be of steel lattice construction using the L12 suite of tower designs. The height range for standard design L12 towers extends from approximately 40 metres to 58 metres tall. It is anticipated that the height of the towers will be approximately 58m high. However, there is also a requirement to construct two no. towers to support the crossing of the River Tees. In order to provide the required clearance over the River, the crossing towers are likely to be around 130m in height.

10.3.4 On the north bank of the River, the proposed route corridor will run from Tower ZZA229 along the western boundary of the SABIC petrochemical plant. On crossing the river to the south bank, the route will run south along the western boundary of the Corus land before running east alongside the railway before rejoining the existing overhead line at Tower ZZA241.

10.3.5 The length of the realigned route will be approximately 4.8kilometres and comprise 16no Towers. This compares to a current route length of 4.04 kilometres and 12no. towers.

10.4 Construction Process

10.4.1 As an organisation National Grid has a strong safety culture and is keenly aware of its responsibility for the safety of the public, landowners and occupiers and has developed this scheme and its proposed construction methods in accordance with this approach. Site specific risk assessments and method statements would be undertaken prior to the commencement of site activities to identify potential risks, assess their likelihood and significance and propose mitigation measures to be implemented to ensure the safety of the general public and site workers.

10.4.2 National Grid would ensure that all working areas are securely fenced to ensure the safety of the general public and protect plant and equipment on site. Twenty four hour security would be considered where necessary

10.4.3 Overhead lines are constructed to conform to the Electricity Supply Industry's own engineering standards which govern the minimum clearances to be provided between the conductors, roads, trees and other features. Sufficient clearance would be provided to enable the land under and near to the line to be used normally. Each transmission tower has property signs, individual number plates and a safety warning. In order to discourage access by unauthorised persons, transmission towers are provided with anti-climbing devices.

10.4.4 In order to undertake construction works on National Grid's electricity transmission system 'outages' must be obtained to switch out certain parts of the system to allow safe working. These electrical outages need to be coordinated with other outages in the locality and elsewhere on the system, and therefore require advance booking to gain access to the system. Booking fixed duration outages in advance therefore also requires associated construction works to be programmed in advance, with all related activities co-ordinated in a fashion to allow all works on the system to be completed within the outage period.

10.4.5 Before constructing the proposed overhead line, precision ground surveys are required to ensure the proposed overhead line complies with technical design standards. Site investigations including trial bores would be carried out to determine foundation design requirements.

10.4.6 A Construction Traffic Management Plan would be prepared for the routeing of construction traffic and for each of the proposed access locations.

10.4.7 Stone roads would be installed to new tower positions, whilst aluminium trackway would be used to access existing towers to be dismantled. During the stripping of any soils a suitably qualified archaeologist would be present to identify any areas of potential archaeological interest. Wherever possible any areas of archaeological interest would be protected in situ. Where this is not possible, time would be allowed for investigating and recording of finds.

10.4.8 The proposed steel towers would be erected by mobile crane. Mass concrete foundations would be used, unless ground conditions require alternative designs. Existing towers would be dismantled and the steel work recycled. Following the erection of towers, conductors and insulators would be installed. Where the route crosses roads, railways or public footpaths appropriate protection measures such as scaffolding and netting would need to be used to safeguard the public and protect property.

10.4.9 In general the majority of components of an overhead line require little maintenance. The conductors and fittings of an overhead line may require renewing after a period of about 40 years. The towers may need renewing after 65 years, but would be repainted every 10 years.

10.4.10 Appropriate measures would be undertaken to ensure that no soil or water becomes contaminated with fuel or lubricants from plant or machinery or with any other potentially polluting chemicals that would be used on site.

10.4.11 After completion of the works, the area would be cleared and tidied up generally. Finally, fences and hedges would be repaired and access routes and disturbed land would be reinstated in agreement with the landowner(s). Any site security fences use during the dismantling and construction works would be removed. Any damage caused to property during the survey, construction or maintenance of the line would be rectified by the Company or full compensation paid for any loss that occurred due to the work undertaken.

10.4.12 Subject to the necessary consents, the construction and removal of the transmission overhead line towers is anticipated to take approximately 24 months, but the speed at which work would take place is largely governed by weather conditions and supply of materials. The tower sites can be occupied at different intervals throughout the construction period depending on site access and the programme. It is anticipated that the majority of the works would take place commencing August 2011 until November 2012.

10.5 Alternatives

10.5.1 National Grid has a duty under Section 9 of the Electricity Act 1989 to develop and maintain its transmission system in an efficient, co-ordinated and economical manner whilst having regard to the desirability of the preservation of amenity.

10.5.2 Section 4, Part II, Schedule 4 of the EIA Regulations requires that an ES should include an outline of the main alternatives studied and an indication of the main reasons for the selection of the proposed development, taking into account environmental effects.

10.5.3 National Grid has undertaken a number of studies (as detailed in Chapter 3) to determine the most appropriate means of upgrading the ZZA route corridor between towers ZZA229 and ZZA241. The alternatives considered include:

- Option 1 - Strengthen the existing foundations of tower ZZA234 and ZZA235, and consider the extent of work necessary to refurbishment and upgrade towers between ZZA229 and ZZA241.
- Option 2 - Relocate tower ZZA234 online (or offline) towards the north bank of the River Tees, or elsewhere within the SABIC site and consider the extent of work necessary to refurbishment and upgrade towers between ZZA229 and ZZA241
- Option3 - Relocate a complete section of overhead line to remove the existing River Tees Crossing, either as a complete route section between towers ZZA229 and ZZA241, or a subsection between these two points.
- Option 4: Remove the overhead line River Tees Crossing and replace with a cable section within a tunnel beneath the river.

10.5.4 Overall the proposed works represent the most economical and efficient option. Given the current condition of the existing towers, the timeframe in which upgrading works must be undertaken, the requirement for infrastructure and overall cost of the scheme, the preferred route option provides the most economical and efficient option

10.5.5 The proposed option is believed to best meet National Grid's licence obligations by minimising the extent of network development required and being the most economic.

10.6 Ecology and Nature Conservation

10.6.1 Following a scoping exercise and consultation with relevant statutory groups, the assessment of effects is based on information gathered through an extended desk study as well as an Extended Phase 1 Habitat Survey undertaken in November 2009.

10.6.2 Overall the impacts of the proposed Tees Crossing Asset Replacement Scheme on nature conservation are not considered to be significant.

10.6.3 Effort has been made to locate construction site compounds and towers away from ecologically sensitive areas of the site such as the mud flats and waterbodies. A precautionary method of working has been advised in order to prevent killing or injury of any reptiles using the site.

10.6.4 Short term temporary disturbance to fauna using the site has been limited by restricting the works to diurnal work and implicating good construction practice such as limiting works to the minimum area and covering trenches at night.

10.6.5 The risk of pollution caused by accidental spillage of fuels or chemicals from construction vehicles involved in the installation will be minimised by standard pollution control measures such as pollution prevention guidelines (PPG's)57 being adhered to throughout the construction period.

10.6.6 No monitoring is considered necessary on this site given the limited scope for the presence of protected and notable species and the generally low value of the habitats present, as discussed within this ES.

10.7 Ornithology

10.7.1 Ecological input was provided from an early stage of the scheme, to assist in the identification of a preferred route that, where possible, minimised adverse effects on ecological features. Measures (including provision of deflectors every 20 m on the proposed line and 2 km of the existing network) have been incorporated into the scheme design and into the construction programme and method (e.g. appropriate timing of works and use of screening at appropriate locations) to avoid and minimise impacts on the local bird populations.

10.7.2 Following a data collation exercise in April-May 2009, an initial scoping visit was undertaken on 29th May 2009 alongside the first Vantage Point survey. Following this initial visit to site and consultation with Natural England a detailed ornithological survey scope was produced for a 12 month period dating from May 2009 to May 2010. This survey scope included two main survey types: Vantage Point surveys and waterbird surveys. This chapter has been based on information gathered between May 2009 and January 2010 only; a supplementary report will be produced following completion of the full 12 month survey period in May 2010 presenting the full results and a detailed impact assessment. In addition to the surveys at the proposed overhead line location, comparative surveys were also undertaken in winter 2009/2010 at two other locations (the Blyth Estuary in the north-east of England and the Firth of Forth in the south-east of Scotland) to examine the potential issue of displacement (following request by RSPB in December 2009).

10.7.3 An Appropriate Assessment screening will be submitted to Natural England in March 2010 taking into account the bird survey results as detailed in this chapter.

10.7.4 There are considered to be three main potential effects of overhead line installation on birds: disturbance, displacement and collision risk.

[57] Environment Agency Pollution Prevention Guidelines website: (http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx).

10.7.5 Data gathered to date indicates that once mitigation has been taken into account there will be short-term negative impacts on one of the SPA qualifying species (redshank) and on assemblage species at the River Tees through minor and temporary levels of disturbance during the construction phase of the works; however as this work will be restricted to the summer months only (other than small-scale vegetation clearance), this impact is not anticipated to occur during periods for which the SPA assemblage or qualifying features are designated (breeding little tern are not anticipated to be present in this area). Consideration will be given to extending this avoidance period to also include the main passage migration season for sandwich tern and ringed plover if the spring 2010 survey results indicate this is necessary (currently only low numbers of these species have been recorded and this is not considered necessary). Short term displacement from habitat surrounding the crossing may also occur during construction although it is thought that this will not be permanent and displacement will be localised only and that birds will quickly habituate to the new crossing. The visual screening that will be used will reduce this impact.

10.7.6 At the Reclamation Ponds, it is more difficult to predict the likely effects of disturbance as the predicted baseline will be significantly different from the present situation as the waterbody is likely to be infilled for the permitted Thor Cogeneration Plant prior to commencement of construction. It is likely that the effects from the overhead line on birds using the pond will be similar to those at the River Tees, with birds only being temporarily affected by the construction process and no significant impact on the SPA qualifying features being anticipated.

10.7.7 Permanent displacement of birds (including redshank on the exposed mudflat) is considered highly unlikely. An indicative study of two comparative sites where overhead lines crossed estuaries (at the Blyth and the Forth Estuaries) and information gathered regarding bird activity close to the existing overhead lines at Teesside has indicated that birds habituate to the presence of overhead lines fairly readily and levels of activity underneath overhead lines is more likely to be influenced by habitat type than as a result of the presence of the infrastructure.

10.7.8 It is likely that there will be some bird collision associated with the proposed overhead line, although data gathered to date indicates that this is unlikely to be significant and in particular, only low numbers of collisions are anticipated for the SPA qualifying species in the area.

10.7.9 The impact of the scheme on the habitats within the nearby designated sites is considered to be neutral. Whilst there will be some effects on bird species and assemblages present, there are not considered to be any effects that will be significantly detrimental to fulfilment of the SPA conservation objectives for this site or that will affect the ability of the populations to survive at their current conservation status.

10.8 Landscape and Visual

10.8.1 The current proposal has been the subject of a landscape and visual impact assessment (LVIA) in accordance with the Guidelines for LVIA (Second Edition) published by the Landscape Institute in conjunction with the Institute of Environmental Management and Assessment (IEMA). The conclusions of the LVIA are set out below.

10.8.2 The main opportunity for mitigating an overhead line is in the identification of a detailed alignment that would minimise its landscape and visual impact. The alignment of the overhead line has been influenced by the location of features identified in the initial route options study, as further refined by National Grid during discussions with consultees and landowners. The route also maximises as far as possible the distance of the line from sensitive receptors.

10.8.3 Detailed assessments on all identified receptors are contained within the Landscape and Visual Assessment Schedule appended to the document (Appendix 6.4).

10.8.4 No significant effects are anticipated on landscape character, designated sites or relevant landscape policies.

10.8.5 Long term slight adverse effects have been evaluated for several visual receptors, including residential properties, viewpoint locations and recreation uses.

10.8.6 A permanent loss of scattered scrub and broadleaved trees would occur during construction; this is not considered to be significant. Short term impacts as a result of construction activities are anticipated on users of the railway near South Bank and the Teesdale Way. It is assessed that generally no impacts or negligible impacts would arise as a result of the construction phase.

10.8.7 A moderate to large adverse effect has been evaluated on a section of the Teesdale Way (European Long Distance Route E2), due to the number of towers that would be visible at close distance and the sensitivity of the receptors. However, this must be balanced with the existing features currently visible along the stretch and adjacent sections, including chimneys, towers and railway line. The significance of the effect is considered to be moderate adverse. The effect on the Teesdale Way overall is not considered to be discernible and evaluated as to be neutral.

10.8.8 No mitigation is suggested for landscape and visual amenity.

10.8.9 Overall the effects of the proposed Tees Crossing Asset Replacement Scheme on landscape and visual amenity are not considered significant.

10.9 Land Use

10.9.1 This section of the Environmental Statement is concerned with the effects that the proposed Asset Replacement Scheme will have on land use.

10.9.2 A general desk and field survey of the area was undertaken focusing on the proposed route of the Asset Replacement Scheme in particular existing and future land use within the vicinity of the proposed works. The area is dominated by industrial development including petrochemical plants, chemical works, area of landfill and waste management and heavy engineering. Proposals for development close to the proposed works are also of an industrial nature.

10.9.3 In the vicinity of the proposed works all of the land is vacant. The existing overhead power lines also currently cross vacant land and it is on vacant land where the majority of the works will occur and the proposed Asset Replacement Scheme will be located.

10.9.4 Given the site of the proposed route is vacant and currently undeveloped, the construction of the Asset Replacement Scheme is considered to result in neutral effects on land use. No significant effects on land use, current or future, are predicted.

10.10 Cultural Heritage

10.10.1 The proposed overhead line will replace an existing line albeit on a different course. The line, like its predecessor, will be constructed in an area of intense industrial development that has occurred since the mid-19th century. The nature of this industrial development means that the line will be part of an existing landscape of industrial construction.

10.10.2 The proposed line is marginally closer to some of the Conservation Areas within the 5km study area, but the existing industrial and infrastructural landscape means that the visual impact of this is nil. The proposals may however slightly adversely impact on the visual setting of a small group of listed buildings in South Bank.

10.10.3 The archaeological resource as it is currently known will not be affected by the proposed overhead line. There has been a high level of land reclamation on both the north and south sides of the River Tees to a depth of at least 3m, and it is unlikely that any archaeology is contained within the topsoils. Potential palaeobotanical deposits within deeper strata remain possible, and there remains a very low potential that unrecorded remains of prehistoric and medieval date may potentially be affected by the construction works. These remains should they exist would increase knowledge and understanding of periods not well understood, especially in the Tees area. A programme of archaeological evaluation through borehole analysis is proposed to mitigate the potential of damaging such remains.

10.11 Contaminated Land, Ground Conditions and Geology

10.11.1 The assessment of the geology and ground conditions identifies the nature of the superficial and solid geology underlying the route, as well as the extent, nature and depth of any Made Ground or fill materials, which could potentially be contaminated and which may have an impact on the development and the environment. The purpose of the assessment is to collate background historical and geo-environmental data to identify, where possible, ground-related development constraints including the potential for contamination.

10.11.2 Based on the information collated for the desk study and walkover, the environmental setting of the site is summarised as follows:

- Between 1857 and 1861, the area was predominantly undeveloped sand and mud flats, bounded farmland, with a Brick Field, Tilery and Iron Works in the area. Significant industrial development had taken place south of the River Tees by 1894. North of the River Tees industrial development had not taken place until 1990.
- The closest surface water features include the River Tees which is tidal at the proposed route crossing point. A settling lagoon /remediation pond is also adjacent the northernmost end of the route.
- The geology at the site is anticipated to be the Mercia Mudstone Group overlain by Estuarine and Marine Alluvium.
- Made Ground is indicated along the length of the route on the geological mapping, including foundry waste used to reclaim land to the north of the River Tees.
- Several areas of potentially infilled land are listed off–site within the Envirocheck Report.
- The geology is classified as a Minor Aquifer with soils of high (urban) leaching potential.
- Potentially contaminative land uses on and within 250m of the route include: Iron Works, Steel Works, Concrete Works, Salt Works, Eston Sheet and Galvanising Works, Tar Macadam Works, Antonien Agro-Chemical Works, Slag Brick Works, Railway Tracks, Power Station, Oil Refinery, Dockyards, effluent discharge from

local Sewage Treatment Works, Settlement Lagoons/ Remediation Ponds, a shaft and tanks,

10.11.3 Based on the above, the environmental sensitivity of the site can be considered at this stage to be moderate.

10.11.4 The survey also identifies potential risks to the proposed development and provides recommendations as to the next stages in investigation of the ground conditions of the proposed route corridor as follows:

Contamination

10.11.5 Contamination along the route corridor is considered likely as a result of historic and current industrial land use including landfilling activities.

10.11.6 Contaminants likely to be present comprise organics and inorganics including metals, heavy metals, hydrocarbons, phenols, VOCs, PCBs and asbestos, as well as ground gas from areas of landfill, Made Ground and natural alluvial deposits.

10.11.7 Potential risks from these contaminants are posed to workers in the route corridor, occupants in adjacent areas, controlled waters, flora and fauna together with structures and in-ground services.

10.11.8 Site workers and adjacent site occupants are at risk from ingestion, inhalation and dermal contact with soil derived dust, outdoor inhalation of vapours from contaminated soil and groundwater, and inhalation of asbestos fibres on disturbance of asbestos-containing material.

10.11.9 Controlled waters (including the River Tees over which the route passes, and the underlying minor aquifer) are at risk from preferential flow paths which may be created during the site works and from the leaching of contaminants.

Extensive Made Ground & existing deep foundations

10.11.10 There is potential deep Made Ground to the north of the River Tees, on land reclaimed using foundry waste.

10.11.11 Further, on the Southern Section deep foundation remnants evident, are likely to relate to former heavy industrial plant. The historic shaft (1915), while likely to have been capped/ infilled is likely to be unsuitable for founding structures on.

Potential Issues for Further Investigation

10.11.12 Intrusive Investigation: Prior to any development along the proposed route, intrusive investigation will be necessary to determine the types and quantities of contaminants in the ground and groundwater, and the geotechnical properties of the ground in order to identify any areas which may present engineering challenges.

10.11.13 It is recommended that a series of boreholes are excavated and installed with groundwater and gas installations in order to monitor the ground conditions including any tidal variation. Samples should be obtained from the boreholes for contamination testing and geotechnical testing.

10.11.14 On completion of contamination testing and groundwater and gas monitoring, results should be screened against Generic Assessment Criteria (GAC) to assess risks to Human Health and Controlled Waters and the Preliminary Conceptual Site Model for the site should be revised and updated as appropriate.

10.12 Planning

10.12.1 This ES has not considered the relationship between National Grid's proposal and the development plan context; this has been considered within a separate Planning Statement.