



SCOTTISHPOWER

SP Transmission Ltd

**East Coast 400kV Reinforcement Project
(Blairingone to Kincardine)**

**Environmental Statement
Volume 1: Environmental Statement**

October 2013

This document has been produced for Scottish Power Transmission Ltd to support an application for Section 37 consent for the upgrade of the existing overhead line route between Kincardine and the SHETL Boundary at Blairingone.

The document has been compiled by



In conjunction with the following Companies



Environmental Designworks

nationalgrid

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PREFACE

The Environmental Statement comprises the following documents:

- Written Statement (principal document)
- Figures
- Appendices

Further copies of all these documents may be obtained, and will be available for viewing, from:

ScottishPower EnergyNetworks
 Environmental Planning
 Ochil House
 Technology Avenue
 Hamilton International Park
 Blantyre
 G72OHT

The Non-Technical Summary is available free of charge, a copy of the Environmental Statement, Figures & Technical Appendices for £150.00. In addition all documents are available (as a PDF for screen viewing only) on a DVD for £10.00.

Copies of all documents are also available free of charge at http://www.spenergynetworks.co.uk/serving_our_customers/performance.asp

Any representations to the application should be made by completing the online representation form on The Scottish Government, Energy Consents website at <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-Consents/Support-object>

or

by email to The Scottish Government, Energy Consents Unit mailbox at representations@scotland.gsi.gov.uk

or

by post to The Scottish Government, Energy Consents Unit, Scottish Government, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU, identifying the proposal and specifying the grounds for representation, not later than Friday 20th December 2013.

Representations should be dated and should clearly state the name (in block capitals) and full return email or postal address of those making representation. All representations to the Scottish Government will be copied in full to the planning authority, and made available to the public on request, unless individuals request otherwise.

Copies of the documents will be available for public viewing at the following Council departments and Libraries:

SP Energy Networks, Environmental Planning, Ochil House, Technology Avenue, Hamilton International Park, Blantyre, G72OHT	Clackmannashire Council, Development Quality, Kilncraigs, Greenside Street, Alloa, FK10 1EB
Fife Council, Planning Department, Fife House, North Street, Glenrothes, KY7 5LT	Kincardine Library , 2 Keith Street, Kincardine, FK10 4ND



East Coast 400kV Reinforcement Project (Blairingone to Kincardine)

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1. INTRODUCTION

Scottish Power Transmission (SPT) is the transmission license holder for the south of Scotland and is required under the Electricity Act 1989 and under the terms of its Electricity supply license “to develop and maintain an efficient, co-ordinated and economical system of electricity transmission”.

SPT is seeking consent from Scottish Ministers under Section 37 of the Electricity Act 1989 for the upgrading and refurbishment of the existing Overhead Transmission Line (“OHL”) between Kincardine (Fife) and Blairingone (Perth & Kinross) including the replacement of existing tower insulators, the replacement of two cable termination compounds, the construction of three new low level gantries and the removal of two existing low level gantries. SPT is also seeking a direction from Scottish Ministers that planning permission for the upgrading and refurbishment of the existing Overhead Transmission Line as well as the construction of a new substation and partial removal of the existing substation at Kincardine is deemed to be granted under Section 57 (2) of the Town and Country Planning (Scotland) Act 1997. A plan of the OHL route and substation site is provided in Volume 2 of this ES (Figure 1).

The application for Section 37 consent and deemed planning permission is accompanied by this Environmental Statement (“ES”). The ES reports on the environmental impact assessment which has been undertaken in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended). The ES presents information on the identification and assessment of the likely significant environmental effects of the Proposal. Further details of the statutory requirements for environmental impact assessment (“EIA”) are set out later in this Chapter.

1.1 Background

The Project is described in detail in Chapter 2: *Description of the Project* of this ES. In summary, it will comprise:

- The upgrading of the OHL from 275,000 volts (275kV) to 400,000 (400kV) over a distance of approximately 10.5 kilometres including the replacement of the existing tower insulators along the extent of the route, replacement of two cable termination compounds,

construction of three new low level gantries and removal of two existing low level gantries;

- Construction of a new 275/400kV Gas Insulated Substation (GIS); and
- The partial removal of the existing 275kV substation at Kincardine”

1.2 The Applicant

SPT is the transmission license holder for the south of Scotland and is required under the Electricity Act 1989 and under the terms of its transmission license “to develop and maintain an efficient, co-ordinated and economical system of electricity transmission”.

In addition, SPT, as owner of the transmission assets within its licence area, has the following obligations pursuant to its licence conditions:

- To plan and develop its transmission system in accordance with the GB Security and Quality of Supply Standards and in doing so to take account of National Grid's obligations, as system operator, to co-ordinate and direct the flow of electricity on, to and over the GB transmission system; and
- To make offers to generators wishing to connect to the transmission system in SPT's licence area. In this connection, SPT is obliged to make its transmission system available for these purposes and to ensure that the system is fit for purpose.

In response to statutory and licence obligations upon it, SPT therefore requires to provide connections for electricity generators and where appropriate reinforcements to increase transmission capacity.

The East Coast 400kV reinforcement project is identified as a key reinforcement in the National Planning Framework (NPF) for Scotland 2 (June 2009). In summary, the main drivers for the project are:

- Increasing the ability to transfer power from north to south, both internal to the SHE Transmission area and between the Scottish Hydro Electric Transmission Ltd (SHETL) and SPT areas; thereby
- Reducing generation constraint costs and facilitating the economic integration of new generation in Scotland and Government renewable energy targets.



1.3 The Legislative Context

The continued management and development of the Scottish electricity network is subject to European and national legislation of which the following comprise the principal legislation relevant to the current development programme:

- The Electricity Act 1989;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (amended 2008); and
- Town and Country Planning (Scotland) Act 1997, as amended by the Planning etc. (Scotland) Act 2006.

The application for this project will be made to the Scottish Ministers under Section 37 of the Electricity Act 1989. However, since the OHL refurbishment lies within the administrative areas of Fife and Clackmannanshire Council, the application will be considered not only in the context of the Electricity Act but Scottish Government Planning Policy (SPP) and development plans for these areas.

As part of the Section 37 application, SPT are also seeking for the Scottish Ministers to issue a direction that deemed planning permission be granted under Section 57(2) of the Town & Country (Scotland) Planning Act for the OHL and the ancillary development of the cable sealing end compounds and proposed substation at Kincardine.

The upgrade works to the OHL, which form part of the project, are not classed as Schedule 2 development, under the terms of the EIA Regulations, as the route extends over only 10.5 km in length. However this project is part of a much larger scheme and SPT has elected to consider the OHL as part of the overall project and therefore considered EIA development within the definition specified in Schedule 1 (b) to the Electricity Works (Environmental Impact assessment) (Scotland) Regulations 2000:

“an electric line installed above ground with (a) a voltage of 220 kilovolts or more and (b) a length of more than 15 kilometres...”

1.4 Objectives of the Environmental Statement

This document is a statement of the findings of the Environmental Impact Assessment (EIA) carried out by the project team between 2012 and 2013.

The objectives of the Environmental Statement (ES) are as follows:

- To report the findings of the assessment of the likely significant environmental effects of the Project during construction and operation; to assist the decision maker prior to the determination of the application for section 37 consent and deemed planning permission;
- To predict and evaluate the extent and significance of the potential effects;
- To identify and evaluate possible mitigation measures to reduce any adverse effects;
- To establish a programme of monitoring where required; and
- To identify significant residual effects.

1.5 Assessment Methodology

The term ‘impact’ is used commonly throughout the EIA process and is usually defined as a change experienced by a receptor (this can be positive, neutral or negative). The term ‘effect’ is commonly used at the conclusion of the EIA process and is usually defined as the consequences for the receptor as a result of an impact. The EIA Regulations require “a description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development”

Therefore, impacts and effects are described separately and the effects assessed in terms of their significance.

In determining significance the following criteria has been considered:

- Sensitivity – of receptor, such as habitat or species;
- Magnitude – change to the baseline in terms of scale, extent, duration, reversibility and timing;
- Probability – the likelihood of the effect occurring

For each topic assessed in the EIA, the potential impacts are presented and assessed to determine for significant effects

It is recognised that the approach to determining the significance of effects varies for each topic, but to ensure consistency and for comparison purposes the overall significance of effects has been sub-categorised as follows:



- None – no detectable change to the environment;
- Minor – a detectable but non-material change to the environment;
- Moderate – a material but non-fundamental change to the environment; and
- Major – a fundamental change to the environment.

None and low effects are considered not to be significant, whereas moderate to major are deemed significant.

1.6 Mitigation

SPT, as a transmission licence holder, are required under Section 38 and Schedule 9 of the 1989 Electricity Act to have regard to the natural and built environment and to undertake reasonable mitigation.

Schedule 9 (Para 1), requires that the holder:

- Have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and
- To do what they reasonably can to mitigate any effect that the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.

Through the evolution of the proposals what is being brought forward is a "relevant proposal" in terms of Schedule 9. SPT has been mindful of its obligations under the Act and have sought to implement mitigation measures and strategies which reduce the effects of the Project upon the receptors.

Mitigation is defined here as: measures envisaged through the consideration of alternatives, physical design, project management or operation to prevent, reduce and where possible offset any significant adverse effects on the environment.

Specific mitigation measures are presented in the relevant chapters.

1.7 Scope and Content of Environmental Statement

Prior to submission of an application to the Scottish Ministers under Section 37 of the Electricity Act 1989,

SPT applied for a scoping opinion to seek agreement on the content and extent of the EIA.

For projects such as this, falling under The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended 2008), the scoping request would, ordinarily, be made directly to the Scottish Ministers. However, given the limited nature of the works involved, SPT did not submit a formal scoping request in this instance. Instead, SPT sent the scoping report directly to the relevant consultees and stakeholders and requested that those who wished to respond did so directly to SPT.

Scoping responses (enclosed within Volume 3, Appendix A of this ES) were subsequently provided by the following organisations:

- Scottish Environment Protection Agency (SEPA);
- Scottish National Heritage (SNH);
- Historic Scotland;

Consultation responses were not provided by the following organisations:

- Fife Council;
- Clackmannanshire Council; and
- The Scottish Government.

The responses confirm the expectations of the consultees regarding the EIA and the resulting content of this ES. References to the scoping responses are provided within each chapter of the ES as appropriate. Further details are presented in Chapter 3 of this ES.

Based on the consultation undertaken and responses received to date, a consensus was reached on the key topics to be assessed as part of the EIA. These were:

- Water Environment;
- Terrestrial Ecology; and
- Landscape and Visual Amenity.

1.8 Sources of Information

Primary sources of information have included:

- Study specific investigations and surveys;
- Literature review;
- Consultation with statutory and non-statutory consultees; and
- Construction methodology.

Specific information sources are referenced throughout the document where appropriate.



1.9 Structure of the Environmental Statement

The ES is presented in three volumes: which incorporate the following:

Environmental Statement (Volume 1):

The main text of the ES setting out the findings of the assessments related to the impacts of the proposed development consisting of the following chapters:

- Chapter 2 Description of Project;
- Chapter 3 Scoping Outcome;
- Chapter 4 Planning Context;
- Chapter 5 Water Environment;
- Chapter 6 Flora and Fauna;
- Chapter 7 Landscape and Visual Amenity;
- Chapter 8 Other Issues;
- Chapter 9 Cumulative Effects;
- Chapter 10 Residual Effects; and
- Chapter 11 Environmental Management Plan (EMP).

Figures, Plates and Technical Drawings (Volume 2): as referenced throughout this report.

Technical Appendices (Volume 3): provides additional technical data.

A **Non-Technical Summary (NTS)** is also provided although this is a stand-alone document and summarises the key issues as highlighted throughout the ES.

1.10 Project Team

The ES was managed and compiled by EnviroCentre Ltd who retain technical responsibility for the Water Environment and Terrestrial Ecology chapters as well as the Geology and Soils section with contributions by the following project team members:

- **Halcrow Group Ltd** [CH2M) (Flood Risk Assessment);
- **Environmental Designworks** (Landscape and Visual Impact Assessment);
- **SgurrEnergy Ltd** (Noise Impact Assessments);
- **National Grid plc** (Electro-Magnetic Fields Impact Assessment); and
- **Iberdrola Engineering and Construction** (Traffic and Transport Assessment).



2. DESCRIPTION OF THE PROJECT

This Chapter provides a description of the Project which forms the basis of the assessment presented within Chapters 5 – 9. It provides details of the construction phase and of the operational phase of the Project.

The Chapter includes an overview of the Project followed by a detailed description of the main components and their method of construction.

2.1 Overview of the Project

The Project will comprise the following main components:

- Upgrading and refurbishment of the existing Overhead Transmission Line between Kincardine and Blairingone, including:
 - I. The replacement of existing tower insulators;
 - II. The replacement of two cable termination compounds;
 - III. Construction of three new low level gantries;
 - IV. The removal of two existing low level gantries;
- The construction of a new 275/400kV substation; and
- Partial removal of the existing 275kV substation at Kincardine.

The Project will comprise three distinct sections, these being:

- The overhead line upgrade, including the removal of the two existing towers and one terminal tower at Kincardine;
- Replacement of cable sealing and compounds on low level gantries adjacent to the crossing of the A977 at Kilbagie; and
- Construction of a new 400/275kV gas insulated substation (GIS) at Kincardine.

2.2 Overhead Line Towers

The existing towers are of an L2 design. The average tower height of the existing line is 45m however these heights vary in order to maintain the statutory ground

clearance distances. The existing towers will not require to be increased in height in order to maintain the minimum clearance distances.

It should be noted that the two existing approach towers at the Kincardine substation will require to be deviated to facilitate connection of the proposed 400kV substation. The replacement tower will be of the same type and design as the existing overhead line.

2.3 Overhead Line Components

The existing towers carry twelve conductors and an earth wire. Each conductor is joined to the tower cross arm via an insulator string (comprising glass dishes). The conductors and earth wire will not require to be replaced in order to facilitate the upgrade of the line to 400kV however the insulators will require to be replaced to allow for the increased clearances required for the increased voltage of the line.

Plate 1 (Vol. 2) shows the typical arrangement of the L2 tower design and its various component parts.

2.4 Cable Sealing End Compounds

The upgrade of the overhead line to 400kV will require the replacement of the existing 275kV cable sealing ends at Kilbagie. This will allow one side of the line to be terminated on to a new 400kV cable between the two compounds in order to safely pass under the existing tower lines crossing the A977. Similar to the existing arrangement this will require a new sealing end compound on each side of the road. Each compound will be surrounded by a 2.74m high security fence and a 1.5m wide perimeter pathway. The compound to the east of the road will be approx. 43m x 42m and the compound to the west will be approx. 46m x 42m. See Technical Drawing- 185D-1-4100-DA-IECEE-0003: Vol 2, for the layout of the compounds.

The other side of the line will cross under the existing lines and over the A977 on a low level gantry.

The existing 275kV sealing end compounds and low level gantries will be removed upon commissioning of the 400kV line. The existing 275kV cable will be capped and left in situ.

Plates 2 and 3 show the existing arrangement of the sealing end compounds and low level gantries at Kilbagie.



2.5 Kincardine GIS (Gas Insulated Substation)

The voltage upgrade requires the establishment of a new 400/275kV substation at Kincardine in order to connect the upgraded line into the electricity grid.

A gas insulated substation is an electrical substation in which the major structures are contained in a sealed environment (steel tubing) with sulphur hexafluoride (SF₆) gas as the insulating medium (Plates 4 and 5 show a typical GIS). SF₆ gas is an extremely efficient insulating medium and one of the main reasons why gas insulated substations were developed was to allow high voltage installations to be made as compact as possible.

In most cases, the circuit breakers and busbars are SF₆ insulated and also employ the gas as the interrupting medium in the breakers. Traditional AIS (air insulated substations) rely on air as the insulating medium and hence safety clearance distances from the live conductors require to be much greater. Plate 6 shows the AIS substation that is currently located at Kincardine.

The proposed 400/275kV GIS at Kincardine will be contained in a compound approx. 218m x 110m surrounded by a 2.74m high security fence and a 1.5m wide perimeter pathway. Drawing no. SP4105140 (Volume 2) shows the proposed layout of the GIS.

2.6 Construction

The construction of the different elements of this project will be procured by SPT through specialist contractors. These will be procured through “design and build” contracts, and will require the contractor to develop the proposals set out within this document into a construction package. Each contractor will be required to comply with the requirements set out in this document and the Technical Appendices attached to it and any conditions or other restrictions placed upon the S37 consent.

The schedule of mitigation and commitments included within this document and the requirement for compliance with all extant laws and regulations will form a part of this contract to ensure that the construction operations carried out accurately reflect the assessment undertaken and presented with this ES.

2.7 Access

Vehicular access with a maximum width of 5m has to be secured to every site on the route. Access routes and detailed arrangements will be agreed with each landowner or occupier and will use the existing agricultural access. The overall objective of the identification and provision of access will be to avoid and /or reduce effects on any natural or cultural heritage interests and to cause least disturbance to current land use and management practices. The principle method employed to achieve this will be to maximise the use of existing tracks (and bridges) with upgrading of these where necessary.

In addition pre-construction ecological surveys will be undertaken to inform the detailed routing of any access routes and to avoid and minimise any environmental effects. The proposed access routes are shown on Figures 2.1a to 2.1b in Volume 2.

Given the type of plant and machinery required to reinsulate the OHL and the existing agricultural accesses, it is anticipated that low pressure vehicle use will be used to access all towers on the route.

The access will however still be limited to the width required and demarcated as appropriate.

Should the use of low ground pressure vehicles not be sufficient to access a tower then towers could be accessed by the following means:

- Floating tracks – this approach will be used in areas of peat or where the ground bearing capacity is insufficient. Geotextiles and geogrids will be employed as required with imported stone. This may be combined with minor local cut and fill and drainage works as required
- Wood/steel matting – in areas with particular sensitivity temporary matting will be used where ground conditions permit.

Access for construction traffic will be required and maintained to all sites during the construction phase. The rolling construction programme will ensure that not all tracks are in place at any one time and any tracks that are no longer required will be removed as appropriate.

Future access arrangements for maintenance and fault repairs will be arranged with the relevant land owners.



The development of the proposals and the accesses to the different elements of these has been designed to minimise the need to cross watercourses. Where however there is a need to provide such a crossing, a temporary crossing will be constructed. However, site surveys have identified the potential requirement to cross four drainage ditches (see Table 5.6 in Chapter 5). In each of these instances it is proposed to use a mat of timbers, supported by steel beams.

2.8 Reinsulation of XL Towers

Reinsulating the existing towers from 275kV to 400kV follows a standard sequence of activities. These include:

- Access site;
- Replacement of insulators
- Reinstatement of access and any temporary works

2.8.1 Access Site

This will be undertaken in line with the actions set out in section 2.6 above.

2.8.2 Replacement of Insulators

Linesmen will climb each tower and attach a pul-lift from tower crossarm to conductors (see Plate 7). This allows existing insulator to be unbolted before being lowered to the ground using a tractor and winch. The tractor and winch (see Plate 8) are then used to lift the new insulator on to the tower cross arm before being attached to the cross arm and conductors. Once the new insulator is in place, the pul-lift is removed. This process is then repeated for the remaining insulators on the tower.

Where insulators are being replaced on towers that are adjacent to a road or railway crossing, protection in the form of scaffolding will be erected prior to the commencement of work in consultation with the appropriate roads authorities (see Plate 9). Scaffolding will be erected at either side of the crossing, with the span between the scaffolding netted to provide the required clearances and to prevent the conductors, or any other items, falling on to the carriageway.

Insulators will be landed on tarpaulins to prevent contamination of the ground with broken insulators. All materials will then be disposed of in accordance with the site waste management plan. The tractor/winch will have drip trays positioned

underneath to prevent any fluid leaks/spills from contaminating the ground.

Reinstatement of Access and Temporary Works
All access materials will be removed and ground reinstated to previous conditions

2.9 Construction of steel lattice towers and low level gantries

OHL construction follows a standard sequence of activities. For steel lattice tower OHLs these activities include:

- Preparation of temporary working areas including excavation and construction of foundations;
- Delivery, assembly and erection of steel lattice towers and associated items;
- Insulator and conductor (wire) stringing; and
- Clearance and reinstatement

2.9.1 Preparation of temporary working areas and construction of foundations

Each new tower and gantry will require a working area of approximately 1,350m² (90mx30m). This area will be fenced off/demarcated to limit construction activities to this area. Consideration will be given to varying the size and shape of these areas to avoid any environmental constraints. Following commissioning of the OHL, these areas will be restored.

Concrete foundations will be required for both the new L8 tower at Kincardine and low level gantries at Kilbagie. All concrete will be imported to site as ready-mix. The foundation type and design for each structure will be confirmed following detailed soil investigations at each location. The tower/gantry steel work connects to a "stub" and these are located and fixed by means of a pile cap at each leg position (see Plate 10). Where foundations are excavated, the dimensions will depend on both the tower type and the ground conditions, but will typically be between 5m x 5m x 5m. Excavated materials will be retained onsite and placed back within the foundations (in appropriate layers) following the concrete works. Any surplus material will be removed from site and treated in accordance with the site waste management plan.

Once the foundations are complete, (and cured) the steelwork will be delivered to site and assembly will commence either by setting up a derrick crane and



building the tower in steel sections, or assembling the tower in part at ground level and lifting the sections by crane to form the tower.

2.9.2 Insulator and conductor (wire) stringing

Once the new towers/gantries have been erected, drums of conductor and a tensioner winch will be located in a working area at one end of the overhead line section, with the pulling winch at the other (see Plates 11 and 12). The conductor will be joined to a single, heavy-duty pilot wire placed in blocks hanging from the insulators on the towers/gantries and drawn through the section under constant tension. By using the “continuous tension stringing” method the conductors are held aloft at all times and do not touch the ground or any other structures.

Where the conductor needs to be strung across the A977, between the low level gantries, protection in the form of scaffolding will be erected prior to the commencement of stringing in consultation with the appropriate roads authorities (Plate 9). Scaffolding will be erected at either side of the crossing, with the span between the scaffolding netted to provide the required clearances and to prevent the conductors, or any other items, falling on to the carriageway.

All required plant will have drip trays positioned underneath to prevent any fluid leaks/spills from contaminating the ground.

2.10 Construction of the Sealing Ends

The construction of the sealing ends and gantries crossing the A977 will comprise the following tasks:

- Pre-construction activities;
- Earthworks to form construction platform;
- Formation of concrete bases for sealing ends;
- Cable installation;
- Establishment of secure compound and facilities;
- Commissioning of installations; and
- Removal of existing sealing end compounds
- Reinstatement of perimeter and removal of any temporary works

2.10.1 Pre-construction activities

Prior to commencement of permanent works, a secure site compound, facilities and access will be provided. This will include for the provision of bunding

and other measures to ensure that any plant or items which may give rise to spills of contamination are protected.

2.10.2 Earthworks

Any turves, topsoil; and subsoil over the site will be removed and stored for subsequent reuse in restoring temporary works areas. Any unsuitable material will be disposed of according to the waste management plan.

In order to create a level flat construction platform suitably graded aggregate will be placed in layers and compacted. This work will include provision for local patterns of drainage to be retained and drainage measures will be incorporated as required. It is envisaged that the aggregate for these bases will be sourced from off-site sources (see section 8.3 on traffic and transport or the full report in Appendix B of Volume 3 of the ES).

2.10.3 Concrete bases

Following the completion of the construction platform, concrete bases will be cast for the individual elements of the sealing end compound requiring this support.

2.10.4 Sealing end installation

The equipment within the compounds, including cabling, insulator supports and steel gantries, will be delivered on normal HGVs and will be assembled and prepared on the pre-cast foundations as required.

2.10.5 Removal of existing sealing end compounds

Following completion and energisation of the upgraded 400kV OHL and GIS substation, the existing 275kV sealing end compounds can be removed (see Drawing No. 185D-1-4100-DA-IECEE-0003). This will involve the removal of all apparatus, including foundations, to 1m below ground level. The existing electrified security fence will also be removed.

2.11 Construction of the Substation

The construction of the substations will comprise the following tasks:

- Felling (where required);
- Pre-construction activities;



- Earthworks to form construction platform;
- Formation of concrete bases for Gas Insulated Switchgear (GIS) building, transformer and other structural elements;
- Electrical plant and cable installation;
- Commissioning of installations;
- Reinstatement of perimeter and removal of any temporary works; and
- Removal of part of existing 275kV substation

2.11.1 Pre-construction activities

Prior to commencement of permanent works, a secure site compound, facilities and access will be provided. This will include for the provision of bunding and other measures to ensure the EMP can be achieved and that any plant or items which may give rise to spills of contamination are protected.

2.11.2 Earthworks

Any turves, topsoil; and subsoil over the site will be removed and stored for subsequent reuse in restoring temporary works areas. Any unsuitable material will be disposed of according to the waste management plan.

In order to create a level flat construction platform suitably graded aggregate will be placed in layers and compacted. This work will include provision for local patterns of drainage to be retained and drainage measures will be incorporated as required. It is envisaged that the aggregate for these bases will be sourced from off-site sources (see traffic and transport chapter)

2.11.3 Concrete bases

Following the completion of the construction platform, concrete bases will be cast for the individual elements of the substation requiring this support.

2.11.4 GIS building and electrical plant installation

The GIS building will be two storeys and constructed using normal construction techniques, using brickwork and profiled steel cladding. This will be fitted out with the electrical, switchgear and control plant required for the substation.

The equipment forming the network within the compound including open air busbars, gas insulated busbars, insulator supports and disconnectors will be

delivered on normal HGVs and will be assembled and prepared on the pre-cast foundations as required.

The transformers will be delivered by specialist HGVs and located within the substations.

2.11.5 Removal of part of existing 275kV substation

Following completion and energisation of the upgraded 400kV OHL and GIS substation, part of the existing 275kV site at Kincardine can be removed (see Drawing No. SP4106267). This will involve the removal of existing concrete gantries and switchgear. The existing electrified security fence will remain in situ.

2.11.6 Removal of redundant XL-Route towers and low level gantries

The existing 275kV OHL (XL-Route) towers 01 and 02 at Kincardine and low level gantries crossing the A977 at Kilbagie must remain operational to ensure a secure electricity supply until the proposed 400kV OHL can be energised.

Following completion and energisation of the upgraded OHL and GIS substation, the existing redundant XL-route towers and low level gantries will be decommissioned and dismantled.

2.11.7 Environment and Waste Removal and Disposal

All waste materials will be removed from site in accordance with relevant waste and environmental regulations. Where possible, the principle of waste minimisation would be applied by the reuse and recycling of removed materials. All wastes would be identified, classified, quantified and where practicable, appropriately segregated. All waste will be transferred using a registered waste carrier to a licensed waste disposal or recycling centre.

The majority of redundant materials from dismantling could be reused or recycled. The conductor, towers and glass insulators would be transferred to a licensed scrap merchant for recycling, with only the dismantled insulators being disposed of in a licensed waste facility. Following removal of foundations, any surplus spoil, which cannot be re-used on site, would also be removed to a licensed waste facility.



2.12 Operation and maintenance

An assessment of the decommissioning of the Project has not been undertaken as part of the EIA as the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage. In addition, proposals for any refurbishment or decommissioning are not known at this stage.

Experience indicates that OHLs of these types would require refurbishment approximately every 20-40 years, depending upon the severity of pollution and local weather conditions.

The substations will be unmanned and will only require weekly visits for the monitoring of equipment or to deal with faults. Any maintenance will typically be carried out during planned operational outages when electricity demand is low, typically during the summer months.

The substations will not be lit unless staff are present on site and the conditions require this.

2.13 Decommissioning

This proposal does not include the decommissioning of the proposed elements of the project. This is not included as the environmental baseline at the time of decommissioning, whenever that may be, is unknown.

On this basis the assessment of the effects of the elements of the project are considered to be long term. This complies with the guidance provided within the Guidance on the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 which accepts that generating stations with a working life of 30 years should be described as long term.

2.14 Mitigation

The project has been developed through the application of the iterative process of EIA, to minimise the environmental effects as far as possible within the technical constraints of a project of this nature. Mitigation has been undertaken when developing the approach to the project to avoid or where possible reduce potential environmental effects



3. SCOPING OUTCOME

Scoping is defined as 'the way in which key issues are identified from a broad range of potential concerns for inclusion in EIA studies, the areas affected, and the level to which they should be studied'.

In June 2013, SPT issued an Environmental Impact Assessment Scoping Report ('Scoping Report') to key stakeholders.

For projects such as this, falling under The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended 2008), the scoping request would, ordinarily, be made directly to the Scottish Ministers. However, given the limited nature of the works involved, SPT did not submit a formal scoping request in this instance. Instead, SPT sent the scoping report directly to the relevant Statutory and Non-Statutory Consultees and requested that those who wished to respond did so directly to SPT.

The key objective of the Scoping Report was to engage with the relevant Statutory and Non-Statutory Consultees to: obtain their views on the project; identify potential impacts; identify existing environmental information; and agree methods for the assessment of the nature and significance of these impacts, thus ensuring that all relevant environmental issues were covered by the EIA. Furthermore, the scoping process enables the topics to be covered in the ES to be agreed and for those topics not considered pertinent to be scoped out or reduced in scope (i.e. not meriting a full chapter).

The Scoping Report initially identified that a full impact assessment chapter would be necessary, within the ES, for the following technical topics:

- Water Environment;
- Terrestrial Ecology; and
- Landscape and Visual.

For the remaining topics, the extent of study was proposed to be either scoped down (i.e. not meriting a full impact assessment) or scoped out (not meriting evaluation beyond scoping).

The Scoping report was provided to each of the following statutory consultee's:

- The Scottish Government;
- Clackmannanshire Council;
- Fife Council;

- Scottish Environment Protection Agency (SEPA);
- Scottish Natural Heritage (SNH); and
- Historic Scotland.

Similarly, each of the following non-statutory consultees was provided with details of the proposed development to ascertain if they had any specific concerns.

- British Geological Survey (BGS);
- Royal Society for the Protection of Birds (RSPB);
- British Trust for Ornithology (BTO);
- Utility providers, including Scottish Water; and
- Forth Fisheries Trust.

The key points made in the responses from the organisations listed above are summarised in Table 3.1. Detailed scoping responses are provided in Appendix 1 of Volume 3 of this ES.



Table 3.1 Consultation Responses

Consultee	Key Comments	Action taken if required
Historic Scotland	<p>No specific objection.</p> <ol style="list-style-type: none"> 1. Confirm that there are no scheduled monuments, category A listed buildings, gardens or designed landscapes within the proposed development site. 2. Stated they are content with the proposed development in this location and consider it unlikely the proposed development will affect any historic environmental assets; as such they are content for the historic environment to be scoped out of the EIA. 	<ol style="list-style-type: none"> 1. Confirmed: No action required. 2. Confirmed: Historic environment scoped out of EIA. .
SEPA	<p>No specific objection.</p> <ol style="list-style-type: none"> 1. Confirm that a Phase 1 habitat survey should be carried out for the whole site while National Vegetation Classification (NVC) assessment should be completed for any wetlands identified. 2. Advise against undertaking of certain works within proximity of groundwater dependent terrestrial ecosystems. 3. Recommend that a site survey of existing water features be carried out to inform the EIA. 4. Advise that all aspects of site work that might impact upon the environment, the potential pollution risks associated with the proposals and the principles of preventative measures and mitigation should be identified as part of the EIA. Also recommend that a draft Schedule of Mitigation be produced as part of the process. 5. Outlined certain elements for inclusion within the ES, including a list of groundwater abstractions within a specific radius of the works and a justification for any activity potentially impacting the water environment and how any adverse impact will be mitigated. 	<ol style="list-style-type: none"> 1. Phase 1 Complete along entire route of the transmission line. NVC survey complete within important habitats and targeted wetland areas. 2. Surveyed and assessed using the NVC system, mitigation systems controlled under the EMP. 3. Included in Water Environment chapter. 4. Draft schedule of mitigation will be produced within EMP when section 37 granted and any conditions known. 5. Included in Water Environment chapter
SNH	<p>No specific objection.</p> <ol style="list-style-type: none"> 1. Confirm that a breeding birds survey should be carried out at the site of the proposed substation and that consideration should also be given to non-breeding bird species of the Forth of Forth 	<ol style="list-style-type: none"> 1. Breeding bird survey (BBS) complete in the vicinity of the proposed substation at Kincardine.



	<p>Special Protection Area (SPA).</p> <ol style="list-style-type: none"> 2. Advised that consideration should be given to great-crested newts and water voles within proximity to the works. 3. Consider the proposed methodology for assessment of landscape and visual impacts to be appropriate. 	<ol style="list-style-type: none"> 2. Consideration of potential habitat for water Vole and Great Crested Newt complete within proposed construction areas. 3. Confirmed: No action required.
Scottish Government	No response provided	
Fife Council	<p>No specific objection</p> <ol style="list-style-type: none"> 1. Advised there have been changes to the Fife Structure Plan 2006-2026 which has been superseded by the SES Strategic Development Plan (2013). In addition various Local Plan policies listed should be included within the Planning Context chapter. 2. Confirm air quality can be scoped out the ES. It has also been noted that Fife council have declared two AQMA's within their boundary. 3. No comments to make regarding the proposed assessment of operational noise and EMF effects. Consideration should be made towards noise impacts on the local residents. 4. Confirm the proposed ADBA and associated impact assessment will address all archaeological and cultural heritage aspects. In addition an appropriate viewpoint has been agreed to take the likely visual impacts on the Kincardine Conservation Area. 5. Advised the only public roads within Fife that are likely to be affected by the proposed development are Hawkhill Road and the A907. The construction period is unlikely to impact the local road network. 6. Advised that formation of temporary vehicular access from the A907 will require consent from Transportation and environmental services. 7. In regards to tidal flooding and the need for FRA the only issue highlighted is with regard to the standard protection of this type of infrastructure, from SPP risk framework the standard protection would be 1 in 1000 years, this should be mentioned within the Water Environment Section. 8. Confirmed the main ecologic receptors have been considered. 	<ol style="list-style-type: none"> 1. Noted, Changes have been made within the planning chapter. 2. Noted, the project does not fall within the AQMA's boundary. 3. Consideration to noise levels to local residents has been incorporated with the EMP. 4. ADBA not considered necessary-Scoped out. LVIA covers other cultural heritage aspects. 5. Noted 6. Noted. 7. Summarised in water environment chapter. See FRA produced by Halcrow (Vol 3). 8. Covered in chapter 6, Flora and Fauna.



	9. Advises viewpoints should be considered with SNH if not already done so.	9. Viewpoints agreed with Fife council.
Clackmannans hire Council	10. No response provided	

The responses provided by the aforementioned consultees showed a reasonable level of consistency with no notable objections made to the proposed development. Based on this consultation exercise and a greater understanding of the proposed development, and through discussion with the applicant, the initial topic list presented in the Scoping Report was further refined.



3.1 Refined EIA Scope

The consultation process determined the content of the pending ES and resulted in the key topics meriting a full chapter being confirmed as:

- Water Environment;
- Terrestrial Ecology; and
- Landscape and Visual.

Topics for which the extent of study was considered not to merit full impact assessment (*i.e.* scoped down) are detailed in Chapter 8. Topics scoped out of the ES are outlined below:

Air Quality

The majority of the works involved in the project are located in a rural setting and air quality is considered to be good. Clackmannanshire and Fife Councils have not declared any Air Quality Management Areas (AQMAs) within its boundaries and a review of the Scottish Pollutant Release Inventory (SPRI) on SEPA's website does not identify any industrial activity within the surrounding area of the proposed development.

For the OHL upgrade, the associated vehicle movements are likely to be no more than two to three at each tower location over the course of the work; while although the number of movements associated with the construction of the proposed substation at Kincardine are anticipated to be higher (approximately three movements per hour for the duration of the construction period), a significant increase in traffic movements is not expected.

There is also the potential for dust to be generated as a result of the construction works, impacting air quality. However, this will be confined to the construction of the GIS at Kincardine and cable sealing end compounds at Kilbagie. The effects can be managed and are not expected to be significant.

Following construction, impacts on local air quality are not predicted. Since the works will not significantly alter the current infrastructure or its maintenance requirements, the effect from traffic emissions associated with the operation and maintenance of the scheme is also not considered to be significant.

The Environmental Management Plan (EMP) will outline measures to ensure that construction traffic levels are managed effectively to reduce impacts to air quality and will also set out measures to control any

dust effects that could be generated during the construction works.

Archaeology and Cultural Heritage

As part of the scoping assessment, a desktop assessment, using data collated from Pastmap, was completed to provide an overview of the archaeological baseline conditions in proximity to the site. This focused mainly on the location of the proposed GIS, as this is the only location where significant ground works will take place.

Within the specified study area, two sites of heritage interest were identified:

- Kincardine Power Station, sub-station, coal store and coal plant conveyors; and,
- Dickson's Wood, Kincardine (comprising cist(s) and cinerary urn(s)).

The proposed development is not anticipated to affect either of the heritage sites identified that lie within the study area. During the construction phase of the project, activities such as ground excavations and the potential requirement for temporary access roads, have the potential to affect any other archaeological or cultural heritage sites that may be in close proximity but were not identified in the scoping assessment.

In their letter response (9th July 2013) to the scoping opinion request Historic Scotland confirmed that: 'we are content with the principle of the proposed development in this location and consider it unlikely that the proposal would result in significant adverse impacts on the site or setting of historic environment assets within our statutory remit'. Their full response is enclosed within Appendix A of Volume 3.

As a precaution, a watching brief of both sites will be maintained during the groundwork's; the details of which will be outlined in the EMP. In the event that any obvious evidence of archaeological or cultural heritage assets was encountered, a suitably experienced archaeologist would be engaged to help assess the situation.



4. PLANNING CONTEXT

Environmental Impact Assessment (EIA) involves the compilation, evaluation and presentation of any likely significant environmental effects resulting from a proposed development to assist the consenting authority in considering and determining an application. Early identification of potentially adverse environmental effects also leads to the identification and incorporation of appropriate mitigation measures into the design to avoid, reduce and if possible remedy potentially significant adverse environmental effects.

This Chapter sets out the relevant planning policy considerations for the proposal. References are included to the national, regional and local policy and guidance frameworks where appropriate, and other relevant materials considerations are also identified.

To maintain the impartiality of this Environmental Statement (ES) this chapter does not present an assessment of the acceptability of the Proposal in planning terms.

Relevant planning policy documents that have been consulted as part of the EIA process include:

- Scottish Planning Policy (SPP) 2010;
- The Second National Planning Framework (NPF2) (2009);
- The Third National Planning Framework (NPF3) (currently under consultation);
- Clackmannanshire and Stirling Structure Plan (2002) and 1st Alteration: Agriculture and Forestry;
- Fife Structure Plan 2006-2026 (2009);
- Clackmannanshire Local Plan (2004); and
- Draft Dunfermline and West Fife Local Plan (2009).

4.1 National Planning Policy

4.1.1 *Second National Planning Framework (NPF2)*

This document sets out a strategy for Scotland's development to 2030. As part of this strategy, Ministers have designated a number of developments as National Developments. These developments have been designated such as they are considered to be

essential to the delivery of the spatial strategy set out in the framework document.

A number of electricity grid reinforcement developments have been designated as National Developments, including two associated with the proposed development:

- Overhead lines and substation works to increase north-south transfer capacity in Central Scotland; and
- Upgrading the East Coast transmission route to 400kV.

The designations cover overhead transmission lines, underground cable routes and associated converter stations and substations.

The document identifies that strategic grid reinforcements, such as the project to which this ES relates, are essential to provide the transmission capacity necessary to realise the potential of Scotland's renewable energy resources, maintain long-term security of electricity supply and support sustainable economic development.

4.1.2 *Third National Planning Framework (NPF3)*

The Third National Planning Framework (NPF3), which is currently at the consultation stage, will set out the Scottish Government's development priorities over the next 20 to 30 years.

A Main Issues and Draft Framework document has been produced, setting out the Government's preferred options as well as potentially reasonable alternatives. The report proposes that NPF3 builds on NPF2 in regards to a number of development priorities including further necessary enhancement to the electricity transmission and distribution grid to help realise the potential of the country's renewable energy resources and maintain long-term security of electricity supply. The report identifies in particular the need for new and modified onshore cables and overhead lines and new and extended substations.

4.1.3 *Scottish Planning Policy (SPP) 2010*

This document outlines the Scottish Government's policy on land use planning. Although the document does not specifically include a planning policy in regards to electricity transmission infrastructure developments, it does highlight the government's commitment to renewable energy – which it sees as a



key tool in reaching its overarching aim of increasing sustainable economic growth – and the importance of the electricity transmission network in facilitating this growth in renewables that is envisioned.

A review of the SPP was announced in September 2012 with a draft of the updated document being published for consultation on 30th April 2013. The document continues to emphasise the merits of sustainable development and the need to tackle climate change and develop renewable energy resources through supportive Development Plans. It is proposed that the updated SPP will be published alongside NPF3 in June 2014.

4.1.4 Summary of National Planning Policy

The national planning policy documents consulted identify electricity grid reinforcements as essential to meeting future planning objectives, most notably for the delivery of the transmission capacity necessary to realise the potential of Scotland's renewable energy resources and to maintain long-term security of electricity supply.

4.2 Local and Regional Planning Policy

There are a number of generic and strategic development control policies contained within these documents, which are of relevance to the proposed development. These are summarised below and their alignment with the proposed project discussed.

4.2.1 Clackmannanshire and Sterling Structure Plan and 1st Alteration: Agriculture and Forestry

Policy ENV3: Development in the Countryside

Under this policy, development in the countryside will only be permitted if the proposed development is dependent upon a countryside location; or if it accords with Policy ED4. All development in the Countryside should be suitable for its particular location, and should respect and preserve features contributing to local character.

Policy ED4: Rural Development

Policy ED4 outlines criteria which Clackmannanshire and Fife Councils will use in conjunction with Local Plan policies to support economic development in rural areas. Criteria of relevance to this development include:

- Development should be focused within existing towns and villages with emphasis being placed on the identification of opportunities in the Rural Centres.
- Development should be restricted within the Green Belt and Clackmannanshire's Countryside Area to that requiring a rural location.

Policy ENV7: Agricultural Land

Development which would result in the permanent loss of prime agricultural land will only be permitted where such land is identified for development in Local Plans and lower quality land cannot reasonably be used.

Policy SD1: Key Principles

In identifying sites for development in Local Plans and in the assessment of other development proposals, the Councils will consider the contribution of the development to the Plan's strategy of "Working towards Sustainable Development".

Alignment of Policies with Proposed Project

This document outlines a number of policies related to restricting proposed development in countryside/rural locations and on agricultural land with development to be focused in existing towns and villages in preference. Due to the established location and infrastructure in place along the present OHL route, as well as the nature and purpose of the OHL electricity transmission system itself, the establishment of the proposed development at an alternative urban location is not feasible.

In respect to Policy SD1, the proposed development's association with national planning policy's renewable energy aims should ensure that the development is considered to contribute to the structure plan's strategy of "Working towards Sustainable Development".

The proposed development is deemed to be in alignment with these planning policy documents.

4.2.2 Fife Structure Plan 2006-2026

Policy SS1: Settlement Development

This policy states that development shall take place within settlements unless there is a justified need for a



countryside location. The policy also requires that when identifying sites for development, the Council take into account the availability of various utilities, facilities and environmental conditions. It is also required that potential economic or environmental enhancements are taken into account in the decision making process.

Policy BL1: Rehabilitation and Re-use of Brownfield Land

This policy states that developments securing the redevelopment and/or re-use of derelict land or vacant land will be supported where the new use meets certain criteria, including:

- Is appropriate to and compatible with the surrounding area;
- Provides environmental/community/economic benefits;
- Can be achieved in an environmentally acceptable and sustainable manner; and,
- Accords with other Structure and Local Plan policies

Policy ENV4: Nature Conservation Enhancement

Under this policy, where a development has the potential to impact on international, national, regional or locally important sites and species, the developer will be required to submit an ecological appraisal of the proposal detailing how any impact will be minimised or mitigated. Developers are required to consider the impact of their proposals on nature conservation interests and to take appropriate measures to maintain and, where possible, enhance this interest.

Alignment of Policies with Proposed Project

Policy SS1, like Policies ENV3 and ED4 in the Clackmannanshire and Sterling Structure Plan, aims to restrict proposed development in countryside locations. As stated previously, due to the established location and infrastructure in place along the present OHL route, as well as the nature and purpose of the OHL electricity transmission system itself, the establishment of the proposed development at an alternative urban location is not feasible.

Policy BL1 is of relevance to the development as the proposed substation at Kincardine and towers adjacent are located on brownfield land. Since the

development will provide economic and community benefits, accords with other structure and local plan policies and is in support of national planning policy aims in relation to promoting Scottish renewable energy objectives the development may be supported by Fife Council.

An appraisal of the potential effects on flora and fauna as a result of the proposed development is included in Chapter 6 of this ES, in accordance with the requirements of Policy ENV4.

The proposed development is deemed to be in alignment with this document.

4.2.3 Clackmannanshire Local Plan

Policy EN18: Development in the Countryside

This policy details requirements for development in the countryside. Developments will not be accepted unless they meet a number of criteria. Criteria of relevance to this development include:

- Where the proposed new use would not have a significant adverse impact on nearby uses or be adversely affected by existing nearby uses, particularly continuing agricultural activities; OR
- Where the development is an essential requirement of a rural activity as defined in the Clackmannanshire and Sterling Structure Plan Policy ENV3;
- The design, scale and siting of the new development respects the character of the surrounding countryside;
- It can be demonstrated that the proposal can provide adequate vehicular and pedestrian access to the site to the required standards of the Council without adverse effects either on or off the site;
- There is no harm to the amenities of adjacent land users; and
- The business as a whole must be capable of providing the whole or main source of livelihood for its occupant.

4.2.4 Draft Dunfermline and West Fife Local Plan



Policy E1: Development Outwith Town and Village Envelopes

This policy states that a development out with local settlement limits will only be permitted where it is in accordance with policies E15 to E29.

Policy E3: Development Quality – Environmental Impact

This policy requires that all new developments must make a positive contribution to the quality of their immediate environment both in terms of environmental impact and the quality of place they will create. New developments are expected to include conservation, mitigation and enhancement measures related to water, ecology, waste energy and the local landscape.

Policy E4: Development Quality – Design

Policy E4 outlines requirements for the design of new developments. A new development must make a positive contribution to its immediate environment in terms of the quality of the development. Requirements for the development include intelligent design and enhancement of community safety.

Policy E6: Contaminated Land

This policy details for developments involving sites where contamination may be present. In this situation, the developer is required to submit details of site investigation to assess the nature and extent of any contamination which may be present. Where contamination is known to be present, Fife Council must be notified of the appropriate remediation measures proposed to render the site fit for its intended use.

Policy E12: Ancient Monuments and Archaeological Sites

This policy requires that no development may adversely affect a scheduled monument unless under exceptional circumstances. All other archaeological resources must also be preserved in situ wherever feasible. The policy also sets out requirements in situations where impact to an archaeological feature is unavoidable.

Policy E15: Development in the Countryside

Policy E15 details requirements for development in the countryside. Developments will not be accepted

unless they enhance the countryside environment, the local economy or local cultural or leisure facilities; or unless they are for housing.

Policy E18: Protection of Agricultural Land

This policy states that irreversible development of prime agricultural land will only be supported if there are overriding national or local circumstances, or if the land is zoned for development in the Local Plan.

Policy E20: Watercourses and Wetlands

Policy E20 states that a development will not be permitted where it would have an adverse effect, either directly or indirectly, on the ecological status of watercourses or wetlands or the quality of groundwater.

Policy E21: European Protected Species

Under this policy, any development that will have a significant adverse effect on European Protected Species will not be permitted unless it can be shown that the development will benefit the public interest; there is no satisfactory alternative; or if it will not be detrimental to the maintenance of the species concerned at favourable conservation status in their natural range. The policy also sets out requirements for surveys/impact assessments, the results of which must be submitted if a proposed development is likely to affect European protected species.

Policy E23: Protection of Biodiversity

Policy E23 states that development that may affect national and local priority habitats or species will not be permitted unless the developer submits an appraisal showing that there will be no adverse effect on the habitats or species; or any significant adverse effect on the habitats or species is clearly outweighed by social or economic benefits of significant local importance. Where development adversely affects the habitats or species, the developer's appraisal must include detail mitigation measures and any appropriate enhancement measures that will be implemented.

Alignment of Policies with Proposed Project

Policies E3 and E4 are not relevant to the proposed development as it is an upgrade of an existing development rather than a new development.

In accordance with Policy E6, a phase 1 environmental risk assessment has been carried out to assess the



contamination risk associated with proposed development. The assessment is included as Appendix C. A watching brief of both sites will also be maintained during undertaking of groundworks associated with cable re-routing. In the event that any obvious contamination is encountered, a suitably experienced contaminated land consultant will be engaged to help assess the contamination.

In reference to Policy E12, it has been confirmed by Historic Scotland that there are no scheduled monuments within the proposed development site. To protect any archaeological or cultural heritage sites that may be in close proximity to the proposed development but were not identified in the scoping assessment, a watching brief of both sites will be maintained during undertaking of groundworks. In the event that any obvious evidence of archaeological or cultural heritage assets was to be encountered, a suitably experienced archaeologist would be engaged to help assess the situation.

Like Policy SS1 in the Fife Structure Plan, Policy E15 aims to restrict proposed development in countryside locations. As stated previously, due to the established location and infrastructure in place along the present OHL route, as well as the nature and purpose of the OHL electricity transmission system itself, the establishment of the proposed development at an alternative urban location is not feasible.

Under Policy E18, irreversible development of prime agricultural land will only be supported if there are overriding national or local circumstances, or if the land is zoned for development in the Local Plan. Since the proposed development is in alignment with national planning policy it should fall within the criteria for support from Fife Council.

An assessment of the anticipated effects of the proposed development on the water environment is presented in Chapter 5 of this ES. The proposed project is not anticipated to have a significant adverse effect, either directly or indirectly, on the ecological status of watercourses or wetlands or the quality of groundwater, and as a result it is in alignment with Policy E20.

An assessment of the anticipated effects of the proposed development on European Protected Species and national and local priority habitats and species is presented in Chapter 6 of this ES. The development is not anticipated to have a significant adverse effect on European Protected Species or national and local priority habitats and species.

Therefore the project is deemed to be in alignment with Policies E21 and E23.

Overall, the proposed development is deemed to be in alignment with this planning policy document.



5. WATER ENVIRONMENT

5.1 Context

This chapter assesses the potential effects of the construction and operation of the Project on the water environment and identifies suitable mitigation measures to minimise these effects. The characteristics of the Project are described in detail in Chapter 2 of this ES. The water environment study area for the purposes of this chapter encompasses surface water, groundwater and wetland receptors potentially affected by the Project.

Planning policies of relevance to this assessment are outlined in Chapter 4: Planning Context. The key environmental legislation relating to the water environment that any development must adhere to includes:

- Water Environment and Water Services Act 2003;
- Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR);
- Water Environment (Oil Storage) (Scotland) Regulations 2006; and
- Pollution Prevention and Control (Scotland) Regulations 2000.

SEPA's policy positions on groundwater protection (Policy No.19) and culverting of watercourses (Policy No. 26) have been considered within this assessment. SEPA's key concerns were outlined in their scoping response, summarised in Table 5.1.

5.2 Assessment Methodology

The assessment has been undertaken through the following steps, which are described in more detail in the following sections:

- Establishing the baseline conditions;
- Identification of potential receptors and assessment of receptor sensitivity;
- Identification of potential impacts and assessment of the effects in terms of significance
- Identification and assessment of appropriate mitigation measures; and
- Assessment of residual impacts.

The assessment has been undertaken primarily using a qualitative approach based on professional

judgement and statutory and general guidance. Key guidance publications include:

- C648: Control of water pollution from linear construction projects, CIRIA (2006);
- C697: The SuDS Manual, CIRIA (2007);
- Forests and Water Guidelines (Fifth Edition), The Forestry Commission (2011);
- A Functional Wetland Typology for Scotland, SNIFFER (2009);
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) – A Practical Guide, SEPA (2013);
- WAT-SG-25: Good Practice Guide – River Crossings; and
- SEPA Pollution Prevention Guidelines (PPG) including.

5.2.1 Establishing Baseline Conditions

The baseline conditions were established through a combination of desk-based study, field surveys and consultation. Information has been obtained from the following sources:

- Desk-based study of published information including Ordnance Survey (OS) mapping (1:25,000 scale), catchment characteristics from the Flood Estimation Handbook (FEH) CD-ROM, and on-line SEPA datasets including the River Basin Management Plan classification results and the Indicative River and Coastal Flood Map;
- BGS digital mapping has been reviewed to provide information on the underlying solid and drift geology;
- Consultation with SEPA and Fife and Clackmannanshire Councils to obtain information on water supplies in the vicinity of the proposed development;
- Review of the Phase 1 Environmental Risk Assessment undertaken by EnviroCentre for the sites of the new GIS at Kincardine and the cable sealing ends at Kilbagie;
- Review of the Flood Risk Assessment undertaken by Halcrow Group Limited for the project for the site of the new substation at Kincardine (provided in Appendix H);
- Review of description and plans of access route and description of proposed works provided by SPT;



- Review of the NVC habitat survey to identify any Groundwater Dependent Terrestrial Ecosystems (GWDTEs); and
- Walkover surveys of the overhead line route, including potential access locations, and the site of the proposed new GIS at Kincardine.

This information was reviewed and an analysis of the hydrological and hydrogeological regime undertaken.

5.2.2 Impact Assessment Approach

Following the baseline study potential receptors were identified and their sensitivity assessed using professional judgement based on the criteria in Table

5.1. Potential impacts were identified and their potential magnitude assessed based on Table 5.2. The likelihood of an impact occurring is also considered and is determined as being certain, probable, unlikely or extremely unlikely. The significance of an impact is defined by the sensitivity of the receptor and the magnitude of the impact and in combination the significance of the resulting effects can be predicted, based Table 5.3. The significance of effects is categorised as presented in section 1.5 of Chapter 1. The assessment of effects is a qualitative assessment and draws on professional judgement and experience. Where significant effects are identified appropriate mitigation measures are proposed where feasible.

Table 5.1: Criteria for assessing receptor sensitivity

Receptor Sensitivity	Description
Low	Receptor with a low value and rarity, no significant contribution to local regime and potential for substitution/replacement. This includes but is not restricted to the following: <ul style="list-style-type: none"> • SEPA ecological status defined as Poor or Bad • Fish sporadically present or restricted, no designated features • Receptors not used for recreation e.g. no clubs or access route associated with watercourse • GWDTE of low value/importance • Receptor artificially modified or heavily engineered
Medium	Receptor with a medium value and rarity, local importance and moderate potential for substitution/replacement. This includes but is not restricted to the following: <ul style="list-style-type: none"> • Local designated site (e.g. local nature conservation sites, national nature reserves) that is dependent on the water environment • Secondary/ backup public water supplies • Private water supplies • Industrial/agricultural abstractions • Occasional or local recreation (e.g. local angling clubs) • Catchment locally important for fisheries • Watercourse not widely used for recreation, or recreation use not directly related to watercourse quality • GWDTE of medium value/importance
High	Receptor with a high value and rarity, of regional/national importance, sensitive to low scale change and limited potential for substitution/replacement. This includes but is not restricted to the following: <ul style="list-style-type: none"> • Statutory designated site (e.g. SAC, SPA, Ramsar site, SSSI) that is dependent on the water environment • Primary public water supplies • Watercourse used for recreation, directly related to watercourse quality (e.g. bathing water) • Active floodplain area (important in relation to flood risk/defence) • GWDTE of high value/importance



Table 5.2: Criteria for assessing magnitude

Magnitude	Description
Negligible	Very light change from baseline conditions. Change barely distinguishable, approximating to the 'no change' situation.
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of the baseline condition will be similar to pre-development circumstances/patterns.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post-development character/ composition/ attributes of baseline will be partially changed.
High	Total loss or major alteration to key elements/features of the baseline (pre-development) conditions such that post-development character/composition/attributes will be fundamentally changed.

Table 5.3: Criteria for assessing significance

Magnitude	Receptor Sensitivity		
	High	Medium	Low
High	Major	Major	Moderate
Medium	Major	Moderate	Minor
Low	Moderate	Minor	Minor
Negligible	None	None	None

5.3 Baseline Conditions

5.3.1 Site Location and Topography

The existing OHL route from Kincardine to Blairingone is approximately 10.5km in length and includes 36 towers (XL001 – XL033). The topography is mostly flat for the first 1.3km of the OHL route from Kincardine to Kilbagie, and passes through gently undulating topography beyond this other than at Gartarry (XL011A) where moderately steep slopes are present. The land use along the route is predominantly agricultural, typically consisting of arable and improved grassland for the first part of the route while unimproved grassland dominates towards Blairingone. Several towers (XL010, XL018 and XL019) are situated within Forestry Commission land and as such are in proximity to forest stands. The route passes through a quarry site to the north of the Black Devon (XL023 – XL024). These towers are located in proximity to disturbed ground apparently associated with the nearby quarry or agricultural land.

The cable termination compounds and low level gantries where the OHL crosses the A977 at Kilbagie are located within gently sloping improved grassland.

The new Kincardine GIS is proposed on land adjacent to and north-west of the existing substation. This area consists of flat made ground with some pioneer species. Standing water was observed during the site walkover survey. Historically this site was used as a coal yard (Phase I Environmental Risk Assessment, Appendix C).

5.3.2 Surface Water Hydrology

The hydrological features described in this section are shown in Figure 5.1A-D.

Kincardine GIS site

The existing and proposed Kincardine GIS are located on a site adjacent to the Upper Forth Estuary. An embankment with a revetment and wave wall is located along the western perimeter between the site and the Forth Estuary. There are existing surface water drainage arrangements within this site, consisting of a piped network, and a drainage ditch that runs parallel to the A896. The surface water drainage is pumped to the Forth Estuary via a storm water pumphouse, situated at the western corner of the existing substation.



A pond was noted at NS 92173 88684 which has formed in a depression left by former industrial activity at the site.

SEPA produces an annual classification for all water bodies, as defined in the River Basin Management Plans for Scotland. The Upper Forth Estuary is classified as a heavily modified water body and in 2011 was found to be at Poor Ecological Potential. SEPA has identified morphological alterations affecting the inter-tidal zone and point source pollution as the key pressures affecting this water body.

OHL route

Towers XL003 – XL010 fall within the catchments of the outflow from Peppermill Dam or the Canal Burn, both of which outfall to the Upper Forth Estuary just west of the Clackmannanshire Bridge.

The outflow from the Peppermill Dam is classified as a small river water body and flows in a south-westerly direction to the estuary. In proximity to towers XL003 and XL004 this burn is approximately 1m wide at average water levels and has a low gradient, silt bed and mostly vegetated banks. The bed and banks of the burn are reinforced upstream of the existing road culvert. The Canal Burn similarly has a low gradient and has been culverted under the A876. A heavily vegetated minor watercourse to the east of XL007 flows in a northerly direction to confluence with the Canal Burn. There also appears to be a piped connection through the railway embankment near XL006.

The remaining towers (XL011 – XL033) are within the catchment of the Black Devon. This watercourse flows in a westerly and south-westerly direction to the Upper Forth Estuary. The OHL route crosses the Black Devon just south of the quarry, between XL021 and XL022. At this location the Black Devon is 3-5m wide and floodplain wetlands are present on both banks. Forestry drains in proximity to XL018 and XL019 discharge to the Black Devon.

In 2011 the Black Devon was classified as being at Good Ecological Status between the source and Birkhill Plantation; the OHL route is situated within this part of the catchment. Further downstream between the Birkhill Plantation and the Upper Forth Estuary it was classified as being at Moderate ecological status

due to point (sewage disposal) and diffuse (agriculture) pollution. This is reflected in the designation of the Black Devon as an Urban Waste Water Treatment Directive (UWWTD) sensitive area.

The smaller watercourses in proximity to the route have catchments less than 10km² and are not classified as water bodies for the Water Framework Directive.

A number of the existing towers are situated in catchments of tributaries of the Black Devon. XL011 – XL017 are situated in the Goudnie Burn sub-catchment. This tributary flows in a westerly direction to the Black Devon at Clackmannan and is classified as a small river water body. Cadger Burn is also a tributary of the Black Devon. Towers XL027 – XL033 are situated within this sub-catchment and although no towers drain directly to this watercourse, XL028 – XL031 are in proximity to minor watercourses and drainage ditches within this sub-catchment.

There are a number of small ponds in proximity to the OHL route; adjacent to the former railway embankment between XL014 and XL015, to the north of XL016 and Sustainable Drainage System (SuDS) ponds associated with the quarry. Much of the OHL route passes through agricultural land; field drains are expected to be present.

5.3.3 Flood Risk

A flood risk assessment was carried out by Halcrow Group Limited for the new GIS site and is included in Appendix H; all comments in this chapter regarding flood risk at the new GIS site are based on this assessment. The assessment identified that tidal flooding is the major source of flood risk to the proposed GIS. Surface water flooding from both direct rainfall and flow escaping from adjacent watercourses was investigated but was found not to pose a significant risk to the project.

The tidal flood mechanism involves high surge tide levels in the Forth Estuary acting in conjunction with wind-generated wave action to create conditions where overtopping of the embankment and wave wall can occur. The resulting flow into the site will collect in the low points before spreading to higher levels. The assessment also highlights the possibility of a breach in the embankment which could result in



severe flooding of the new GIS site during a surge tide event.

The flood risk assessment determined that the existing tidal defences provide some protection up to the present day 200 year flood event (0.5% annual exceedance probability), limiting the flood level on site to 2.25mAOD assuming no breach occurs. The Energy Networks Association report¹ recommends that for grid substations the target level of resilience should be the 1 in 1000 year flood event (0.1% annual exceedance probability). For this event, the embankment would be drowned out, i.e. the flood level within the site will equal that in the estuary. The flood risk associated with predicted sea level rise to 2085 was also considered. In this scenario a peak water level of 5.77mAOD is predicted for the 1 in 1000 year flood event and drowning of the embankment at the 1 in 50 year event.

The new GIS will be constructed on a raised platform to protect it from this flood risk. A conservative level of 6.20mAOD was recommended which is based on the 2085 1 in 1000 year flood level plus a freeboard allowance for wave action. This platform level is approximately 4m above existing ground levels. A lower platform level has also been considered (5.33mAOD) where some inundation would occur at the design event, with substation assets protected by bunding, flood barriers or flood resistant construction.

All the remaining towers are out with the 1 in 200 year return period flood extent (i.e. the flood with a 0.5% probability of occurring in any single year) shown on SEPA Indicative River and Coastal Flood Map. Watercourses having a catchment area less than 3km² are not represented in the Indicative Flood Map but may still pose a risk of flooding. The small size of these watercourses and the relative location of the towers is such that the risk of flooding from watercourses is low to negligible.

Standing water was observed at several locations during the site walkover surveys. There may be a localised risk of surface water flooding where towers are situated on flat ground that received runoff from surrounding hillslopes or where drainage is impeded.

5.3.4 Hydrogeology

¹ Reference - ETR 138 Resilience to Flooding of Grid and Primary Substations (2009)

The underlying bedrock geology consists of sedimentary rocks from the Scottish coal measures and the Clackmannan group. A number of faults and coal seams are present. Superficial deposits are dominated by till for the majority of the OHL route. Alluvial deposits underlie the Black Devon valley and raised beach and marine deposits underlie the route between Kincardine and XL009. Small, localised peat deposits are recorded in proximity to XL015, as detailed in section 8.1.

Information provided by SEPA indicates that the bedrock aquifer at the Kincardine GIS site and at Kilbagie is classed as a moderately productive aquifer with both intergranular and fracture flow. The majority of the site has no drift aquifer mapped, although where present this is mapped as intergranular moderately productive drift aquifer. The groundwater body, the Alloa bedrock and localised sand and gravel aquifers, was classified in 2011 as having Poor status as a result of diffuse pollution from coal mining affecting the groundwater quality.

The groundwater vulnerability classification varies along the route, with much of the route Class 3 (vulnerable to some pollutants with many significantly attenuated) or lower vulnerability. The proposed GIS site at Kincardine has a vulnerability classification of 2, other than in the eastern part of the site which is defined as Class 4 (vulnerable to those pollutants not readily adsorbed or transformed). Where the cable termination compounds and low level gantries will be replaced at Kilbagie the groundwater vulnerability is similarly defined as Class 2 and Class 4.

GWDETs have been identified based on the NVC survey and Table 2 of SEPA's guidance. The majority of the OHL route passes through agricultural land uses and therefore the occurrence of GWDETs is limited. There are no GWDETs identified within 250m of the proposed works at Kincardine or Kilbagie.

An area of M23 (*Juncus effusus/acuteiflorus-Galium palustre* rush-pasture) is situated immediately to the east of tower XL027. This is a marshy grassland habitat commonly found in Scotland and its distribution is influenced by contribution of shallow through-flow from surrounding slopes and impeded drainage. The valley floodplains of the Black Devon between XL021 and XL022 also include M23. M27, which is widely distributed in Scotland though not particularly



common, is also present as a very small community on the margins of the wetland. These GWDTes will be influenced by contribution of shallow through-flow from the valley sides and fluctuations of water levels in the Black Devon. M15, a valley mire, is found at XL018 and XL019 and is associated with water movement through the near-surface soil layers, with localised linear areas of M6 also present. Both these communities are also common in Scotland. The UKTAG NVC tables² list the groundwater dependency of the identified GWDTes as moderate, other than M6 which is considered to have a high groundwater dependency

5.3.5 Designated Sites

There is one statutory ecological designated site in proximity to the route of relevance to the water environment. The Firth of Forth is designated as a Ramsar site and Special Protection Area (SPA) for assemblages of migratory and over-wintering waterfowl. The site is also designated as a Site of Special Scientific Interest (SSSI) on the basis of these non-breeding bird assemblages and the wider range of coastal and inter-tidal habitats found within the estuary.

Two Local Nature Conservation Sites are situated in proximity to the OHL route and are potentially connected hydrologically to the site. These are Brucefield, located in 'Slack Wood' approximately 300m to the east of XL015 and the Devon Wetlands at Muirpark, also known as Glenochil Meadow which is located where the route crosses the Black Devon between XL021 and XL022.

The Black Devon is designated as a Salmonid Water under the Freshwater Fish Directive.

5.3.6 Water Supplies

Consultation revealed that Fife Council and Clackmannanshire Council hold no records of Private Water Supplies within 2km of the Project, including the OHL route.

Information on CAR licenced abstractions within 2km of the proposed substation at Kincardine and the replacement of the cable ends at Kilbagie was

requested from SEPA. Seven abstractions were identified, six of which are over 750m from the proposed works. One abstraction is located ~350m from the existing cable sealing end at Kilbagie. This abstraction is for Kilbagie Recycled Fibres Ltd and is sourced at NS 92995 90099 from the minor tributary downstream of XL007 and XL006B (shown in Figure 5.1A).

The Black Devon between its source and Birkhill Plantation is designated as Drinking Water Protection Areas, as are the Alloa bedrock and localised sand and gravel aquifers.

5.4 Assessment of Potential Impacts

This section identifies and assesses the potential impacts on the water environment that could arise from the project in the absence of mitigation. The development is described in detail in chapter 2. The potential water environment receptors have been identified in Table 5.5 and the sensitivity of these receptors determined using the criteria in Table 5.1.

The key activities that have the potential to impact upon the water environment have been identified as:

- Earthworks and stockpiling of soils at Kincardine and Kilbagie;
- Excavations for foundations at Kincardine and Kilbagie, and for underground cabling at Kilbagie;
- Access to the OHL route towers, including temporary watercourse crossings; and
- Oils and fuels stored on-site and within vehicles and machinery for all phases of work.

The receptors potentially affected by the proposed works during the construction and operation phases have been summarised in Table 5.4. Potential impacts arising from the replacement of the OHL insulators will mostly affect surface water receptors, while the proposed works to construct the new substation at Kincardine and cable sealing ends at Kilbagie have the potential to affect both surface water and groundwater receptors. The assessment of impact significance is summarised in Table 5.8. The impact magnitude pre and post mitigation is provided in this table and the residual impact significance determined by reference to Table 5.3.

² Reference - UKTAG list of NVC communities 210513, accessed at http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/UKTAG%20list%20of%20NVC%20communities_210513.pdf



Table 5.4: Potential Receptors

Receptor	Sub-catchment area	Proposed works affecting receptor	Potential Impact
Surface Water – water bodies including estuary, watercourses and ponds, and surface water abstractions	Upper Forth Estuary – water bodies	<ul style="list-style-type: none"> • Kincardine proposed substation and associated towers: <ul style="list-style-type: none"> ○ Drainage from site pumped to estuary. ○ Potential connectivity via lateral groundwater movement. 	<ul style="list-style-type: none"> • Flow alterations • Increased sediment discharges • Contaminant discharges
	Outflow from Peppermill Dam – water bodies	<ul style="list-style-type: none"> • Replacement of OHL insulators: <ul style="list-style-type: none"> ○ XL003 within 50m of watercourse. Topography is however very flat, reducing surface water runoff from XL003 towards the burn. 	<ul style="list-style-type: none"> • Flow alterations • Increased sediment discharges • Contaminant discharges
	Canal Burn – water bodies & abstraction	<ul style="list-style-type: none"> • Replacement of cable sealing ends at Kilbagie: <ul style="list-style-type: none"> ○ XL007 and XL006B <100m from minor tributary, topography here is relatively flat. ○ Abstraction from tributary ~350m downstream. 	<ul style="list-style-type: none"> • Flow alterations • Increased sediment discharges • Contaminant discharges
	Goudnie Burn – water bodies	<ul style="list-style-type: none"> • Replacement of OHL insulators: <ul style="list-style-type: none"> ○ XL012 & XL013 situated on topography sloping towards watercourse. Both towers over 100m from watercourse. 	<ul style="list-style-type: none"> • Flow alterations • Increased sediment discharges • Contaminant discharges
	Goudnie Burn – Slack Wood local nature conservation site	<ul style="list-style-type: none"> • Replacement of OHL insulators: <ul style="list-style-type: none"> ○ Potential for runoff from XL015 to affect Slack Wood. 	<ul style="list-style-type: none"> • Flow alterations • Increased sediment discharges • Contaminant discharges
	Black Devon – water bodies	<ul style="list-style-type: none"> • Replacement of OHL insulators: <ul style="list-style-type: none"> ○ XL021 & XL022 situated on ground slope towards watercourse. Both >100m from watercourse. ○ XL018 & XL019 within 25m of drains which could provide a pathway to the Black Devon (1km downstream). Temporary crossings will be required to access the towers. ○ Towers in proximity to the quarry (XL023 – XL025A) are situated on ground that is already disturbed and either doesn't drain to the Black Devon or passes through the quarry SuDS first. 	<ul style="list-style-type: none"> • Flow alterations • Increased sediment discharges • Contaminant discharges
	Cadger Burn – water bodies	<ul style="list-style-type: none"> • Replacement of OHL insulators: <ul style="list-style-type: none"> ○ Drainage ditches in proximity to XL028 – XL031 could provide a pathway to the Cadger Burn. ○ No towers drain directly to this burn and only XL31 is in close proximity to drainage ditches. 	<ul style="list-style-type: none"> • Flow alterations • Increased sediment discharges • Contaminant discharges
Groundwater - aquifer		<ul style="list-style-type: none"> • Kincardine proposed GIS and associated towers. • Replacement of cable sealing ends at Kilbagie. 	<ul style="list-style-type: none"> • Flow and level alterations • Contaminant discharges
Wetlands – GWDTEs and Devon Wetlands local nature conservation site		<ul style="list-style-type: none"> • Replacement of OHL insulators 	<ul style="list-style-type: none"> • Flow and level alterations • Contaminant discharges



Table 5.5 : Receptor Sensitivity

Receptor		Receptor sensitivity	Comment
Surface water	Water bodies including estuary, watercourses and pond	Medium	<ul style="list-style-type: none"> • Statutory designations are associated with the Upper Forth Estuary, however it is currently classified as being at poor ecological status (morphological and water quality pressures). • Remaining water bodies not statutory designated sites and not used for primary public water supplies. • Slack Wood is local designated site which may be in hydrological connectivity with the proposed works.
	Abstraction	Medium	<ul style="list-style-type: none"> • Abstraction from minor watercourse, possibly for industrial use.
Groundwater - aquifer		Low	<ul style="list-style-type: none"> • Moderately productive aquifer currently assessed as being at poor status (water quality pressure).
Wetlands – GWDTes and Devon Wetlands local nature conservation site		Medium	<ul style="list-style-type: none"> • GWDTes present are generally common in Scotland and are mostly considered to be moderately dependent on groundwater.

5.4.1 Surface Water Flow Alterations and Flood Risk

During construction and operation of the GIS at Kincardine and the cable sealing ends at Kilbagie there is potential for increased runoff which may result in soil erosion and increased flow rates to nearby watercourses.

Made-ground consisting of impermeable and semi-impermeable surfaces is already present at the site of the new GIS at Kincardine. The new raised platform on which the GIS will be located will be permeable. Construction activities may however temporarily alter runoff rates and directions, for example through introduction of voids associated with foundation excavations. These excavations will be limited and most are likely to be within the raised platform, which will be between 3.2 to 3.5m above the existing ground level. The excavations will only be open for a limited period of time. The potential environmental impacts of surface water flow alterations associated with the construction of the Kincardine GIS will therefore be of a negligible magnitude.

At Kilbagie, granular material will be used within the sealing end compounds and the increase in impermeable area once operational will therefore be minimal. Earthwork activities may result in compaction of soils, potentially increasing runoff, and excavations may also alter runoff rates. These

activities will be localised in extent and undertaken over a limited period of time. The potential magnitude of surface water flow alterations at Kilbagie is therefore low.

Based on the Halcrow FRA, it is understood that the raised platform on which the new GIS at Kincardine will be built will displace floodwater, resulting in slightly higher flood levels within the power station site for the less severe floods which do not result in drowned conditions. The FRA considers that the extent of this flooding does not extend out with the former Kincardine power station site and that no compensatory storage or other mitigation is required. The magnitude of the potential effect is therefore considered to be negligible.

Replacement of the OHL insulators will require vehicular access to each tower. This has the potential to increase surface water runoff through compaction of soils. Vehicles ruts could lead to local concentration of flows. During operation annual inspections will be carried out alternately from the ground and from the air by helicopter. This impact is considered to be of low magnitude given the small area potentially affected, the short-term nature of the works and the distance of the majority of the towers from local watercourses and drainage ditches.



Temporary watercourse crossings will be required to access a number of the OHL towers (Table 5.6 and Figure 5.1). These crossings may restrict flows in the channel, potentially leading to localised flooding and erosion. However, the crossings are of minor drainage ditches rather than main watercourses and will be temporary structures, and as such the impact magnitude is considered to be low. Towers XLO21 and XLO22 will be accessed from the south and north respectively, avoiding any work in proximity to the Black Devon.

Overall, the potential environmental effects of surface water flow alterations arising from the Project have been assessed as being of low or negligible magnitude. In the absence of best working practices these effects are predicted to be minor (not significant) and reduce to none when assuming that the best practice approaches outlined in section 5.5 are followed (as summarised in Table 5.8).

5.4.2 Groundwater Flow and Level Alterations

Excavations below the groundwater level will occur at Kincardine and Kilbagie, for example for the new underground cabling and for foundations for the substation, sealing end compounds and new towers. This could lead to a localised groundwater drawdown, and open excavations that cannot be drained by gravity may require dewatering. Once constructed the foundations and underground cable trenches may locally alter groundwater flow paths. The magnitude of this impact on the groundwater aquifer will be low due to the small extents and temporary nature of the excavations.

There are no GWDTEs identified within 250m of the proposed foundation excavations and the underground cabling. Potential impacts on GWDTEs from groundwater flow or levels arising from the proposed works are therefore negligible.

The replacement of the OHL insulators will not involve excavation and will have no impact on groundwater flows or levels.

Overall, the magnitude of the potential environmental effects of groundwater flow and level alterations arising from the project is assessed as being low without mitigation measures and the effects are therefore predicted to be minor and not significant, based on Table 5.3 and summarised in Table 5.8. The

significance of the effects reduces to none assuming that the mitigation measures in section 5.5 are implemented.

5.4.3 Sediment Discharges

There is potential for increased release of sediments to watercourses from the following activities:

- Soil stripping at and dewatering of foundation excavations for the new GIS, new cable sealing end compounds and new towers;
- Runoff and erosion from soil stockpiles,
- Removal of existing gantries and cable sealing end compounds;
- Construction of temporary watercourse crossings; and
- Soil erosion associated with vehicular access to OHL towers.

Increased sediment loading to watercourses can degrade water quality of the receiving waters and change the substrate characteristics. Such effects may result in changes in the flora and fauna of the receiving watercourses and adversely affect fish populations downstream of the site. Sedimentation of watercourses can also have a detrimental effect on flow conveyance.

The effect of increased release of sediments to watercourses located in proximity to the construction works would be of medium magnitude in the absence of any mitigation measures. These effects are assessed as being potentially significant falling within the moderate significance category, based on Table 5.3 and summarised in Table 5.8. However if best practice guidance and mitigation, as outlined in section 5.5, is followed these effects are predicted to reduce to minor and not significant.

5.4.4 Contaminant Discharges

There is a risk of contamination from the construction activities proposed for both the GIS site and the sealing end compounds at Kilbagie. The Phase 1 Environmental Risk Assessment Report (Appendix C) identified the potential for contaminants within the soils at both sites, given the historic uses. The report concludes that for both sites a watching brief should be maintained during the earthworks activities for both sites in line with a construction Environmental Management Plan (EMP). In the event that any obvious potential contamination is encountered, a suitably experienced contaminated land specialist



should be engaged to provide advice on appropriate control measures.

During both construction and operation there is a risk of accidental pollution from spillage or leakage of oils and fuels from site storage, vehicles, equipment and machinery. In terms of GWDTE's the principal risk is pollution originating from vehicles accessing the towers. For construction the pouring of concrete presents a risk to the water environment (specifically the cement component) as it is generally highly alkaline. Any spillage to the water environment would be detrimental to water quality and flora and fauna.

Oil or fuel spillages and other contaminant releases to the water environment would be detrimental to water quality and could affect fauna and flora. Oils and fuels are hazardous (List 1) substances under the Groundwater and Priority Substances (Scotland) Regulations 2009 and their ingress to groundwater must be prevented. The groundwater vulnerability ranges between class 2 and 4, however the vulnerability will increase where drift deposits are excavated for the construction of foundations or cable trenches. It is understood that the new GIS will contain two oil cooled transformers, but that these will be within a bunded area and any leaks or spills contained.

The effect of contaminant discharges on surface water receptors, groundwater and GWDTEs would be of a medium magnitude prior to the application of mitigation measures, and therefore potentially significant (moderate significance) based on Table 5.3 and summarised in Table 5.8. However, the fuels and oils used in vehicle's or at each construction site will be limited in volume and the probability of a spill occurring is considered to be unlikely. Providing good practice storage, containment and handling measures are implemented, as outlined in section 5.5, the potential environmental effects are predicted to be of minor significance.

5.5 Mitigation Measures

The impact assessment determined that the potential effects of the proposed works on the water environment will not be significant if standard mitigation and best practice is applied during construction and operation. This section details the

recommend mitigation measures and references good practice measures.

An Environmental Management Plan (EMP) including surface water management, pollution prevention measures and construction method statements will be in place during the proposed works. The EMP will remain a live document and will be continually updated as work progresses. All mitigation measures will be incorporated into the EMP. Best practice will be adopted throughout the construction period following the guidance listed in section 5.2.

A pollution prevention and response plan will be set out in the EMP which will provide site spill response procedures, emergency contact details and equipment inventories and their location. All staff will be made aware of this document and its content during site induction. A copy will be available in the site office at all times.

It is anticipated that a water quality monitoring plan will be implemented. The aim of this will be to characterise the baseline conditions prior to construction works commencing and to continue throughout the construction phase to confirm that the mitigation measure are performing as expected. The monitoring plan will be established and implemented with the agreement of SEPA and will focus on monitoring of water quality at the Kincardine proposed GIS.

All activities with the potential to significantly affect the water environment require to be authorised under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). The level of authorisation required is dependent on the anticipated environmental risk posed by the activity to be carried out. These activities could include construction drainage and dewatering, which to be would be confined to the works at Kincardine and Kilbagie if necessary at all. Temporary watercourse crossings should comply with General Binding Rule (GBR) 6.

5.5.1 Surface Water Flows and Flood Risk

Surface water drainage arrangements for construction elements at the Kincardine GIS and Kilbagie sites will be in line with the principles of SuDS, incorporating appropriate attenuation and treatment prior to discharge to the water environment in accordance



with GBR10 and GBR11. It is proposed to replicate natural drainage around construction areas and to use source control to deal with rainwater where possible. This approach is in line with CIRIA and SEPA SuDS guidance. The implementation of a given SuDS measure will be dependent upon detailed site and hydrological investigations. Once operational, the new GIS will be free draining, and the existing surface water drainage arrangements including the pumped outfall to the Forth Estuary will be maintained.

The raised platform upon which the new GIS will be built will result in a small rise in flood levels. The Halcrow FRA concludes that since the increase in flood level is small and its extent only affects Scottish Power’s land ownership, it is considered that no compensatory storage or other mitigation is required.

Surface water drainage will not be required where proposed works are limited to replacement of the OHL insulators.


Access routes to the OHL towers for replacement of the insulators will make use of existing access arrangements (agricultural/ quarry access) wherever possible to avoid the need for new water crossings and minimise the potential for rutting. Low ground

pressure vehicles will be used to further minimise the potential for rutting and concentration of surface water flows.

The proposed access arrangements will require four crossings of watercourses shown on the OS 1:25k mapping. These are described in Table 5.6 and shown in Figure 5.1A-D, and are all of man-made drainage ditches. Crossing of a minor drain is also likely to be required to access XL031. All watercourse crossings will be temporary and will be removed when the works are complete. Crossings constructed of timbers and steel beams are proposed. When installing these crossings, GBR6 will be followed. Vegetation removal will be minimised and all reasonable steps taken to ensure that works do not result in increased erosion of the bed and banks, bank stability is not compromised, and flows are not restricted.

If temporary tracks are required these will ensure that local drainage patterns are maintained and the ground will be reinstated as soon as possible once the works are complete.

Table 5.6: Water Crossings

ID	Grid Ref	Watercourse Description	Photograph
WC01	295725 692985	Drainage ditch along access to XL019. Man-made ditch, steep-sided banks, in-channel vegetation. Approx. 2m deep and 0.6m wide at water level. Water level on day of survey 0.2m depth.	



ID	Grid Ref	Watercourse Description	Photograph
WC02 & WC03	297337 695284, 295657 692946	Drainage ditch along access to XL018. Man-made ditch along field boundary with in-channel vegetation. No flow on day of survey, approx. 0.8m deep and 1.5m wide at top of bank.	
WC04	295557 692882	Drainage ditch along field boundary, access between XL027 and XL028. Ditch vegetated, approx. 1m deep and 0.5m wide at water level.	

5.5.2 Groundwater Flow and Level Alterations

The time proposed excavations at Kincardine and Kilbagie are kept open for will be minimised to avoid ingress of water and localised groundwater drawdown. Dewatering of excavations will comply with GBR2 and GBR15. If abstraction exceeds 10m³ in any one day a CAR registration will be required and if over 50m³/day a licence will be required. Temporary cut-off drains will be installed to prevent surface water runoff entering excavations. Runoff from these drains and water pumped from excavations will be passed through a SuDS feature prior to discharge to the water environment.

5.5.3 Sediment Discharges

The majority of the existing infrastructure (OHL towers and sealing end compounds) is sited over 50m from local watercourses, which provides a buffer between construction activities and receptors. No construction

activities, including stockpiles and SuDS features, will be placed within the buffer zones described in Table 5.7.

Any runoff from stockpiles of excavated soil and subsoil at Kincardine and Kilbagie will be caught in swales or blind ditches and clean surface water runoff will be diverted around the stockpiles. Long term stockpiles will be encouraged to re-vegetate. Excavated soils will be reinstated where possible and as soon as is practicable. Excess material will be removed in line with the Site Waste Management Plan. The proposals include the removal of the existing cable sealing end compounds and reinstatement of these areas.

As noted in sections 5.5.1 and 5.5.2, SuDS measures will be installed for construction elements at the Kincardine GIS and Kilbagie sites. These SuDS features will encourage settlement of sediment and all runoff



from the construction area, including site compounds, stockpiles and any water pumped from excavations will pass through the SuDS features prior to discharge to the water environment. Clean runoff will be diverted around any construction/storage areas using interception ditches.

Low pressure vehicles will be used to access the OHL towers to avoid compaction and erosion of soils, and potential sediment discharges.

5.5.4 Contaminant Discharges

Mitigation measures to minimise the risk of oil and fuel spills will be in line with SEPA PPG documents and include the following:

- Storage:
 - Storage for oil and fuels on site will be designed to be compliant with PPG 2 and 8;
 - The storage and use of loose drums of fuel on site will be not permitted; and
 - Storage vessels (*i.e.* transformers) containing oils and fuels will be bunded and the bund will provide storage of at least 110% of the tank's maximum capacity.
- Refuelling and maintenance:
 - Fuelling and maintenance of vehicles and machinery, and cleaning of tools, will be carried out in a designated area where possible, in line with PPG 7;
 - Multiple spill kits will be kept on site;
 - Drip trays will be used while refuelling and for on-site plant; and
 - Regular inspection and maintenance of vehicles, tanks and bunds will be undertaken.

- Emergency procedure: The Pollution Prevention and Response Plan will include measures to deal with accidental spillages.

The temporary site compounds at the Kincardine GIS and Kilbagie sites will be bunded to contain any accidental spillages within the area of hardstanding to minimise the risk of water pollution. Runoff from the compounds will be captured and passed through a SuDS system prior to discharge. A closed loop wheel wash facility within the compounds will be provided to minimise the transport of contaminants off-site. Foul drainage will be contained in a closed system and disposed of at a suitable off-site facility.

There is no concrete batching proposed on-site. Pouring of concrete for foundations will take place within well shuttered pours to prevent egress of concrete from the pour area. Pouring of concrete during adverse weather conditions will be avoided. The EMP will include a site spill response and drivers of vehicles carrying concrete will be informed so as to raise awareness of potential effects of concrete and of the procedures for clean-up of accidental spills. Concrete pH will be as close to neutral as practicable as a further precaution against spills or leakage affecting groundwater pH.

The Phase 1 Environmental Report identified potential sources of contamination within the soils at the Kincardine GIS and Kilbagie sites relating to previous land uses. This report recommended that a watching brief of the two sites is maintained during groundworks. In the event of any obvious contamination being encountered a suitably experienced contaminated land consultant should be engaged to assess the ground conditions and advise on future proceedings.



Table 5.7: Buffer Zones for Construction Activities

Water Body			Recommended Buffer Zone
Permanent	watercourses	with	10m on either side
channel width <2m			
Permanent	watercourses	with	20m on either side
channel width >2m			

Source: Forests and Water Guidelines (5th Ed). The Forestry Commission 2011

The assessment of impact significance following implementation of the mitigation measures detailed above is presented in Table 5.8. The residual impact significance reflects the receptor sensitivity and the post-mitigation magnitude of effects.

The assessment concludes that the significance of the predicted effects will be minor to none, post-mitigation. Therefore none of the predicted residual effects are considered to be significant.



Table 5.8: Summary of Impact Significance Assessment

Potential Impact	Receptor, sensitivity	Source of Impact	Type & Duration of Impact	Probability of Impact	Magnitude of Impact	Pre-Mitigation Significance	Mitigation Measures	Post-mitigation Magnitude of Impact	Residual Impact Significance
Surface water flow alterations	Surface water (all), Medium	GIS, cable sealing end compounds and construction compounds at Kincardine and Kilbagie, temporary water crossings along OHL route	-ve Short to long term	Probable	Low	Minor	SuD approach Low ground pressure vehicles used Watercourse crossings temporary and installed using best practice guidance and following GBR6	Negligible	None
Groundwater flow and level alterations	Groundwater (aquifer), Low	Excavations & foundations at Kincardine and Kilbagie, underground cabling at Kilbagie	-ve Short term	Certain	Low	Minor	Duration of excavation and dewatering times minimised. No excavations occurring within 250m of GWDTEs.	Negligible	None
Sediment discharges	Surface water (all), Medium	Soil stripping, dewatering excavations and stockpiles at Kincardine and Kilbagie, access to OHL route including temporary water crossings	-ve Short term	Probable	Medium	Moderate	SuD approach and buffer zones for construction activities including stockpiles. Reinstatement where infrastructure removed. Temporary water crossings to avoid impacts on banks through following GBR6.	Low	Minor
Contaminant discharges	Surface water (all), Medium	Site vehicles, oil & fuel storage, contamination existing in soils	-ve Medium term	Unlikely	Medium	Moderate	SuD approach and buffer zones. Oil/ fuel storage areas bunded & impermeable. Drip trays used. Spill kits & emergency plan in place. Regular inspection & maintenance of vehicles, tanks & bunds. No concrete batching on site. Well shuttered concrete pours, avoiding adverse weather. Watching brief during groundworks. Monitoring	Low	Minor
	Minor								
	Moderate								



6. FLORA AND FAUNA

6.1 Introduction

EnviroCentre Limited was appointed by SPT to carry out an Ecological Impact Assessment (EclA) of the potential effects of the construction and operation of the project on terrestrial ecology. This chapter details the specialist studies undertaken and the results of the impact assessment, which has been carried out according to the guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM).

6.1.1 Potential Impacts

The following main activities during the construction period of The Development could potentially negatively impact on terrestrial ecology in the absence of effective mitigation:

- Soil and vegetation stripping;
- Construction activities including access track creation;
- Stockpiling of materials;
- Use of the temporary construction compounds; and
- Traffic and personnel movements.

The following main activities during the post-construction/operational period of The Development could potentially negatively impact on terrestrial ecology in the absence of effective mitigation:

- Traffic and personnel movements.

Impacts arising from the process of potential decommissioning of The Development have not been assessed, as these are predicted to be of a similar nature to the construction impacts. The tools and techniques that would be used to decommission the transmission line at the end of its life span are likely to be superior to those currently available.

6.1.2 Scope of Assessment

Following consultations with Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA), and other relevant parties, the scope of the terrestrial ecology survey work was agreed and is summarised below:

- Phase 1 Habitat Survey along the entire route of the transmission line;
- National Vegetation Classification (NVC) Survey within important habitats and wetland areas;
- Breeding Bird Survey (BBS) in the vicinity of the proposed substation at Kincardine; and
- Consideration of potential habitat for Water Vole (*Arvicola amphibius*) and Great Crested Newt (*Triturus cristatus*) in proposed construction areas.

A summary of the relevant consultation responses is provided in Table 6.1 below.



Table 6.1: Summary of Consultation Responses

Consultee	Key Comments
SEPA	<p>No specific objection.</p> <p>Confirm that a Phase 1 Habitat Survey should be carried out for the whole site while National Vegetation Classification (NVC) Survey should be completed for any wetlands identified.</p> <p>Advise against undertaking of certain works within proximity of groundwater dependent terrestrial ecosystems (GWDTEs).</p> <p>Outlined certain elements for inclusion within the ES, including a list of groundwater abstractions within a specific radius of the works and a justification for any activity potentially impacting the water environment and how any adverse impact will be mitigated.</p>
SNH	<p>No specific objection.</p> <p>Confirm that a Breeding Bird Survey (BBS) should be carried out at the site of the proposed substation and that consideration should also be given to non-breeding birds within the Forth of Forth Special Protection Area (SPA).</p> <p>Advise that consideration should be given to great-crested newts and water voles within proximity to the works.</p>

The final scope of the impact assessment on terrestrial ecology is listed in the points below. Where survey work was not carried out, desk study information was used to support the assessment where required. The construction and operation phases of The Development are covered in the assessment of the following impacts:

- Damage to habitats;
- Fragmentation of faunal populations;
- Noise and visual disturbance to fauna; and
- Faunal fatalities.

6.2 Assessment Methodology

6.2.1 Legislation, Conservation Initiatives and General Guidance

The compilation of this chapter has taken cognisance of the following legislation, conservation initiatives and general guidance:

- Council Directive 85/337/EEC (as amended) on the assessment of the effects of certain public and private projects on the environment (The Environmental Impact Assessment Directive);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (amended 2008);
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (The Habitats Directive);
- The Conservation of Wild Birds and their Habitats EC Directive (2009/147/EC);

- The Conservation (Natural Habitats etc.) Regulations 1994 (as amended in Scotland) (The Habitats Regulations);
- The Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Nature Conservation (Scotland) Act 2004 (NCA);
- The Conservation (Natural Habitats, &c.) Amendments (Scotland) Regulations 2007;
- The Environmental Impact Assessment (Scotland) Regulations 1999;
- The Wildlife and Natural Environment (Scotland) Act 2011 (WANE);
- The UK Biodiversity Action Plan (BAP);
- Fife Local Biodiversity Action Plan (LBAP) 2010-2015;
- Clackmannanshire Biodiversity Action Plan 2012-2017;
- 2020 Challenge for Scotland's Biodiversity - A Strategy for the conservation and enhancement of biodiversity in Scotland;
- Scottish Planning Policy (SPP);
- Planning Advice Note (PAN) 60: Planning for Natural Heritage;
- Guidelines for Ecological Impact Assessment in the United Kingdom by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2006); and
- Constructed Tracks in the Scottish Uplands by Scottish Natural Heritage (2005).
- Water Framework Directive 2000



6.2.2 Desk Study

A desk study was conducted to search for existing ecological information within a 5km radius of the site. The following sources were reviewed:

- SNH Sitelink website³ for statutory designated sites;
- Woodland Trust for Ancient Woodland Inventory (AWI) 4 sites;
- National Biodiversity Network (NBN) Gateway website⁵ for protected and notable species records;
- RSPB⁶ and British Trust for Ornithology⁷ (BTO) websites;
- Birds Of Scotland⁸; and
- UK Biodiversity Action Plan⁹, Fife Local Biodiversity Action Plan¹⁰ and Clackmannanshire Biodiversity Action Plan¹¹ (for local and national priority species).

The results of the desk study helped to identify whether The Development has the potential to impact upon any designated areas or notable or protected species; informed the field survey; and provided information to guide actions and priorities for ecological mitigation and enhancement. The desk study was undertaken in August 2012 and updated in June 2013.

6.2.3 Field Study

Phase 1 habitat system is a walkover survey which aims to identify the broad types of habitat on a site. The National Vegetation Classification is a more detailed survey technique using quadrats on a range of different vegetation types to identify European and UK Biodiversity Action Plan habitats of importance as well as GWDTE which are sensitive to development. The Phase 1 Habitat Survey¹² was undertaken during July 2012. The BBS¹³ was undertaken on a single visit during June 2013, and the NVC Surveys¹⁴ were completed in August 2013. All of the surveys were undertaken by experienced surveyors according to the generic survey guidance provided by CIEEM¹⁵ and the established methods for each of the components.

6.2.4 Evaluation Methods for Habitats and non-Avian Species

Table 7.2 shows a procedure for determining the geographical value of site designations, habitats and species in the UK (applicable to The Development).

³ Scottish Natural Heritage SiteLink website. Available at <http://www.snh.org.uk/snhi/>

⁴ Ancient Woodland Inventory, Available from: <http://www.woodlandtrust.org.uk/en/about-us/our-woods/Pages/interactive-map.aspx>

⁵ NBN Gateway website. Available at <http://data.nbn.org.uk/>

⁶ RSPB (2012). <http://www.rspb.org.uk/wildlife/birdguide/name>.

⁷ BTO (2012). <http://www.bto.org/about-birds/birdfacts/find-a-species>.

⁸ Forrester, R.W., Andrews I.J., McInerney C.J., Murray R.D., McGowan R.Y., Zonfrillo B., Betts M.W., Jardine D.W. & Grundy D.S. (eds). 2012. *The Birds of Scotland. Digital Version*. The Scottish Ornithologists Club, Aberlady.

⁹ UK Biodiversity Action Plan. Available at: <http://jncc.defra.gov.uk/page-5155>

¹⁰ Fife Local Biodiversity Action Plan. Available at: http://admin.1fife.org.uk/uploadfiles/publications/c64_SAP.pdf

¹¹ Clackmannanshire Biodiversity Action Plan. Available at: <http://biodiversity.clacksweb.org.uk/>

¹² JNCC, (2010), Handbook for Phase 1 habitat survey - a technique for environmental audit

¹³ BTO Breeding Bird Survey. Available at: <http://www.bto.org/bbs/index.htm>

¹⁴ NVC Users' Handbook. Available at: http://jncc.defra.gov.uk/pdf/pub06_NVCUsershandbook2006.pdf

¹⁵ Chartered Institute of Ecology and Environmental Management (undated). General advice on surveys and methods. Available online at: <http://www.cieem.net/general-survey-advice>



Table 6.2: Geographical Evaluation Criteria

Geographical Value	Sites, habitats and species assessment criteria		
	Sites	Habitats	Species
International	Designated, candidate or proposed SACs, SPAs and Ramsar sites; Biosphere Reserves; Biogenetic Reserves; European Diploma Sites (Category A or C); or (Ecological) World Heritage Sites.	Any viable area of habitat included in Annex I of the EC Habitats Directive ¹⁶ ; Any habitat area that is critical for a part of the life cycle of an internationally important species that is Critically Endangered to Vulnerable in the UK.	An internationally important population of a European Protected Species; An internationally important population of an internationally Vulnerable to Critically Endangered Red Data Book species. IUCN Data Deficient or Uncategorized species of global conservation concern.
National / UK	SSSIs; National Nature Reserves.	A viable area of priority habitat listed in the UKBAP ⁷ ; An area of habitat fulfilling the criteria for designation as a SSSI. Any habitat area that is critical for a part of the life cycle of a nationally important species that is Critically Endangered to Vulnerable in the UK.	A nationally important population of any Red Data Book species that is Vulnerable to Critically Endangered in the UK. A nationally important population of any species that is Rare in the UK (<15 10 km grid squares); or that is included in the UK BAP; or that is classed as Data Deficient or Uncategorized in/by the Red Data Books/IUCN. A nationally important population of any Schedule 1 (bird), Schedule 5 (animal) and Schedule 8 (plant) species included in the Wildlife and Countryside Act 1981.
Regional	Regional Parks; Areas of Great Landscape Value.	A viable area of priority habitat listed in the Fife or Clackmannanshire LBAP; Habitats with a significance greater than the county level but not sufficient for SSSI designation.	A regionally important population of a species that is 'Nationally Scarce' (present in 16-100 10km grid squares); or that is included in the Fife or Clackmannanshire LBAP. A significant assemblage of regionally scarce species.
County	The designations should be valued at the level of the criteria or the governing body that declared them (e.g. County, District or Local Council).	Fife or Clackmannanshire LBAP habitats noted as requiring protection; Semi-natural, ancient woodland >0.25ha in extent; A viable area of habitat included within the Fife or Clackmannanshire LBAP.	An important population of a species that is included within the Fife or Clackmannanshire LBAP; A significant assemblage of species that is scarce at the county level.

¹⁶ Smaller areas should be considered at this level when they contribute to the viability of a larger area of similar or related habitat, such as by functioning as a corridor or stepping stone.



Geographical Value	Sites, habitats and species assessment criteria		
	Sites	Habitats	Species
District		Semi-natural, ancient woodland <0.25ha in extent; Areas of viable habitat identified in the District LBAP (if available); Diverse or ecologically valuable hedgerow network.	An important population of a species that is included within the District LBAP (if available) or which occurs in 70-176 10km grid squares.
Local		Habitats that are unique in or of some other significance in the local area; Areas of habitat that contribute to the local ecological resource (e.g. species-rich hedgerows, verges, ponds, woodlands etc.).	A locally important assemblage of species.
ZOI ¹⁷	No designations.	Common, often anthropogenic habitats.	Common, frequently ruderal or alien species.

¹⁷ Within the Zone of Influence (ZOI) only (which might be the project site or a larger area).



Habitats and individuals of species that have Action Plans (Habitat Action Plans (HAPs) and Species Action Plans (SAPs)) in the UK BAP are not necessarily nationally important, nor are LBAP HAP habitats and individuals of SAP species necessarily locally important. The purpose of a HAP/SAP is to guide conservation action or set priorities for the habitat/species concerned. It does not imply any specific level of value for the habitat/species. The only exception to this is where a HAP states that all areas of a particular habitat should be protected, as is often the case for priority habitats.

Where a feature has value at more than one level in the table, its overriding value is that of the highest level. Similarly, in the evaluations for this site and its environs, generally only the highest level of legal protection is listed.

For the purposes of this evaluation the 'site' is the site OHL line route, area of proposed new GIS and cable sealing ends at Kilbagie as shown on Figure 1. The evaluations have been applied only to those habitats and species that have been scoped in to the assessment and those that are predicted to be affected by the construction or the operation of The Development. These are termed Valued Ecological Receptors (VERs).

6.2.5 Evaluation Methods for Birds

Biodiversity Value of Bird Species

The biodiversity value of each species was determined through consideration of two factors. Firstly, the legal protection afforded by relevant European and national legislation was determined for each species. Secondly, the conservation status for each species was determined by their inclusion as a Priority Species in BAPs and in their inclusion on global, European and national lists of species of conservation concern. These two factors are described in more detail below.

Legal Protection of Bird Species

Wild birds within the UK are protected under both European and national legislation. On a European scale, The Birds Directive, or European Directive 2009/147/EC (the codified version of EEC Directive 79/409/EEC as amended) relates to the conservation of all species of naturally occurring birds in the wild state. It covers the protection, management and control of these species and applies to birds, their eggs, nests and habitats.

It requires measures to be taken to address the factors which may affect the numbers of birds, namely the repercussions of man's activities and, in particular, the destruction and pollution of their habitats, in

order to maintain populations at a level which corresponds to ecological, scientific and cultural requirements. The Directive requires in particular, that species mentioned in Annex 1 shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.

In the following assessment, those species subject of special conservation measures under this European designation is referred to as "Annex 1" species.

In the UK, the provisions of the Birds Directive are implemented through the Wildlife & Countryside Act 1981 (as amended), the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and the Conservation of Habitats and Species Regulations 2010. In Scotland the Habitats Directive is transposed through a combination of the Habitats Regulations 2010 (in relation to reserved matters) and the 1994 Regulations.

Parts I, IA and AI of Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) lists birds which are protected by special penalties at all times, and provides the highest level of protection. Part II lists birds which are protected by special penalties during the close season.

In the following assessment, birds which are protected by special penalties under these designations are referred to as "Part I of Schedule 1", or "Part II of Schedule 1" species.

Conservation Status of Bird Species

Wild birds may be listed as Priority Species in Biodiversity Action Plans at national (UK BAP) and local (LBAP) levels. These plans are non-statutory, but aim to describe the biological diversity resources of the UK, and to set out a detailed plan for their conservation in order to contribute to fulfilling the UK's international and national obligations.

Global conservation status of birds is defined in the "IUCN Red List Categories and Criteria"¹⁸. The general aim of the system is to provide an explicit, objective framework for the classification of species according to their extinction risk. This is the world's most comprehensive inventory of the global conservation status of species and those categorised as "Threatened" may be further categorised on a

¹⁸ IUCN. (2001). IUCN Red List Categories and Criteria: Version 3.1. IUCN. Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK. ii + 30 pp.



decreasing scale as “Critically Endangered”, “Endangered” or “Vulnerable”.

Those not considered as “Threatened”, may be categorised as “Near Threatened” when close to qualifying, or if likely to qualify in the future. A species at the lowest level of threat is categorised as “Least Concern”, and widespread and abundant species are included in this category. When there is inadequate information to make an assessment, a species may be categorised as “Data Deficient”.

European conservation status of birds is determined by Birdlife International in their report “Birds in Europe”¹⁹ which identifies priority species in order that conservation action can be taken to improve their status. Such birds are described as “Species of European Conservation Concern” (SPEC).

National conservation status of birds is determined by their listing on the Red, Amber and Green lists of “Birds of Conservation Concern” (BoCC), as defined by Eaton *et al.*²⁰. The criteria used to assess these lists reflect each species’ global, European and UK status and measure the importance of the UK populations in international terms.

BoCC “Red List” species are either globally “Threatened” using IUCN criteria; have suffered a severe decline since 1800 without substantial recent recovery; have suffered a severe decline in breeding or non-breeding population of more than 50% over 25 years; or suffered a severe decline in breeding range of more than 50%, measured by birds present in 10km squares, over 25 years.

BoCC “Amber List” species must have been identified as a SPEC; or have been Red listed for historical decline in a previous review, but with a substantial recent recovery; or have a moderate (25%-50%) decline in breeding or non-breeding populations or breeding range over the past 25 years; or have a UK breeding population of fewer than 300 pairs, non-breeding population of fewer than 900 individuals; or have at least 50% of the UK breeding or non-breeding population found in 10 or fewer sites; or be species of international importance with at least 20% of the

European breeding or non-breeding population found in the UK.

BoCC “Green List” species comprise all regularly occurring species that do not qualify under any of the Red or Amber criteria. The Green list also includes those species listed as recovering from Historical Decline in the last review that have continued to recover and do not qualify under any of the other criteria.

Assessment Criteria and Geographical Scale of Birds

The assessment criteria which were used to define the biodiversity value of each species are listed below in Table 7.3.

¹⁹ **BirdLife International (2004). Birds in Europe – Population estimates, trends and conservation status. BirdLife Conservation Series No. 12.**

²⁰ Eaton M.A., Brown A.F., Noble D.G., Musgrove A.J., Hearn R., Aebischer N.J., Gibbons D.W., Evans A. & Gregory R.D. (2009). Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds*, **102**, 296-341.

**Table 6.3: Criteria for Assessing the Biodiversity Value of Bird Species**

Geographical Scale	Assessment Criteria
International	<ul style="list-style-type: none"> Any species within Annex 1 of the EU Birds Directive.
National	<ul style="list-style-type: none"> Any species within Schedule 1 of the Wildlife and Countryside Act Any species that is listed as a Priority Species in the UKBAP. Any species on the BoCC Red List.
Local	<ul style="list-style-type: none"> Any species that is listed as a Priority Species in the LBAP. Any species on the BoCC Amber List.
ZOI	<ul style="list-style-type: none"> BoCC Green List; or species with no conservation concern; common and widespread throughout the UK.

Overall Value of the Site for Birds

Once the biodiversity value of each species recorded during the surveys was determined, the overall value of the site for each species was then determined from the findings of the baseline conditions in Section 7.3 below and comparison with the international and national population sizes.

A geographical scale from “International” to “ZOI” was used to describe the overall value of the site for each species. This is similar to the scale described above, but with an additional category of “Regional”. The definition of each category is as follows:

- International: Supporting greater than 1% of EC population;
- National: Supporting greater than 1% of UK population;
- Regional: Supporting greater than 0.5% of UK population;
- Local: Supporting greater than 0.05% of UK population; and
- ZOI: Supporting less than 0.05% of UK population.

In determining the size of the UK populations, reference was made to the websites of three organisations: RSPB²¹, British Trust for Ornithology (BTO)²² and Joint Nature Conservation Committee

(JNCC)²³. Scottish populations were determined using The Birds of Scotland²⁴. Where there was variation between the estimates provided by these organisations, the range of estimates is provided.

6.2.6 Impact Assessment Methods for All Habitats and Species

The ways in which the VERs might be affected by the development are explained and the magnitudes and probabilities of the likely impacts and their subsequent effects are predicted. The term ‘impact’ is used commonly throughout the EIA process and is usually defined as a change experienced by a receptor (this can be positive, neutral or negative). The term ‘effect’ is commonly used at the conclusion of the EIA process and is usually defined as the consequences for the receptor of an impact. The EIA Regulations specifically require all likely significant effects to be considered. Therefore, impacts and effects are described separately and the effects for the VERs are assessed as being either **significant or not** at the assigned level of geographical value.

To align with the methodology presented in section 1.5, an ecological effect deemed to be **not significant** is considered to fall into the sub-categories of none to minor. Whereas an effect deemed to be potentially **significant falls** into the sub-categories of moderate to major.

²¹ RSPB (2012). <http://www.rspb.org.uk/wildlife/birdguide/name>.

²² BTO (2012). <http://www.bto.org/about-birds/birdfacts/find-a-species>.

²³ JNCC (2012). <http://jncc.defra.gov.uk/page-1419>.

²⁴ Forrester, R.W., Andrews I.J., McInerney C.J., Murray R.D., McGowan R.Y., Zonfrillo B., Betts M.W., Jardine D.W. & Grundy D.S. (eds). 2012. *The Birds of Scotland. Digital Version*. The Scottish Ornithologists Club, Aberlady.



Assessment Criteria - Magnitude

The CIEEM guidance²⁵ states that when describing changes/activities and positive or negative impacts on ecosystem structure and function, reference should be made to the following parameters:

- Magnitude;
- Extent;
- Duration;
- Reversibility; and
- Timing and frequency.

Magnitude: refers to the 'size' or 'amount' of an impact, determined on a quantitative basis if possible, but typically expressed in terms of relative severity, such as major, moderate or low. Extent, duration, reversibility, timing and frequency of the impact can be assessed separately but they tie in to determine the overall magnitude.

Extent: the area over which the impact occurs. When the VER is the habitat itself, magnitude and extent may be synonymous.

Duration: the time for which the impact is expected to last prior to recovery or replacement of the VER. This is defined in relation to ecological characteristics, rather than human timeframes. The duration of an activity may differ from the duration of the resulting impact caused by the activity and this is taken into account.

Reversibility: an irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible (temporary) impact is one from which spontaneous recovery is possible or for which effective mitigation is both possible and an enforceable commitment has been made.

Timing and frequency: some changes may only cause an impact if they happen to coincide with critical life-stages or seasons. The frequency of an activity and hence the resulting impact is also considered.

Assessment Criteria – Probability of Occurrence

It is important to consider the likelihood that a change/activity will occur as predicted. The following objective scale is used:

- Certain/near certain: probability estimated at 95% chance or higher.

- Probable: probability estimated above 50% but below 95%.
- Unlikely: probability estimated above 5% but less than 50%.
- Extremely unlikely: probability estimated at less than 5%.

The reason for including a category of 'extremely unlikely' is that some effects may be very improbable, but extremely serious should they occur and hence merit contingency planning. Where doubt exists, the more conservative level is assigned.

Assessment Criteria - Significance

CIEEM defines an ecologically significant impact as one that (negatively or positively) affects the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area. These terms are defined below:

Integrity: The concept of site integrity is a principle used in the Habitats Directive to assess adverse impacts on internationally designated sites. It can be applied at all sites in the conservation hierarchy and also to sites with no conservation designation. Site integrity can be defined as: the coherence of ecological structure and function across the site's whole area, which enables it to sustain the complex of habitats and/or the levels of populations of species for which it was classified/identified as a VER. A site/ecosystem that achieves this level of coherence is considered to be in favourable condition. The overall question is: will the predicted impacts of the development move the condition of the site/ecosystem towards or away from favourable condition?

Conservation status: The Habitats Directive provides a helpful definition of conservation status for habitats and species:

- For habitats, conservation status is determined by the sum of the 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; and
- 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 populations within a given geographical area.

²⁵ Chartered Institute of Ecology and Environmental Management (CIEEM) (2006). Guidelines for Ecological Impact Assessment in the United Kingdom. Available at: <http://www.cieem.org.uk/ecia/index.html>



Conservation status may be evaluated for any defined study area at any defined level of ecological value. The extent of the area used in the assessment relates to the geographical level at which the feature is considered important (see Table 6.2 above). If a VER is likely to experience a significant impact, the consequences in terms of development control, policy guidance and legislation will depend on the level at which it is valued. Significant impacts on features of ecological importance should be mitigated (or compensated for) in accordance with guidance derived from policies applied at the scale relevant to the value of the feature or resource.

Assessment Criteria – Confidence in Predictions

CIEEM does not cover levels of confidence in predictions adequately; therefore an approach has been adopted based on river conservation evaluation²⁶. A simple, qualitative index is assigned to each predicted impact as follows:

A: high confidence.

B: intermediate confidence.

C: low confidence.

Factors influencing confidence include:

- The frequency and effort of field sampling;
- Constraints to the field survey;
- The completeness of the data (field and desk);
- The age of the data (although recent data are not necessarily always more reliable than old data);
- The state of scientific knowledge relating to the predicted effects of development activities on the VER (the accuracy of the magnitude assessment);
- The accuracy of the probability assessment; and
- The accuracy of the assessment of significance.

Assessment Criteria – Success of Mitigation

CIEEM states that, due to the uncertainty associated with the success of proposed mitigation (and particularly compensation) measures, evidence (from other similar projects) should be provided of the effectiveness of agreed or recommended mitigation, compensation and enhancement measures, accompanied by a statement of the level of success

that can be expected. The uncertainty will vary according to a number of factors:

- The technical feasibility of what is proposed;
- The overall quantity of what is proposed;
- The overall quality of what is proposed;
- The level of commitment provided to achieve what is proposed; and
- The timescale over which the predicted benefits are to be realised.

Again, the following objective scale is used:

- Certain/near certain: probability estimated at 95% chance or higher.
- Probable: probability estimated above 50% but below 95%.
- Unlikely: probability estimated above 5% but less than 50%.
- Extremely unlikely: probability estimated at less than 5%.

Estimates of certain/near certain and probable are the targets for successful mitigation measures. Estimates of unlikely and extremely unlikely will warrant further investigation in order to improve the measure's probability of success.

6.3 Baseline Conditions

6.3.1 Designated Sites

No statutory designated sites exist within or adjacent to the site boundary. However, a total of ten designated sites are found within a 5km radius of the site. The sites in Table 6.4 are present within this area and are listed together with the features for which they were respectively designated as well as an indication of their distance from, and orientation to, the most proximal part of the power line.

²⁶ SERCON: System for Evaluating Rivers for Conservation, Version 2, Technical Manual. Scottish Natural Heritage (2001).



Table 6.4: Internationally and nationally-designated sites located within 5km of the transmission line, the features for which they were designated, and their distance and orientation.

Designation	Feature(s)	Orientation to the Site
Firth of Forth SSSI, SPA & Ramsar	<p>SSSI</p> <ul style="list-style-type: none"> • Eider (<i>Somateria mollissima</i>), breeding; • Ringed plover (<i>Charadrius hiaticula</i>), breeding; • Shelduck (<i>Tadorna tadorna</i>), breeding; • Curlew (<i>Numenius arquata</i>), non-breeding; • Grey Plover (<i>Pluvialis squatarola</i>), non-breeding; • Scaup (<i>Aythya marila</i>), non-breeding; • Knot (<i>Calidris canutus</i>), non-breeding; • Red-breasted merganser (<i>Mergus serrator</i>), non-breeding; • Shelduck (<i>Tadorna tadorna</i>), non-breeding; and • Pink-footed Goose (<i>Anser brachyrhynchus</i>), non-breeding. <p>SPA</p> <ul style="list-style-type: none"> • Waterfowl assemblage, non-breeding; • Bar-tailed Godwit (<i>Limosa lapponica</i>), non-breeding • Cormorant (<i>Phalacrocorax carbo</i>), non-breeding • Curlew (<i>Numenius arquata</i>), non-breeding; • Dunlin (<i>Calidris alpina alpina</i>), non-breeding; • Eider (<i>Somateria mollissima</i>), non-breeding • Goldeneye (<i>Bucephala clangula</i>), non-breeding; • Great Crested Grebe (<i>Podiceps cristatus</i>), non-breeding; • Grey Plover (<i>Pluvialis squatarola</i>), non-breeding; and • Knot (<i>Calidris canutus</i>), non-breeding. <p>RAMSAR</p> <ul style="list-style-type: none"> • Bar-tailed Godwit (<i>Limosa lapponica</i>), non-breeding; • Sandwich Tern (<i>Sterna sandvicensis</i>), passage; • Waterfowl assemblage, non-breeding; • Goldeneye (<i>Bucephala clangula</i>), non-breeding; • Knot (<i>Calidris canutus</i>), non-breeding; • Pink-footed Goose (<i>Anser brachyrhynchus</i>), non-breeding; • Redshank (<i>Tringa totanus</i>), non-breeding; • Shelduck (<i>Tadorna tadorna</i>), non-breeding; • Slavonian Grebe (<i>Podiceps auritus</i>), non-breeding; and • Turnstone (<i>Arenaria interpres</i>), non-breeding. 	0.8km south and west



Craigmad SSSI	Wood	<ul style="list-style-type: none"> • Upland oak woodland; and • Lowland dry heath. 	1.0km east
Damhead SSSI	Wood	<ul style="list-style-type: none"> • Wet woodland 	1.4km west
Lin Mill SSSI		<ul style="list-style-type: none"> • Upland mixed ash woodland 	2.8km west
Gartmorn Dam SSSI		<ul style="list-style-type: none"> • Open water transition fen • Eutrophic loch 	3.7km west
Devon Gorge SSSI		<ul style="list-style-type: none"> • Upland mixed ash woodland 	4.1km north-west
Lockshaw SSSI	Mosses	<ul style="list-style-type: none"> • Raised bog 	4.7km east
Dollar Glen SSSI		<ul style="list-style-type: none"> • Upland mixed ash woodland; • Subalpine calcareous grassland; • Subalpine flushes; • Carboniferous - Permian Igneous; • Beetle (<i>Stenus glacialis</i>) 	5.0km north-west

The Firth of Forth is internationally designated as an SPA and Ramsar site. It is also designated nationally as a SSSI, and there are a further seven sites accorded with this designation. The latter are all designated for the habitat that they contain whereas the SPA and Ramsar designations for the Firth of Forth are in respect of highly mobile bird species.

The bird species for which the Firth of Forth was designated are not anticipated to be affected by The Development as the works and subsequent operation of the upgraded transmission line will be confined to the three dimensional footprint of structures that they will already be used to avoiding. The exemption is the replacement of two transmission towers at the Kincardine substation by one terminal tower. However, given the distance from the SPA and the prevalence of similar structures within the area, this change in three dimensional footprint is not considered to be worthy of further assessment.

Similarly, there are no anticipated effects upon the SSSIs whose features are fixed and generally at some distance (>1.0km) from the overheadline (OHL) operations.

There were no further ecological or hydrological connections within the designated sites, and therefore none of the designated sites or their qualifying species is considered further within this assessment.

6.3.2 Priority Habitats and Species

At a local level, the following are included as Priority Habitats and Species in the Fife Local Biodiversity

Action Plan that are relevant to the Kincardine to Blairingone route:

- Farmland;
- Rivers;
- Standing Water;
- Common lizard (*Zootoca vivipara*);
- Common toad (*Bufo bufo*);
- Common frog (*Rana temporaria*);
- Water vole;
- Otter (*Lutra lutra*);
- Soprano pipistrelle bat (*Pipistrellus pygmaeus*);
- Common pipistrelle bat (*Pipistrellus pipistrellus*);
- Brown Long-eared bat (*Plecotus auritus*);
- Red squirrel (*Sciurus vulgaris*);
- Skylark (*Alauda arvensis*);
- Linnet (*Carduelis cannabina*);
- Bullfinch (*Pyrrhula pyrrhula*); and
- Song Thrush (*Turdus philomelos*).

At a local level, the following are included as Priority Habitats and Species in the Clackmannanshire Biodiversity Action Plan that are relevant to the Kincardine to Blairingone route:

- Ponds;
- Rivers and streams;
- Common lizard;



- Water vole;
- Otter;
- Soprano pipistrelle bat;
- Common pipistrelle bat;
- Brown Long-eared bat;
- Red squirrel;
- Yellowhammer (*Emberiza citrinella*);
- Dunnock (*Prunella modularis*);
- House Sparrow (*Passer domesticus*);
- Herring Gull (*Larus argentatus*);
- Starling (*Sturnus vulgaris*);
- Skylark;
- Linnet;
- Bullfinch; and
- Song Thrush.

At a national level, the following are included as Priority Habitats and Species in the UK Biodiversity Action Plan that are relevant to the Kincardine to Blairingone route:

- Rivers;
- Arable Field Margins;
- Hedgerows;
- Oligotrophic and dystrophic lakes;
- Slow worm (*Anguis fragilis*);
- Adder (*Vipera berus*);
- Common lizard;
- Common toad;
- Water vole;
- Otter;
- Soprano pipistrelle bat;
- Brown Long-eared bat;
- Red squirrel;
- Skylark;
- Linnet;
- Yellowhammer;
- Bullfinch;
- Song Thrush;
- Starling; and
- Dunnock.

The following species are specially protected under international and national legislation:

- All bat species and otter (European Protected Species (EPS));
- Water vole (shelter and protection only) (Wildlife and Countryside Act 1981 (WCA));

- All breeding bird species (Schedule 1 Part I of the WCA);
- Red squirrel (WCA);
- Slow worm, adder and common lizard (limited protection under the WCA); and
- Badger (*Meles meles*) (Protection of Badgers Act 1992 (PBA)).

6.3.3 Vegetation Survey

The habitats within the footprint of The Development are generally highly modified and managed for agricultural purposes (including forestry). Semi-natural habitat is limited to small areas of scattered scrub, open water, tall herb fen and swamp, mire and marshy grassland that are left unmanaged because of their unproductive nature (in agricultural terms).

The most prominent habitats are all agricultural/forestry and they include (according to their JNCC Phase 1 Habitat Survey titles):

- Coniferous plantation;
- Semi-improved and neutral grassland;
- Unimproved neutral grassland;
- Improved grassland; and
- Arable.

All of these habitats are subject to regular, seasonal disturbance for agricultural purposes (ploughing, reseeding, fertilising, harvesting and/or grazing).

Smaller areas of non-agricultural and/or semi-natural habitat are also located sporadically within the footprint of The Development. These include (according to their JNCC Phase 1 Habitat Survey titles):

- Scattered and lines of trees;
- Scattered scrub;
- Marshy grassland;
- Heath;
- Tall herb fen and swamp
- Mire
- Bracken;
- Tall ruderal;
- Ephemeral/short perennial;
- Still water ponds; and
- Running water (in natural and modified watercourses).



A legacy of agricultural management along the length of the transmission line means that the areas attributable to each of these habitats are small (generally <1.0ha) and subject to historical and/or periodic disturbance so that while they contain distinctive species, the species-richness is generally low.

A total of 17 Phase 1 habitats were recorded on the site including semi-natural broadleaved woodland, marshy grassland, and marshy grassland incorporating acid dry dwarf shrub heath (see Appendix G, Volume 2 for Phase 1 map, habitat descriptions, locations and an indication of the absolute and relative areas of each habitat). Following Phase 1 survey more detailed NVC surveys were undertaken of more important protected European/UKBAP and GWDTE habitats.

Transmission towers are located only within the heath and marshy grassland habitats. The remaining habitats intervene between the towers. As is the case generally, the heath and marshy grassland have already been subject to disturbance, respectively through the establishment of coniferous plantation and through on-going improvement and grazing.

A total of seven NVC communities were recorded on the site in tall herb fen, swamp and mire habitats (see Appendix G, Volume 2, for community descriptions, locations). All of the recorded communities are GWDTE (see Water Environment Chapter), and all are included within Annex I of the Habitats Directive and within the UK BAP and many LBAPs. These are:

- M6 *Carex echinata* - *Sphagnum recurvum/auriculatum* mire;
- M15 *Scirpus cespitosum*-*Erica tetralix* wet heath; and
- M23b *Juncus effusus/acutiflorus*- *Galium palustre* rush pasture, *Juncus effusus* sub-community
- M25 *Molinia caerulea*-*Potentilla erecta* mire.
- M27 *Filipendula ulmaria*-*Angelica sylvestris* mire

- S5 *Glyceria maxima* swamp
- S28 *Phalaris arundinacea* tall herb fen

Community descriptions of the NVC communities are provided below.

M6 *Carex echinata* - *Sphagnum recurvum/auriculatum* mire

One M6 acid flush was recorded. *Juncus effusus* and *Carex echinata* dominated marshy grassland on the margins of a wet *Polytrichum commune* heath and bounded by plantations and arable fields. *Sphagnum* is a semi conspicuous component especially in more open habitat grading to wet heath with frequent *Calliergon* spp. and *Calluna*.

M15 *Scirpus cespitosum*-*Erica tetralix* wet heath

A variable linear strip of wet heath along the transmission line route lying between pine plantations and arable fields. The marginal M23 and M6 vegetation and managed encroaching scrub forms an atypical sub-community mosaic. *Calluna vulgaris* dominates throughout with patches of locally abundant *Sphagnum fallax*, *Juncus effusus*, *Polytrichum commune* and *Molinia caerulea*.

M23b *Juncus effusus/acutiflorus*-*Galium palustre* rush-pasture, *Juncus effusus* sub-community *Juncus effusus* dominated marshy grassland with occasional patchy grassy areas grading to other grassy areas. These stands are often restricted in size due to surrounding landuse, but included locally frequent patches of *Holcus lanatus*, *Deschampsia cespitosa*, *Calliergon* spp, *Rhytidadelphus squarrosus* and *Mentha aquatica*.

M25 *Molinia caerulea*-*Potentilla erecta* mire

A tussocky *Molinia* dominated mire on shallow peat in a 70x30m strip adjacent to a broadleaved birch woodland. The mire is heavily poached and grazed by cattle with few associate plants, which include the occasional *Potentilla erecta*, *Polytrichum commune*, *Deschampsia flexuosa* and *Festuca* spp.



M27 *Filipendula ulmaria*-*Angelica sylvestris* mire

Marginal vegetation very restricted in extent to narrow 5-10m band around a large valley swamp. The margins are quite dry and influenced by drier habitat in the form of tall grasses and tall herbs and weeds. Complex mosaics also occur with common tall herbs such as *Urtica dioica* and *Cirsium* spp. as well as *Juncus* marsh. *Arrhenatherum elatius* co-dominates with the *Filipendula* and *Angelica*, and *Deschampsia cespitosa*, *Rumex acetosa*, *Epilobium plautre*, *Stachys palustre*, *Potentilla anserina*, *Ranunculus repens* and *Galium aparine* are all frequent.

British Red List²⁷, i.e. they are not currently threatened.

S5 *Glyceria maxima* swamp

Small patches of *Glyceria maxima* swamp up to 2m high, among a much larger extensive *Phalaris* valley swamp. This swamp appears to be in former pools slightly wetter than the surrounding swamp and is never more than 30x30m in area. The community is very species poor, with *Phalaris arundinacea* locally frequent and *Urtica dioica* and *Galeopsis tetrahit* occasional.

S28 *Phalaridetum arundinaceae* tall-herb fen

A large valley swamp dominated by *Phalaris arundinacea* with patchy S5 and marginal vegetation. The swamp is quite dry probably due to the dry summer of 2013. *Glyceria maxima* is frequent, with occasional small patches of *Urtica dioica* and *Polygonum persicaria*. It extends along the stream margins but this is more disturbed with steep muddy banks (with some bunding) supporting some willow scrub and tall ruderal species.

6.3.4 Notable Flora

A search of data held by the NBN Gateway for the two OS 10km grid squares NS98 and NS 99, filtered to include only those species that are included in the JNCC collation of taxon designations, produced the species listed in Table 7.5. Bogbean, harebell and heather were found on the site in the survey. All of these species are listed as Least Concern (LC) in the

²⁷ Nature conservation designations for all UK taxa are contained in the JNCC spreadsheet available from: <http://jncc.defra.gov.uk/page-3408>

**Table 6.5:** Plant species included within the JNCC collation of taxon designations recorded for the two 10 km grid squares in which the site is located (i.e. NS98 and NS99).

Vernacular name	Scientific name
Allseed	<i>Radiola linoides</i>
Bird's-nest orchid	<i>Neottia nidus-avis</i>
Black-bindweed	<i>Fallopia convolvulus</i>
Bluebell	<i>Hyacinthoides non-scripta</i>
Bogbean	<i>Menyanthes trifoliata</i>
Box	<i>Buxus sempervirens</i>
Charlock	<i>Sinapis arvensis</i>
Chicory	<i>Cichorium intybus</i>
Coralroot orchid	<i>Corallorhiza trifida</i>
Corn mint	<i>Mentha arvensis</i>
Cowslip	<i>Primula veris</i>
Dwarf eelgrass	<i>Zostera noltei</i>
Eelgrass	<i>Zostera marina</i>
Fly honeysuckle	<i>Lonicera xylosteum</i>
Fragrant orchid	<i>Gymnadenia conopsea</i>
Greater butterfly-orchid	<i>Platanthera chlorantha</i>
Greater knapweed	<i>Centaurea scabiosa</i>
Hairy stonecrop	<i>Sedum villosum</i>
Harebell	<i>Campanula rotundifolia</i>
Heath cudweed	<i>Gnaphalium sylvaticum</i>
Heather	<i>Calluna vulgaris</i>
Hoary mullein	<i>Verbascum pulverulentum</i>
Hoary plantain	<i>Plantago media</i>
Large-flowered hemp-nettle	<i>Galeopsis speciosa</i>

The JNCC collation of taxon designations includes those species are that included within the following items:

- Bern Convention (Appendices 1, 2 and 3);
- Biodiversity Action Plan (BAP) UK priority species list;
- Global IUCN Red List;
- Habitats Directive (Annex 2 (priority species), Annex 2 (non-priority species), Annexes 4 and 5);
- Nationally Rare/Scarce (not based on IUCN criteria);
- National Red Lists (including red listings based on IUCN guidelines);
- Species of principal importance in Scotland (NERC section 41 & 42 lists, Scottish Biodiversity List);

- The Conservation (Natural Habitats, &c.) Regulations 1994 (Schedules 2, 3 & 4) and
- Wildlife and Countryside Act 1981 (Schedules 1, 5 & 8).

6.3.5 Protected Species

The historical presence of protected species recorded within the two 10km OS grid squares occupied by The Development (i.e. 10km grid squares NS98 & NS99) is included in Table 6.6 which also lists the Priority Species included within the Fife and Clackmannanshire LBAPs which are most pertinent to The Development, based on the presence of suitable and/or the existence of previous records (as determined from the desk study).



Table 6.6: Protected Species and Local Biodiversity Action Plan Priority Species potentially within the transmission line upgrade buffer zone.

Designation	Species(s)	Existing records?
Fauna		
Protected species	Badger	None
	Otter	Yes
	Red Squirrel	Yes
	Bats	Several species including: <ul style="list-style-type: none"> • Common Pipistrelle • Daubenton's Bat (<i>Myotis daubentonii</i>); • Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>); • Natterer's Bat (<i>Myotis nattereri</i>); • Noctule Bat (<i>Nyctalus noctula</i>); • <i>Pipistrellus pipistrellus sensu lato</i>; and • Soprano Pipistrelle
	Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	None
	Great-crested Newt	None
	Mountain Hare (<i>Lepus timidus</i>)	Yes
	Pine Marten (<i>Martes martes</i>)	None
	Water vole	None
LBAP	Common Lizard	Yes
	Otter	Yes
	Bats – all species listed above	Yes
Priorities	Common Frog	Yes
	Common Toad	Yes

No observations or field signs of any of the protected species listed in Table 6.6 were made during the survey. However, suitable habitat for the following species was located:

- Badger;
- Bats;
- Common toad;
- Common frog; and
- Red squirrel.

Suitable habitat for badger and red squirrel exists in the areas of woodland and plantation abutting the buffer zone; and to a lesser extent, any associated semi-natural habitat (for foraging and/or commuting). Such woodland habitat also offers some potential habitat for roosting bats and the hedgerows and network of small woodlands/plantations offers

resource for this group of species when commuting or foraging.

No field signs or historical records of badger exist within the vicinity of The Development, so it is considered that due to the limited disturbance within the proposed footprint, no further evaluation or assessment of badger should be undertaken.

Still water bodies provide suitable habitat for common toad and common frog, and may also provide a foraging resource for transitory otters. The watercourses crossing the site are generally unsuitable for otter on account of their size, although the Black Devon offers some opportunities for this species.

The watercourses on the site are predominantly steep-banked. This feature and the marginal vegetation present are generally unsuitable for water vole, as is the overall level of connectivity within the wider landscape. With no historical records of this



species from the area, it is considered that no further evaluation or assessment of water vole is necessary for The Development.

All watercourses on the site also lack the sandy substrate and pebbly bottom required for the potential presence of freshwater pearl mussel. The managed and disturbed land adjacent to the watercourses and marginal vegetation present are also likely to affect the ability of the mussels to survive in the area, and no further evaluation or assessment of freshwater pearl mussel is considered necessary for The Development.

Great crested newts have not been recorded locally, but as a species can be found in a variety of wetland habitats containing marginal vegetation used for egg-laying. Connectivity of the landscape is important for great crested newts as populations are less able to thrive where there are high degrees of fragmentation. They often occur in meta-populations that encompass a number of ponds in a small geographical area which helps ensure the survival of populations even if sub-populations are affected. No suitable waterbodies for great crested newt were recorded during the Phase 1 Habitat Survey, and no further evaluation or assessment of great crested newt will be undertaken.

Pre-construction surveys should include checks for great crested newt, water vole and otter to ensure that these species have not colonised the area or are not present during the construction phase of the project, and are not likely to be affected by the proposed works. This is included as a mitigation measure (Section 6.6.1 below).

Although there are historic records of mountain hare within the 10km squares within which The Development is proposed, the habitat and associated land use within the proposed footprint of the works is deemed totally unsuitable for this species, and no further evaluation or assessment of mountain hare will be undertaken.

6.3.6 Ornithology Survey

No species afforded extra protection (those included on Annex I of the Birds Directive or Schedule I of the WCA) were recorded during the BBS conducted around the site of the proposed Kincardine substation. However, nine species recorded are of conservation interest within the UK as shown by their inclusion on the UK BAP. These are:

- Bullfinch;
- Dunnock;
- Herring Gull;
- House Sparrow;
- Linnet;
- Skylark;
- Song Thrush;
- Starling; and
- Yellowhammer.

All nine species appear on the Clackmannanshire LBAP and Bullfinch, Linnet, Skylark and Song Thrush also appear on the Fife LBAP.

Of the nine species of conservation interest, seven also appear on the BoCC Red List:

- House Sparrow, Starling and Yellowhammer have all suffered a severe (>50%) medium and long-term decline in their UK breeding numbers. House Sparrow and Starling are also European Species of Conservation Concern (SPEC);
- Linnet and Skylark have suffered a severe medium-term and moderate (25-50%) long-term decline in their UK breeding numbers. Both species are also SPEC;
- Song Thrush has suffered a severe long-term decline in its UK breeding numbers; and
- Herring Gull has suffered a moderate medium-term decline in its UK breeding numbers and a severe long-term decline in both its UK breeding and non-breeding numbers. These figures are internationally important as 20% of the European non-breeding population overwinters in the UK.

The remaining two species both appear on the BoCC Amber List:

- Bullfinch has suffered a severe decline in its long-term UK breeding numbers, and both



Bullfinch and Dunnock have suffered moderate medium-term declines in their UK breeding numbers.

6.4 Evaluation

The evaluation has been applied only to those habitats and species that have been scoped in to the assessment and those that are predicted to be affected by the construction or the operation of the proposed upgrade of the transmission line (see Sections 6.2.4 and 6.2.5 for Methods). The evaluation is based on the scheme layout and access tracks (illustrated in Figures 6.1 -6.4), which run across agricultural fields and follow existing tracks and pathways. This avoidance of habitats adjacent to agricultural land negates impacts on the vegetation such as habitat loss and habitat fragmentation, and as such, the evaluation is solely based on those impacts listed in Section 6.1.2, namely:

- Damage to habitats;
- Fragmentation of faunal populations;
- Noise and visual disturbance to fauna; and
- Faunal fatalities.

The Valued Ecological Receptors (VERs) are as follows:

- Running water;
- Unimproved Neutral Grassland;
- Semi-improved Neutral Grassland;

- M6 Carex echinata - Sphagnum recurvum/auriculatum mire;
- M15 Scirpus cespitosum-Erica tetralix wet heath;
- M23b Juncus effusus/acutiflorus-Galium palustre rush-pasture, Juncus effusus sub-community;
- M25 Molinia caerulea-Potentilla erecta mire;
- M27 Filipendula ulmaria-Angelica sylvestris mire;
- S5 Glyceria maxima swamp;
- S28 Phalaridetum arundinaceae tall-herb fen;
- Otter;
- Red Squirrel;
- Common Lizard;
- Common Frog;
- Common Toad;
- All bat species (predominantly Soprano and Common Pipistrelle and Brown Long-eared bats); and
- All breeding bird species (predominantly those of conservation interest listed in Section 6.3.6 above).

6.4.1 Plant Communities

The overriding value of the site for plant communities and species is shown in Table 6.7 below.



Table 6.7: Geographical value of the Phase 1 habitats or Phase 2 vegetation communities recorded

Habitat Code	Habitat/Species	Biodiversity Value	Value of Site to Habitat	Justification
N/A	Running water	Local	ZOI	<ul style="list-style-type: none"> Several narrow burns cross the site. The Black Devon inundates areas of low lying land supporting and linked to adjacent sensitive mires and swamps. Few watercourses with low connectivity to the wider landscape.
B2.1	Unimproved grassland neutral	District	Local	<ul style="list-style-type: none"> Continuous, but small-scale agricultural meadows and grazing areas along the access to towers XL022, 024, 025A, 025, 030 and 031. Species richness generally low with an indistinctive assemblage of species. Poorly connected to surrounding areas of comparable unimproved grassland habitat, apart from standard roadside verge habitats.
B2.2	Semi-improved grassland neutral	Local	ZOI	<ul style="list-style-type: none"> Grazing and agricultural land along the access to towers XL009, 010, 011, 020, 021, 026, 027, 029, 032 and 033. Species richness very low with an assemblage of common and typical species for the area. Poorly connected to areas of comparable grassland habitat.
M6	<i>Carex echinata</i> <i>Sphagnum recurvum/auriculatum</i> mire	International	Local	<ul style="list-style-type: none"> One small flush/mire present grading into wet heath. Species richness average, medium and with a distinctive assemblage of species. GWDTE. Typical of M26 and light grazing (some scrub encroachment). Included in the Habitats Directive.
M15	<i>Scirpus cespitosum-Erica tetralix</i> wet heath	International	Regional	<ul style="list-style-type: none"> Narrow, linear strip of variable habitat. Bordered by coniferous plantation and arable land. Marginal M6 and M23 communities create unusual assemblage of species, important and unusual regionally. Encroachment and subsequent regular management of scrub. GWDTE. Larger areas are included in the Habitats Directive and the UK and Clackmannan BAPs.



Habitat Code	Habitat/Species	Biodiversity Value	Value of Site to Habitat	Justification
M23b	<i>Juncus effusus/acutiflorus-Galium palustre</i> rush-pasture, <i>Juncus effusus</i> sub-community	International	Local	<ul style="list-style-type: none"> • Small areas of fragmented grassland restricted due to surrounding land use. • Species richness typical with a moderately distinctive assemblage of species. • GDWTE. • A common habitat in this setting.
M25	<i>Molinia caerulea-Potentilla erecta</i> mire	International	Local	<ul style="list-style-type: none"> • One small patch of tussocky mire on shallow peat bordered by <i>Betula</i> woodland. • Subjected to heavy poaching and grazing by cattle. • Species richness typically low. • GDWTE. • Included in the Habitats Directive and the UK and Clackmannan BAPs.
M27	<i>Filipendula ulmaria-Angelica sylvestris</i> mire	International	Local	<ul style="list-style-type: none"> • Very restricted marginal vegetation around large swamp. • Dry edges heavily influenced by surrounding vegetation. • Species richness typical with exterior influences creating complex habitat mosaics. • GDWTE. • Included in the Habitats Directive and BAPs.
S5	<i>Glyceria maxima</i> swamp	International	Regional	<ul style="list-style-type: none"> • Small area of viable habitat that is contained within more extensive <i>Phalaris</i> swamp. • Confined to areas of former wetter land within wider landscape. • Species richness typically very low. • GDWTE and an important and unusual community within the Region. • Included within the Habitats Directive.
S28	<i>Phalaridetum arundinaceae</i> tall-herb fen	Regional	Regional	<ul style="list-style-type: none"> • Relatively large area of habitat ; patches of S5 and marginal vegetation on margins of Black Devon. • Presence of distinctive but common and widespread species representative of the community. • Drier than expected, although extends along adjacent watercourses. • GDWTE



6.4.2 Fauna

A summary of the value of the site for fauna is shown in Table 6.8 below.

Table 6.8: Evaluation of faunal Valued Ecological Receptors (VERs)

VER	Present on site?	Present in immediate environs?	Legal status (highest)	Biodiversity value (highest)	Value of the site for VER
Otter	No evidence found but suitable habitat present	Recorded within the 10km square. The nearest historical record is c.700m NW of the transmission line across the A977 near Gartarry Wood.	Habitat Regulations 1994, Schedule II - European Protected Species	European Protected Species (International)	Local
Red Squirrel	No evidence found but suitable habitat present	Recorded within the 10km square. There are many historical records in all wooded areas adjacent to and within the proposed footprint for the transmission line upgrade.	Wildlife and Countryside Act 1981 (as amended)	UK BAP Priority species (National)	Local
Common Lizard	No evidence found but suitable habitat present	Recorded within the 10km square. The nearest historical record is c. 3km NW of the transmission line to the east of Coalsnaughton.	Wildlife and Countryside Act 1981 (as amended)	UK BAP Priority species (National)	Local
Common Frog	No evidence found but suitable habitat present	Recorded within the 10km square. One 2008 record concerns a record from Gartfinnan Farm which lies within the proposed footprint.	Not specially protected	UK BAP Priority species (National)	ZOI
Common Toad	No evidence found but suitable habitat present	Recorded within the 10km square. Also one 2008 record concerns a record from Gartfinnan Farm.	Not specially protected	UK BAP Priority species (National)	ZOI
Bats	No evidence found but suitable habitat present	Recorded within the 10km square. Common and Soprano Pipistrelle records found within 1km of The Development.	Habitat Regulations 1994, Schedule II - European Protected Species	European Protected Species (International)	Local



6.4.3 Ornithology

The nine species being evaluated all have a nationally important conservation status (through inclusion on the UK BAP), and therefore all nine have a Biodiversity Value of “National”. However, all the species recorded are commonly encountered within suitable habitat locally, regionally and across the majority of lowland Scotland, where numbers of breeding birds have failed to drop as sharply as areas within England and Wales.

Due to the low numbers of birds recorded during the survey, with most observations from areas away from the main bulk of proposed construction activity, it is assessed that the Value of the Site for all the recorded species is “ZOI”.

Table 6.9, below, summarises the bird records from the site using the evaluation methods explained in section 7.2.5. The Species are listed in order of Value of the Site to the Species, then Biodiversity Value of the species.



Table 6.9: Summary evaluations of the Value of the Site to Birds

Species	Legal Protection		Conservation Status					Biodiversity Value of the Species	Value of the Site to the Species
	Annex 1	Schedule 1	UK BAP	LBAP (Fife/Clackmannan)	Red	Amber	Green		
Skylark			X	X/X	X			National	ZOI
Song Thrush			X	X/X	X			National	ZOI
Linnet			X	X/X	X			National	ZOI
Bullfinch			X	X/X		X		National	ZOI
Yellowhammer			X	O/X	X			National	ZOI
Herring Gull			X	O/X	X			National	ZOI
House Sparrow			X	O/X	X			National	ZOI
Starling			X	O/X	X			National	ZOI
Duncock			X	O/X		X		National	ZOI

6.5 Assessment of Environmental Impacts

This assessment is based on the description of the scheme provided in Chapter 2 and the associated drawings and figures, enclosed as Volume 2. The scheme has been iteratively designed to avoid sensitive ecological features where possible; however, it may not completely avoid sub-optimal mires which are listed as Annex 1 priority habitats under the Habitats Directive.

Impacts to the hydrology and drainage of the habitats are dealt with in the Water Environment Chapter, Chapter 5. Low residual effects are predicted, which are assessed as being not significant.

Impacts on waterbodies from the use of access roads and water crossings are assessed in the Water Environment Chapter, Chapter 5. Low to negligible residual impacts are predicted, which are assessed as being not significant.

6.5.1 Negative Construction Impacts

Habitat Damage

The habitat damaged as a result of The Development is likely to be confined to use of access tracks used by traffic accessing each tower. The access routes as proposed are a mixture of established routes and temporary crossings to reach the base of each tower. These are shown, together with the Phase 1 Habitat Mapping on Figures 6.1a to 6.4e (See Volume 2). Much of the access is through agricultural fields that

have undergone regular disturbance, management and modification for a considerable period of time.

Unimproved and semi-improved grassland

It is predicted that there will be some impact on unimproved and semi-improved neutral grassland habitats. This will be a **likely, one-off, temporary** impact on in areas within which it is likely to occur, and of **low** magnitude. The effects of these impacts is assessed as being **not significant** at the ZOI level for the semi-improved neutral grassland, with a confidence level of **A**, and is assessed as being **not significant** at the Local level for the unimproved neutral grassland, with a confidence level of **A**.

GWDTE's

It is predicted that there is the potential for some impacts on GWDTE communities, such as marshy grassland and wet heath. This is in specific relation to very small areas of these habitats present along the access routes and location of three towers (i.e. XL 015, XL 018 and XL 019).

Habitat damage to GWDTE's will be **likely, one-off, temporary** impact at the location of three towers. The magnitude of the impacts is assessed as **low** for all the GWDTE communities present. The significance of these impacts on the integrity and conservation status of these communities is assessed as being **not significant** at the Regional level for M23 and M15, with a confidence level of **A**, and **not significant** at the Local and ZOI level for the remaining communities, with a confidence level of **A**. The effects can be further



reduced by the application of mitigation measures set out in section 6.6.

Fragmentation of Faunal Populations

Otter

The site offers limited potential for otter to be present seasonally both to forage and to commute through the landscape via the watercourses that run through the site and wetlands within it. Any severance of watercourse corridors (for example through the use of culverts) may negatively affect the foraging and commuting resource for otter. Otters may temporarily alter their foraging and commuting behaviour to avoid construction activities. This is anticipated to occur during spring and early summer when there are increased foraging resources and otter are more likely to access the site. However, there is suitable habitat nearby for them to disperse into.

Otter is an EPS and of international biodiversity value but the value of the site to support otter is only local. The probability of effects on otter is **unlikely** and will be **temporary**. Fragmentation of habitat would be limited to the hours around dawn and dusk, and at night, during spring and early summer when otter are foraging and commuting, when they may move to alternative habitat nearby. Successful mitigation, in the form of waterbody buffer zones and limited working hours, would minimise these effects. Any watercourse crossings should be designed to maintain the natural bed substrate on all watercourses and otter ledges can be installed if deemed necessary. The magnitude of effects on otter is predicted to be **low** and **no significant** effects on otter populations in the area are predicted. The confidence level of this assessment is **B**.

Red Squirrel

The presence of squirrels in suitable woodland habitat in many areas directly adjacent to the site suggests that there is a population present within the area. The transmission line upgrade does not include the felling of any coniferous trees, although there may be several trees felled for access and Health & Safety reasons beneath the transmission lines if deemed necessary.

The majority of woodland in the immediate corridor is semi-natural broadleaved woodland which is suboptimal habitat for red squirrel, although they will forage outwith their core range when food resources are low.

Red Squirrel is of national biodiversity value but the value of the site to support this species is only local. The probability of effects on red squirrel is **unlikely** and will be **temporary**. Fragmentation of habitat would be limited to extremely small areas of the site during spring. The magnitude of effects on red squirrel is predicted to be **low** and **no significant** effects on

their populations in the area are predicted. The confidence level of this assessment is **B**.

Common Lizard

Common Lizard has been recorded within the 10km square and suitable habitat is present on site. Loss or fragmentation of this habitat may fragment lizard populations, although there is suitable habitat nearby for them to disperse into. Common lizard is afforded legal protection under the WCA and is of national biodiversity value. The value of the site to support common lizard is local. The probability of habitat damage effects on common lizard is **extremely unlikely** and is **temporary**. Successful mitigation, in the form of minimisation of habitat damage, would minimise these effects. The magnitude of effects on common lizard is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Common Frog

Common Frog has been recorded within the footprint of The Development and further suitable habitat is present on site. Loss or fragmentation of this habitat may fragment frog populations, although there is suitable habitat nearby for them to disperse into. Common frog is afforded legal protection under the WCA and is of national biodiversity value. The value of the site to support common frog is ZOI. The probability of habitat damage effects on common frog is **extremely unlikely** and is **temporary**. Successful mitigation, in the form of minimisation of habitat damage, and working during the times when frogs are least abundant would minimise these effects. The magnitude of effects on common frog is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Common Toad

Common Toad has been recorded within the footprint of The Development and further suitable habitat is present on site. Loss or fragmentation of this habitat may fragment toad populations, although there is suitable habitat nearby for them to disperse into. Common toad is afforded legal protection through the WCA and is of national biodiversity value. The value of the site to support common toad is ZOI. The probability of habitat damage effects on common toad is **extremely unlikely** and is **temporary**. Successful mitigation, in the form of minimisation of habitat damage, and working during the times when toads are least abundant would minimise these effects. The magnitude of effects on common toad is predicted to be **low** and **no significant** effects on their



populations in the area are predicted. The confidence level of this assessment is **B**.

Bats (all species)

Many bat records have been documented within the 10km square, and soprano and common pipistrelles have been recorded within 1km of The Development. Suitable habitat is present on site for bats to use for foraging and commuting purposes, although bat roost potential is limited due to the paucity of mature trees and buildings. Loss or fragmentation of the habitat may fragment foraging populations, although there is suitable habitat nearby for bats to disperse into. All bat species are EPS and are afforded legal protection through the WCA. Therefore, all bats are of international biodiversity value, although the value of the site to support bats is considered to be local. The probability of habitat damage effects on bats is **extremely unlikely** and is **temporary**. The magnitude of effects on bats is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Birds (all species)

The site offers nesting and foraging potential for all birds, including the nine species that have a National Biodiversity Value through their inclusion on Schedule 1 of the WCA. Any fragmentation of habitat or loss of trees or scrub is likely to impact on their ability to nest or forage in their preferred location.

All species present within the footprint of The Development are commonly occurring birds within suitable habitat across the UK, and suitable habitat exists throughout the area. The value of the site to all species is ZOI. The probability of habitat damage effects on birds is **probable** and could be **permanent** or **temporary**. The magnitude of effects on birds is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Noise Disturbance to Fauna

Otter

Disturbance from noise, vibration and people movement has the potential to alter the resting, foraging and commuting behaviour of otter. Otters are particularly active at dusk and dawn and they are more likely to access the site during spring and early summer when there are increased foraging resources. Otter is an EPS and of international biodiversity value but the value of the site to support otter is local. The probability of effects on otter is **unlikely** and would only be **temporary** and limited to the hours around dawn and dusk, and at night, during spring and early

summer when otter are foraging and commuting. Successful mitigation, in the form of waterbody buffer zones and limited working hours, would minimise these effects. The magnitude of effects on otter is predicted to be **low** and **no significant** effects on otter populations in the area are predicted. The confidence level of this assessment is **B**.

Red Squirrel

Disturbance from noise, vibration and people movement has the potential to alter the resting, foraging and commuting behaviour of red squirrel. The presence of squirrels in suitable woodland habitat in many areas directly adjacent to the site suggests that there is a population present within the area. The majority of woodland in the immediate corridor is semi-natural broadleaved woodland which is suboptimal habitat for red squirrel, although they will forage outwith their core range when food resources are low.

Red squirrel is of national biodiversity value but the value of the site to support this species is only local. The probability of disturbance on red squirrel within The Development is **unlikely** and will be **temporary**. The magnitude of disturbance effects on red squirrel is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Common Lizard

Common Lizard has been recorded within the 10km square and suitable habitat is present on site. Disturbance from noise and vibration may have some impact on any lizards present within the site footprint, although there is suitable habitat nearby for them to disperse into. Common lizard is afforded legal protection under the WCA and is of national biodiversity value. The value of the site to support common lizard is local. The probability of disturbance effects on common lizard is **unlikely** and is **temporary**. Successful mitigation, in the form of minimisation of habitat damage, would minimise these effects. The magnitude of effects on common lizard is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Common Frog

Common Frog has been recorded within the footprint of The Development and further suitable habitat is present on site. Disturbance from noise and vibration may have some negative effects on frog populations within the site, although there is suitable habitat nearby for them to disperse into. Common frog is afforded protection within the WCA, and is of national



biodiversity value. The value of the site to support common frog is ZOI. The probability of disturbance effects on common frog is **unlikely** and is **temporary**. Successful mitigation, in the form of working during the times when frogs are least abundant would minimise these effects. The magnitude of effects on common frog is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Common Toad

Common Toad has been recorded within the footprint of The Development and further suitable habitat is present on site. Disturbance from noise or vibrations may have negative effects on any toad population within The Development, although there is suitable habitat nearby for them to disperse into. Common toad is afforded legal protection through the WCA and is of national biodiversity value. The value of the site to support common toad is ZOI. The probability of disturbance effects on common toad is **unlikely** and is **temporary**. Successful mitigation, in the form of working during the times when toads are least abundant would minimise these effects. The magnitude of effects on common toad is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Bats (all species)

Many bat records have been documented within the 10km square, and soprano and common pipistrelles have been recorded within 1km of The Development. Suitable habitat is present on site for bats to use for foraging and commuting purposes, although bat roost potential is limited due to the paucity of mature trees and buildings. Disturbance through noise, vibration or increased human presence on the site will occur during daylight hours, and should not coincide with foraging or commuting bats, although any bats roosting directly within The Development may suffer limited negative effects. All bat species are EPS and are afforded legal protection through the WCA. All bats are of international biodiversity value. The value of the site to support bats is local. The probability of disturbance effects on bats is **extremely unlikely** and is **temporary**. The magnitude of effects on bats is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Birds (all species)

The site offers nesting and foraging potential for all birds, including the nine species that have a National Biodiversity Value through their inclusion on Schedule 1 of the WCA. Any disturbance (especially during the

extended breeding season, approximately April to August) may impact on their ability to nest or forage in their preferred location.

All species present within the footprint of The Development are commonly occurring birds within suitable habitat across the UK, and suitable habitat exists throughout the area. The value of the site to all species is ZOI. The probability of disturbance effects on birds is **unlikely** and is **temporary**. The magnitude of effects on birds is predicted to be **low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **B**.

Faunal Fatalities

Otter

Pollution of wetland areas and waterbodies through uncontrolled spillage of contaminants has the potential to cause otter fatalities, in the absence of effective mitigation. There is also the potential for otter fatality or injury due to the increased movement of vehicles on the site and on the wider road network and in the event of animals becoming trapped within construction infrastructure (E.g. containers, pipes etc), in the absence of effective mitigation.

Otter is an EPS and of international biodiversity value but the value of the site to support otter is local. The probability of effects on otter is **extremely unlikely** and would only be **temporary**. The likelihood of road fatalities is limited to the hours around dawn and dusk, and at night, during spring and early summer when otter are foraging and commuting. Successful mitigation in the form of strict control on waste and hazardous materials, vehicle speed restrictions, and would minimise these effects. The magnitude of effects on otter is predicted to be **low** and **no significant effects** on otter populations in the area are predicted. The confidence level of this assessment is **A**.

Red Squirrel

There is the potential for red squirrel fatality or injury due to the increased movement of vehicles on the site and on the wider road network, and the potential of animals becoming trapped within construction infrastructure (E.g. containers, pipes etc), in the absence of effective mitigation.

Red Squirrel is of national biodiversity value but the value of the site to support this species is only local. The probability of effects on red squirrel is **extremely unlikely** and will be **temporary**. The potential numbers of red squirrel within The Development are



not thought to be high, and as a result the effects on red squirrel is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **A**.

Common Lizard

There is the potential for common lizard fatality or injury due to the increased movement of vehicles on the site and on the wider road network, and the potential of animals becoming trapped within construction infrastructure (E.g. containers, pipes etc), in the absence of effective mitigation.

Common lizard is afforded legal protection under the WCA and is of national biodiversity value. The value of the site to support common lizard is local. The probability of effects on common lizard is **extremely unlikely** and is **temporary**. Successful mitigation would minimise these effects. The magnitude of effects on common lizard is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **A**.

Common Frog

There is the potential for common frog fatality or injury due to the increased movement of vehicles on the site and on the wider road network, and the potential of animals becoming trapped within construction infrastructure (E.g. containers, pipes etc), in the absence of effective mitigation.

Common frog is afforded legal protection within the WCA, and is of national biodiversity value. The value of the site to support common frog is ZOI. The probability of effects on common frog is **extremely unlikely** and is **temporary**. Successful mitigation would minimise these effects. The magnitude of effects on common frog is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **A**.

Common Toad

There is the potential for common toad fatality or injury due to the increased movement of vehicles on the site and on the wider road network, and the potential of animals becoming trapped within construction infrastructure (E.g. containers, pipes etc), in the absence of effective mitigation.

Common toad is afforded legal protection through the WCA and is of national biodiversity value. The value of the site to support common toad is ZOI. The probability of effects on common toad is **extremely unlikely** and is **temporary**. Successful mitigation

would minimise these effects. The magnitude of effects on common toad is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **A**.

Bats (all species)

There is the potential for bat fatality or injury due to collision risk with the erected infrastructure and the potential of animals becoming trapped within construction infrastructure (E.g. containers, pipes etc), in the absence of effective mitigation.

All bat species are EPS and are afforded legal protection through the WCA. All bats are of international biodiversity value. The value of the site to support bats is local. The probability of effects on bats is **extremely unlikely** and is **temporary**. The magnitude of effects on bats is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **A**.

Birds (all species)

There is the potential for bird fatality or injury due to collision risk with the erected infrastructure and the potential of birds becoming trapped within construction infrastructure (E.g. containers, pipes etc), in the absence of effective mitigation.

All breeding bird species are protected under the WCA and the nine species contained within this assessment all have national biodiversity value, although the value of the site to all species is ZOI. The probability of effects on birds is **extremely unlikely** and **temporary**. The magnitude of effects on birds is predicted to be **extremely low** and **no significant** effects on their populations in the area are predicted. The confidence level of this assessment is **A**.

6.5.2 Operational Impacts

The OHL requires only very limited maintenance over their lifetime. No significant negative operation impacts are predicted as there is a limited maintenance requirement for the OHL once the upgrade works have been completed.

6.6 Mitigation Measures

The following good practice and mitigation measures would be applied to the project during construction to ensure that any effects on the VERs are reduced and the project is completed ensuring wildlife legislation requirements are met.



6.6.1 Construction Phase

- All construction works would be required to accord with an Environmental Management Plan (EMP). The construction works would require a Construction Method Statement (CMS) to be prepared post-determination and in advance of the commencement of works on site;
- The EMP should highlight ecologically sensitive areas (E.g. GWDTE locations) to ensure that they are avoided by construction works where possible;
- An Ecological Clerk of Works (ECoW) would be employed for the duration of the construction phase to advise the contractor and assist them in ensuring that any planning conditions concerning site ecology are applied. Site staff would be provided with information regarding the site's ecological sensitivities as part of the health and safety induction (appropriate text would be prepared by the ECoW to be presented by the induction manager);
- During the pre-construction survey undertaken by the ECoW, all waterbodies and watercourses should be checked for signs of great crested newt, water vole and otter to ensure that these species have not colonised the area or are not present and are not affected by the proposed works;
- Mitigation presented in the Water Chapter (Chapter 5) would be applied to prevent waterbody pollution;
- The loss of plant communities is an unavoidable consequence of the development. Further, incidental losses of habitat may be avoided by minimising the footprint of the construction activity. This would be achieved by operating machinery and storing materials within the footprint of permanent construction features wherever practicable, such as the access tracks and OH towers, for example. This would also be achieved through appropriate training of the site staff and by ensuring that vehicles and their operators do not inadvertently stray onto adjacent habitat areas;
- To reduce the scale of impact on GWDTE habitats, particularly M23 and M15 communities access tracks should be micro-sited to avoid these habitats where possible. Where this is not possible alternative access options to minimise damage should be implemented.
- Site compounds/material or plant storage areas would be located away from waterbodies, wetland and woodland habitats;
- Upgraded and existing roads will include a speed restriction of 20mph to be applied on the site and 30mph within a buffer of 200m outside the site boundary, with the aim of reducing the likelihood of faunal collisions. Speed limits would be clearly marked using standard road signage as a minimum;
- During construction an exclusion zone of a 30m radius around known locations of protected species (should any be discovered) would be adhered to by all site staff, vehicles and plant. This exclusion zone would be visibly marked but would not be fenced in such a way that would inhibit the movement of the species in question. Waterbody banksides (in general) would also be treated as sensitive areas with a 10m exclusion zone;
- Temporary lights used during construction would be fitted with shades to prevent light spillage out with the working area. Temporary lights would not illuminate tree lines or waterbodies as lighting can affect commuting and foraging success for protected species;
- Holes (for example that may be present to lay infrastructure) would be covered at the end of each working day or a wooden plank placed inside to allow any protected faunal species to escape, should it enter the hole. Any temporarily exposed open pipe system would be capped in such a way as to prevent wildlife gaining access;
- Works should be conducted during daylight hours where possible, avoiding the sensitive periods of dawn and dusk when wildlife is most active;
- Any clearance of scrub or felling of trees should be avoided during the bird breeding season (approximately April to August) where possible, unless a pre-construction survey has been undertaken by the ECoW. In such cases, works must commence within the surveyed area within 48 hours of the survey being completed;
- In the event that a protected species is discovered on site all work in that area would stop immediately and the ECoW would be contacted. Increased buffer areas may be required in these locations. Details of the local police Wildlife Crime Officer, SNH Area Officer and Scottish Society for the Prevention of Cruelty to Animals (SSPCA) relevant Officer would be held in the site emergency procedure documents.



The level of success of all of the above mitigation is assessed as **certain/near certain**.

6.6.2 Operation Phase

No specific measures will be required during the operation phase unless service checks are timetabled to be undertaken on the transmission line. Such events are likely to require brief pre-construction surveys to ensure no wildlife will be affected by any proposed works. This will be particularly relevant during the breeding season (approximately April to August).

The level of success of all of the above mitigation is assessed as **certain/near certain**.

6.7 Compensation and Enhancement

The CIEEM guidance states that significant effects on features of ecological importance should be mitigated (or compensated for) in accordance with the guidance and derived from policies applied at the scale relevant to the value of the feature or resource. Given that significant ecological effects are not predicted, compensation or enhancement measures are not considered necessary.

6.8 Further Survey and Licensing

It is advised that pre-construction protected species surveys for otter and red squirrel are undertaken to determine if new shelters have been established.

An EPS licence is not required for otter based on the results presented in this report. If pre-construction surveys reveal any otter resting sites then the licensing situation may need to be reviewed.

During the survey, any suitable habitat for water vole, great crested newt, common frog, common toad and common lizard will also be documented, as will the locations of breeding birds and any increase in bat roost potential (dependant on timing).

Further NVC surveys are deemed unlikely, but should small patches of wetland plant communities or GWDTs be suspected, further surveys may be required.

6.9 Residual Effects

With effective mitigation, no significant effects are predicted on the Valued Ecological Receptors (VERs) from the construction or operational phases of the transmission line upgrade between Kincardine and Blairingone. Taking into account the age and paucity of historical data and the potential inadequacy of an initial single field visit which combined EPS and Phase 1 Habitat data, using the criteria outlined in the Confidence in Predictions in Section 7.2.6, this

prediction is made with a confidence level of **B**. Table 6.10, below, summarises the results of the impact assessment.

6.10 Statement of Significance

Overall, the effects of the proposed works to construct the new GIS, cable sealing end compounds and the OHL upgrade on the terrestrial ecology are not significant in terms of the EIA definition.



Table 6.106-10: Ecological Impact Assessment Summary (with Mitigation)

Construction Phase							
VER(s)	Biodiversity value	Site value	Probability	Duration	Magnitude	Significance	Confidence
Habitat loss, fragmentation and damage							
Running water	Local	ZOI	See Water Environment Chapter, Chapter 5				
Unimproved neutral grassland	District	Local	Likely	Temporary	Low	Not significant	A
Semi-improved neutral grassland	Local	ZOI	Likely	Temporary	Low	Not significant	A
M6 <i>Carex echinata</i> - <i>Sphagnum recurvum/auriculatum</i> mire	International	Local	Extremely Unlikely	Temporary	Extremely Low	Not significant	A
M15 <i>Scirpus cespitosum-Erica tetralix</i> wet heath	International	Regional	Extremely Unlikely	Temporary	Extremely Low	Not significant	A
M23b <i>Juncus effusus/acuteiflorus-Galium palustre</i> rush-pasture, <i>Juncus effusus</i> sub-community	International	Local	Extremely Unlikely	Temporary	Extremely Low	Not significant	A
M25 <i>Molinia caerulea-Potentilla erecta</i> mire	International	Local	Extremely Unlikely	Temporary	Extremely Low	Not significant	A
M27 <i>Filipendula ulmaria-Angelica sylvestris</i> mire	International	Local	Extremely Unlikely	Temporary	Extremely Low	Not significant	A
S5 <i>Glyceria maxima</i> swamp	International	Regional	Extremely Unlikely	Temporary	Extremely Low	Not significant	A
S28 <i>Phalaridetum arundinaceae</i> tall-herb fen	International	ZOI	Extremely Unlikely	Temporary	Extremely Low	Not significant	A
Fragmentation of faunal populations							
Otter	International	Local	Unlikely	Temporary	Low	Not significant	B
Red Squirrel	National	Local	Unlikely	Temporary	Low	Not significant	B
Common Lizard	National	Local	Extremely	Temporary	Low	Not	B



Construction Phase							
VER(s)	Biodiversity value	Site value	Probability	Duration	Magnitude	Significance	Confidence
			unlikely			significant	
Common Frog	National	ZOI	Extremely unlikely	Temporary	Low	Not significant	B
Common Toad	National	ZOI	Extremely unlikely	Temporary	Low	Not significant	B
Bats (all species)	National	Local	Extremely unlikely	Temporary	Extremely Low	Not significant	B
Birds (all species)	National	ZOI	Probable	Permanent or Temporary	Low	Not significant	B
Noise disturbance to fauna							
Otter	International	Local	Unlikely	Temporary	Low	Not significant	B
Red Squirrel	National	Local	Unlikely	Temporary	Low	Not significant	B
Common Lizard	National	Local	Unlikely	Temporary	Low	Not significant	B
Common Frog	National	ZOI	Unlikely	Temporary	Low	Not significant	B
Common Toad	National	ZOI	Unlikely	Temporary	Low	Not significant	B
Bats (all species)	National	Local	Extremely Unlikely	Temporary	Extremely Low	Not significant	B
Birds (all species)	National	ZOI	Unlikely	Temporary	Low	Not significant	B
Faunal fatalities							
Otter	International	Local	Extremely unlikely	Temporary	Low	Not significant	A
Red Squirrel	National	Local	Extremely unlikely	Temporary	Extremely Low	Not significant	A
Common Lizard	National	Local	Extremely unlikely	Temporary	Extremely Low	Not significant	A



Construction Phase							
VER(s)	Biodiversity value	Site value	Probability	Duration	Magnitude	Significance	Confidence
Common Frog	National	ZOI	Extremely unlikely	Temporary	Extremely Low	Not significant	A
Common Toad	National	ZOI	Extremely unlikely	Temporary	Extremely Low	Not significant	A
Bats (all species)	National	Local	Extremely unlikely	Temporary	Extremely Low	Not significant	A
Birds (all species)	National	ZOI	Extremely unlikely	Temporary	Extremely Low	Not significant	A



7. LANDSCAPE AND VISUAL CONDITIONS

7.1 Context

This Chapter provides a summary of the assessment of the potential effects on landscape and visual amenity arising from the proposed 400/275kV Gas Insulated Substation (GIS) and associated Overhead Line (OHL) works adjacent the Kincardine 275kV Substation (Figure 1.2, Appendix I). The detailed landscape and visual impact assessment (LVIA) forms an Appendix to the Environmental Statement (ES) which can be found in Volume 3, Appendix I.

7.2 Assessment Methodology

Good practice as described in the “Guidelines for Landscape and Visual Impact Assessment” (LI, IEMA, 2013) has been followed in undertaking the appraisal of the potential effects on landscape and visual amenity arising from the proposed development.

The adopted methodology and approach is summarised below:

Baseline Survey and Analysis

- Description of the Site and Surroundings: Collation and review of baseline information covering key features of the physical environment, planning allocation, natural and cultural heritage of the site and surroundings.
- Description of the Landscape and Features: The character, condition and value of the landscape are determined through a combination of desk and field study. Relevant designations are identified from a review of planning policies and other designations relating to the area.
- Review of the Existing Visibility and Visual Amenity: Visibility, visual amenity and potential visual receptors are identified, for example, residential properties, public footpaths, transport routes, key viewpoints, etc. The visual baseline including extent of visibility is determined

by using a combination of specialist computer mapping and fieldwork.

Impact Assessment

- Landscape and Visual Effect: Identifies the potential sources of impact of the proposed development, sensitivity of the landscape and visual resources (nature of receptors), and magnitude of change to the existing landscape and visual environment (nature of effects).
- Evaluation of Significance of Effects: Provides an assessment of the likely significance of effects reviewed with reference to landscape features, character, views and visual amenity. The different thresholds of significance of impact (major, moderate, minor or none) are determined through professional judgement and evaluation of the scale or magnitude of effect, and the environmental sensitivity of the location or receptor.

The relative significance of effects is assessed using the following terms:

- Major - a fundamental change to the environment.
- Moderate - a material but non-fundamental change to the environment.
- Minor - a detectable but non-material change to the environment.
- None- no detectable change to the environment.

The Scoping Report outlined the proposed scope of the landscape and visual assessment. This confirmed that the assessment would cover the proposed GIS and associated OHL works in the immediate vicinity of the Kincardine Substation only. Taking into consideration the nature of the works required on the existing overhead line from Kincardine to Blairingone, as described in Chapter 2 of the ES, it was not deemed necessary to include these within the scope of the LVIA.

Consultation was also undertaken with Fife Council regarding the proposed viewpoints to provide a representative range for the LVIA. Following feedback a further viewpoint was added within the settlement



of Kincardine (Viewpoint 3). Two further viewpoints were identified during the detailed site survey stage.

Review of the scale of the proposed development, initial site survey and professional judgement determined that a 5km radius Study Area was appropriate for the LVIA.

7.3 Baseline Conditions

Development Plans

The following development plans cover the Study Area: -

- Fife Structure Plan 2006-2026
- Falkirk Council Structure Plan 2007
- Clackmannanshire and Stirling Structure Plan 2002
- Dunfermline and West Fife Local Plan 2012
- Falkirk Council Local Plan 2010
- Clackmannanshire Local Plan 2011

The Structure Plan strategy for Fife “seeks to ensure that development is located in the most sustainable locations. It is based on the need to balance social justice with economic competitiveness and environmental issues”. Policy BL1 supports the rehabilitation and reuse of brownfield land.

With regard to specific planning policies in the current adopted Local Plan, the site is covered by Policy KCDO07, which is a protected employment area and allocates the land for long term specialist industry (energy). To the immediate east of the former Power Station site, the land is protected open space (Policy C4). To the east of the railway line, the Kincardine Conservation Area encompasses the historic core, surrounding rows of houses and pier (Policy E7).

Planned Development

Current consented development in the surrounding area include the following of particular note in terms of proximity and scale:

- Planning consent granted to the east of Kincardine for 350 housing units in 2010.
- Biomass plant at Grangemouth approved by Scottish Government in 2013.

Landscape Character Assessment

Scottish Natural Heritage (SNH) has undertaken a “Landscape Character Assessment of Fife” (LCA) (DTA/SNH, 1998) which classifies the proposed

development site as within the “Coastal Flats” landscape character type (LCT). This landscape type is described as “low lying, open, large scale” and that “high voltage power lines are dominant features in the Kincardine area radiating out from the Power Stations”.

The landscape guidelines for the Coastal Flats LCT notes with reference to “Other Development and Structures”, the aim to: “Ensure any new road or other major engineering works are carefully sited and designed to minimise their landscape and visual impact”. It is also noted that the coastal area has “a high capacity for accommodating woodland and linear tree belts that would help to screen some of the intrusive features, relieve the uniformity and horizontal nature of the area” (Fife LCA 1999).

Existing Landscape Character

The landform of the proposed development site is flat low lying level ground at approximately 3.0 m AOD. To the north and east of the proposed GIS site the land remains level to the former Power Station perimeter fence. To the south, the land rises approximately 3-4m to form the coastal defence barrier to the Forth of Forth. Along the top of this grass embankment is the former Power Station boundary fence and coastal footpath. To the west, the land remains level to the boundary fence. Beyond there is a ditch parallel to the fence alignment and the land then rises to the A876, which is on embankment to join the Clackmannanshire Bridge. This embankment rises from being at grade at the northern boundary of the former Power Station site to approximately 8- 10m above ground level to the south.

The land cover of the proposed development site is predominantly rough grassland and scrub with areas of hardstanding and portacabins. The former railway sidings to the north of the proposed GIS is now a regenerating woodland and scrub of predominantly Birch and Ash with some Oak, Elm, Sycamore now reaching 8-12m height. Along the western end of the northern boundary of the former Power Station site, a 10-12m high row of willows follows the alignment of a ditch immediately to the north of the perimeter fence.

To the east of the proposed GIS site scattered scrub and trees form the boundary to the existing 275kV Substation. Beyond the 275kV Substation to the east are larger blocks and strips of mature woodland comprising of Horse Chestnut, Lime, Hornbeam, with some Ash and Sycamore. This planting was established as part of the screening of the former Power Station and is now approximately 18-20m height.



To the south of the development site is a grass embankment with some scattered scrub forming the boundary to the perimeter fence. To the west the recent A876 embankment planting comprises of scrub and broadleaved trees of mainly Alder, Birch, Willow and Hawthorn, which are now reaching 4m height.

The surrounding floodplain is predominantly a regular grid pattern of large arable fields bounded by hawthorn hedges with mature hedgerow trees of Oak, Sycamore and Ash or more open with ditches lined with reeds. Dispersed throughout the area are a number of farms with associated outbuildings often enclosed by mature trees and nearby cottages served by a network of minor roads. There are a few clumps of mature woodland scattered throughout this flat area and near the proposed development site include: to the north around Old Tulliallan Castle; immediately west of the A876, which once formed part of the former Power Station site; and around Kennet Pans.

The rising ground to the north, north east and east comprises of large arable fields and extensive mature policy woodland. To the east and south east, the settlement of Kincardine comprising of predominantly two storey or single storey properties extends from the coast and up the gently rising ground to the north east. South of the Firth of Forth is an area of similar mature woodlands encompassing rising ground and the linear settlement of Airth, which follows the alignment of the A905 and Hill of Airth.

The main landuse of the immediate surrounding area is agriculture with the settlement of Kincardine to the east and A876 to the west. Scattered throughout the area are a number of farms, cottages, large estates, historic properties and large-scale industrial uses located mainly along the coast.

The proposed development site is currently vacant with temporary uses requiring a secure open space currently undertaken in the area. Within this area is the operational Kincardine Substation to which a number of overhead lines routed along the coast and crossing the Firth of Forth converge. To the south of the proposed GIS site is the Anchor Tower and tall flashing Forth Crossing tower at approximately 140m.

A number of public footpaths and cycleways follow the coastline and cross the plains to the rising foothills. In the immediate vicinity of the proposed development site a footpath and cycleway is aligned along Hawkhill Road to the north, and footpath along the coast to the south and the western side of the A876. Further to the north east an extensive network

of paths extend through the Garden and Designed Landscape of Tulliallan Castle and adjacent Devilla Forest.

There are a number designated heritage sites in the surrounding area, some of which are also popular visitor attractions. This includes the Scheduled Ancient Monuments of Old Tulliallan Castle immediately to the north and Kennet Pans to the west of the A876, the Pineapple Listed Building located within the Garden and Designed Landscape of Dunmore Park to the west and Clackmannan Tower to the north west.

The landscape character of the proposed development site is of a large scale flat, open and barren, derelict industrial site. This industrial character is reinforced by the convergence of overhead lines and tall Firth of Forth Crossing and Anchor towers, operational Substation and to the immediate west with the busy A876 and Clackmannanshire Bridge. To the north, east and south the character is more natural and unmanaged with the regenerating woodland encompassing the former railways sidings, mature woodland blocks, and mudflats and waterscape of the Firth of Forth.

The landscape character of the surrounding area is of a managed and relatively enclosed agricultural landscape. The more open coastal area is a busy, settled, and dominated by communication corridors with roads, bridges, railway lines and overhead lines, and large scale industrial uses creating a range of colours, forms, textures, lights and noise. Localised diversity in texture and colour is provided by the following landscape features: extensive mature estate woodlands; hedges and hedgerow trees; scattered clumps of woodland associated with farmsteads and properties, and reed lined ditches.

The former Power Station site has a coherency due to its long term ownership and use. Within the site currently disused areas have an unmanaged and neglected appearance. Existing mature woodland is in a moderate to poor condition, whereas the naturally regenerating trees and scrub are establishing well.

In summary, the proposed development site is currently disused and has a neglected landscape character with few landscape features. The Dunfermline and West Local Plan identifies the land for long term specialist industry (Policy KCD007) and the potential for further woodland and linear tree belts in the Coastal Flats LCT has been identified in the SNH LCA. Overall, it is considered that the landscape



features and character of the proposed development site are of **low** sensitivity to change.

Existing Visibility

The computer-generated Zone of Theoretical Visibility (ZTV) of the proposed GIS is shown in Figure 3.1, Appendix I. The extent of theoretical visibility of the proposed GIS is indicated in two shades of red. The lighter shade indicates the ZTV as bareground, and the darker red, the ZTV taking account of the screening of woodland blocks and buildings. The computer generated ZTV of the proposed GIS demonstrates that predicted visibility is **restricted to the north and east, and more extensive to the south, west and north west.**

The extent of visibility encompasses receptors of **high** to **low** sensitivity. Open views of the proposed development site are restricted to the immediate south of the site and afforded from the coastal footpath, Clackmannanshire Bridge and Firth of Forth. Partial or glimpse visibility is limited to the north, east and west to receptors located either near the site or from elevated areas, and encompass Kilbagie, Hawkhill Farm, parts of Kincardine settlement, Tulliallan Castle Garden and Designed Landscape and Kennet Pans.

More distant partial and glimpse visibility will be afforded from receptors to the southwest, west and northwest, encompassing residents of the settlements of Airth, Dunmore and Clackmannan, visitors to the Garden and Designed Landscape of Dunmore Park, Clackmannan Tower and recreational users of the cycle route and footpaths crossing the area.

Transient partial views will be afforded by travellers using Hawkhill Road to north and east, Kincardine on Forth Bridge to the south, more distant A905 to the southwest, the A876 to the west and minor roads around Kennet Pans.

From all directions views of the proposed GIS and associated OHL works also encompass the adjacent large-scale infrastructure of the Forth Crossing and Anchor Towers, Clackmannanshire Bridge and overhead lines. More distant views afford a wider panorama, which includes the large-scale industrial developments of Longannet Power Station and Grangemouth chemical works. These panoramic views encompass a skyline punctuated by overhead lines and chimneys.

7.4 Assessment of Potential Impacts

Photomontages

Figure 4.1 (a-d), Appendix I, presents photomontages of the proposed GIS and associated OHL works without any mitigation measures in the context of the surrounding landscape from four key viewpoints. The correct viewing distance for A3 size prints is noted on each.

Landscape Impact

The baseline landscape study identified that the landscape features and character of the site was of **low** sensitivity.

Loss of Landscape Features

The proposed GIS compound will occupy an area of approximately 1.6Ha of disused ground and areas of hardstanding once occupied by the coal storage area of the former Power Station. Some scattered self seeded scrub and young trees will require to be removed to accommodate the proposed GIS and land locally raised by an average of 3.5m. Some self regenerating woodland and scrub will require to be removed to accommodate the proposed tower and wayleave corridor to the north east of the GIS. Existing woodland to the east will also require to be thinned to accommodate the wayleave corridor of the proposed deviated overhead line.

In summary, the design approach by locating the proposed development on an area of open derelict land has ensured that that the majority of existing landscape features on site have been retained and safeguarded. Overall, it is considered that the magnitude of change on landscape elements will be low adverse during construction reflecting primarily the small loss of scrub and trees associated with the proposed development. On completion, it is considered that the magnitude of change will be low beneficial with the implementation of the associated landscape works, and over time improve.

Impact on Landscape Character

The proposed development is located within a productive well-managed agricultural and industrial coastal landscape with landscape features providing enclosure and variety. The proposed GIS site adjacent an existing Substation and overhead lines is currently disused with few landscape features. The local landscape character appears well managed and valued as a productive agricultural landscape. In contrast, the proposed GIS site appears neglected and derelict. The area to the immediate north and north east where there is large scale natural regeneration of woodland on the former railway sidings and area of



mature woodland has a more natural and interesting character.

In summary, the existing landscape character allows for potential mitigation planting of new woodland to provide screening and integrate the development with the surroundings. Overall, it is considered that the permanent removal of derelict land to undertake the proposed GIS development will be of **low beneficial** magnitude of change upon the landscape character during construction. The overhead line works with the removal and repositioning of towers is considered to represent no change to the existing landscape character. On completion, it is considered that the magnitude of change will be **low beneficial** at the start of the operational stage, and over time **improve** with the establishment of the associated landscape works.

Visual Impact

The baseline visibility study identified that, within the visual envelope, a number of sensitive and less sensitive receptors (residential properties, designated areas and features, cycleways, footpaths, major and minor roads) will have views or transient views of the proposed development (**high-low**).

Potential views of the proposed development are relatively limited to the north and east, and more extensive to the south and west. To the east and west partial and glimpse views will be afforded from residential properties in the immediate surrounding area. Transient open views will be afforded from the footpath to the immediate south of the site, Clackmannanshire Bridge and Firth of Forth. More distant views will be afforded from the coast to the west, and higher ground to the north, north east, south west and north west encompassing parts of the settlements of Kincardine, Airth, Dunmore and Clackmannan.

Overall, it is considered that given the scale and duration of construction of the proposed development, the magnitude of change to views and visual amenity will be **high** for receptors located immediately to the south of the proposed development, and **medium/low** for the majority of receptors. The permanent magnitude of change is considered to be **medium/low** as existing views encompass the large scale industry and electricity infrastructure, which influences the overall visual amenity of the area. The magnitude of change will be highest at the outset when the degree of contrast will be greatest. The scale of change in the character of the view and visual amenity will **decrease** over time as the new development integrates with the

surroundings with the establishment of the associated landscape works

Mitigation Measures

The Outline Landscape Proposals for the proposed development are indicated in Figure 5.1, Appendix I, and have the following strategic landscape design aims: -

- Provide screening
- Integrate the proposed development into the existing landscape
- Enhance biodiversity and habitat connectivity
- Reinforce the distinctive qualities and features of the existing landscape character

A key landscape aim is the extension of the existing distinctive landscape features of the area to assist with “fitting” the proposed development into the existing landscape pattern and reinforcing landscape character. This approach and reference to the SNH LCA guidance has informed the design of a landscape framework of strong woodland belts taking reference from the large scale planting associated with the historic estates located along the Firth of Forth. This landscape framework provides strategic screening and a setting for the proposed GIS, whilst increasing habitat and wildlife diversity.

The outline landscape scheme encompasses existing tree planting and regenerating woodland and scrub to the north and east of the site, and proposes new areas of mixed woodland. New mixed woodland planting is proposed to the immediate north and south of the proposed GIS site. Further west along the perimeter fence new mixed woodland and scrub planting is also proposed which will reinforce the existing A876 roadside embankment planting.

The existing woodland along the north and east perimeter fence has either been planted as part of the screening works for the former Power Station or has self-seeded to form a naturally regenerating woodland. It is proposed that these areas are managed to retain and promote the woodland as this forms an effective immediate screen for the proposed development.

Statement of Significance

The evaluation of significance of landscape and visual effects associated with the proposed development is summarised in Table 7.0 below. Positive beneficial effects are underlined.



7.1: Summary of Evaluation of Landscape & Visual Effects

Landscape Receptor	Effect		Significance				
	Sensitivity	Magnitude of Change		Level of Construction Effect	Level of Operational Effect	Level of Residual Effect	Rationale
		Construction	Operational				
Landscape Features	Low	Low	<u>Low</u>	Minor	Minor	Minor/ Moderate	<p>Construction: Loss of self seeded trees and scrub vegetation. Localised land raising by approximately 3.5m. Tree removal along wayleave corridor.</p> <p>Operational: Establishment of associated landscape works will extend and manage existing woodland to provide a new landscape feature creating a net benefit. During the operational phase Minor beneficial effect on landscape features will increase over time as planting becomes established.</p>
Landscape Character	Low	<u>Low</u>	<u>Low</u>	Minor	Minor	Minor	<p>Construction: Alteration of the local appearance and character of the derelict site during construction associated with proposed GIS.</p> <p>Operational: Establishment of landscape planting associated with the new development and management of existing planting will add to the landscape character. During the operational phase localised Minor beneficial effect on landscape character will increase over time as planting becomes established.</p>



Visual Receptor	Effect			Significance			Rationale
	Sensitivity	Magnitude of Change		Level of Construction Effect	Level of Operational Effect	Level of Residual Effect	
		Construction	Operational				
Receptors within Visual Envelope/ Viewpoints 1-12	High- Low	High/ Medium	Medium/ Low	Major/ Moderate	Moderate	Moderate/Minor	<p>Construction: Temporary alteration of the localised available view of the site and character during construction.</p> <p>Operational: Change in character of view and visual amenity. Establishment of associated landscape works will reduce visual effect over time. During the operational phase the Moderate adverse localised effect will decrease over time.</p>



8. OTHER ISSUES

8.1 Context

This chapter provides a summary of the topics for which the extent of study was considered not to merit full impact assessment (*i.e.* scoped down). The summaries provided below are cross referenced to supporting documents contained with Volume 3.

8.2 Geology and Soils

8.2.1 Contamination Potential

Context

This section summarises the potential impacts and consideration of effects on geology and soils from the planned earth works and ground excavation activities at the new GIS and sealing end compounds at Kilbagie. The activities proposed for the OHL upgrade were excluded from this assessment as no earthworks or excavations are necessary.

The location of the new GIS is within the area of the former Coal Fired power station which is a probable source of contaminants. Any contamination is likely to be bound within the underlying superficial deposits or suspended in the groundwater. Groundwater in itself is a receptor and could be affected by downward migration of any surface contaminants.

An outline desktop study, completed as part of the scoping assessment, concluded that the ground contamination risk posed by the proposed works (at the new GIS and Kilbagie) is anticipated to be low provided that good practice construction measures are followed. It is also understood, based on the findings of Halcrow's FRA that the GIS will be constructed on a conservative platform level of 6.20 metres AOD. This is to help protect the GIS from coastal flooding, and effectively means the majority of foundation excavations will be within the platform and not the existing ground where contamination may be present.

However to evaluate the contamination risk a Phase 1 Environmental Risk Assessment (ERA) has been carried out per the industry accepted guidance. This section summarises the ERA, which is included in full in Appendix C of this ES.

Study Methodology

The study incorporated a desk based assessment and a site walkover of the following sites and their immediate surroundings:

- Land adjacent to Kincardine Sub-station, Kincardine, Fife (Site A); and
- Land adjacent to A977, Kilbagie, Kincardine, Fife (Site B).

The site walkover identified current conditions at the site including topography, surface type, vegetation and surface water. The desk based assessment incorporated the use of a variety of resources including current and historical maps, geological maps, past site investigation reports and various regulatory resources to assess the likelihood of contamination existing at the sites and the likelihood for impacts on the surrounding area from the proposed project.

Baseline Situation

Site A comprises made ground. It is generally flat and is dominated by open ground. The surface is mostly coarse aggregate, vegetated with weeds and pioneer species. A tarmacked access road and car park are located in the north east of the site.

Three buildings are located at Site A. An office building and a toilet building are situated close to the car park in the north east of the plot while a brick building is located to the south west. The buildings do not appear to be in regular use. Areas of surface water ponding were also observed around the site.

The topography at Site B undulates gently and rises gradually eastwards across the site. The existing towers, low level gantries and cable sealing end compounds are located on agricultural land, the majority of which appeared to have been recently grazed at the time of the visit. The towers and low level gantries are situated on this grassy open ground.

The cable termination compounds comprise tall enclosed perimeter fences with electricity transmission equipment housed within. The surface covering in the compounds is coarse aggregate vegetated with weeds while vegetated open ground underlies the towers. There was no surface water in proximity to any of the structures.



There was no evidence of any fuel or chemical storage at either of the site and there was also no evidence of any surface staining or vandalism.

There is a history of industry at Site A. The site was a coal yard between 1959 and 1992. The land adjacent was part of Kincardine Power Station/Electricity Works from 1959 and is now Kincardine Sub-station. Site B has been dominated by agricultural land since 1863. OHLs have traversed the site since 1985.

EnviroCentre is not aware of any previous environmental assessment work conducted at either of the sites.

Solid geology underlying the sites is dominated by Westphalian coal measures. Superficial deposits consist of raised beach and marine deposits. The bedrock will provide a moderately important aquifer. A number of boreholes have historically been located in close proximity to both sites. A well is also located within 100m of Site B to the North West. Aquifer vulnerability is classed as moderate.

The River Forth is located 100m away from Site A to the South West while the Canal Burn is located approximately 300m to the West of Site B and 350m North West of Site A. A drain that flows into the Canal Burn passes within 150m of Site B to the South East and within 500m of Site A, to the North.

The Firth of Forth (SSSI, SPA & Ramsar Site) is located within 250m of site A. No ecological receptors are located within 250m of Site B. There are no Scheduled Ancient Monuments (SAMs) located within 250m of either of the sites.

Risk Assessment

At Site A, the investigation identified the following potentially significant pollutant linkages:

- Impacts on groundwater from downward leaching of contaminants from soil;
- Impacts on surface water from lateral migration of groundwater towards the River Forth; and
- Impacts on structural foundations from contaminants in soil and/or groundwater.

At Site B the investigation identified the following potentially significant pollutant linkages:

- Impacts on groundwater from downward leaching of contaminants from soil;

- Impacts on surface water from lateral migration of contaminated groundwater towards the drain to the South East; and
- Impacts on structural foundations from contaminants in soil and/or groundwater.

Conclusions and Recommendations

The risk of activating a pollutant risk is considered to be low. It is proposed that a watching brief is maintained during the earthworks activities for both sites. In the event that any obvious potential contamination is encountered, a suitably experienced contaminated land specialist should be engaged to complete an assessment and provide advice on the appropriate control measures.

8.2.2 Peat

Context

In SEPA's scoping response, included in Volume 3, Appendix 1 of this ES, it was advised that disruptions to peatlands as a result of the proposals should be avoided. This section has been prepared to summarise and evaluate any possible effects.

Baseline Situation

Small, localised peat deposits are recorded in proximity to XL15 in BGS data. Targeted peat probing undertaken during the site walkover indicated that peat is localised in extent and is present in the valley bottom between XL15 and XL16, though peat was not observed at XL15 or XL16. An existing farm access track traverses this area.

Risk Assessment

No ground excavations are included under the scope of works in proximity to the localised peat deposits present in the valley bottom between towers XL15 and XL16. Vehicle movements to and from the towers are the only component of the works that has the potential to impact the peat deposits.

Tower XL15 and its proposed access route fall outside the area of localised peat deposits. Part of the access route to XL16 crosses the area of peat; however, since this is an established farm track accustomed to regular use by farm vehicles, significant impacts from vehicle movements associated with the development are not anticipated.

Conclusions and Mitigation



In conclusion, significant impacts to peat deposits at the site are not anticipated as a result of the proposed development. The EMP will outline measures to ensure that vehicle movements associated with accessing tower XH16 are managed effectively to reduce potential impacts to peat deposits in the vicinity.

8.3 Noise, Vibration and Electro-Magnetic Fields

Construction Noise and Vibration

Context

The following section is a summary of the Noise Impact Assessments that have been completed by SGURR Energy for the project. The SGURR reports are enclosed as Appendix D and E.

As with all construction operations, the construction of the proposed substation and terminal tower at Kincardine and the new cable sealing end compounds and low level gantries at Kilbagie are likely to give rise to additional noise compared to the existing baseline at these locations. As well as the civil engineering operations related to the construction of these elements and the removal of the structures they will replace, vehicle movements associated with the works will also produce noise.

As a result of the way in which these proposals will be procured it is not possible to identify the exact locations and sequencing of operations which will give rise to construction noise and as a result of this it has not been possible to undertake a detailed assessment of the noise attributable to these operations.

The potential for construction noise to constitute an environmental effect is however recognised and a suite of measures are proposed to ensure that the effects of this are maintained below accepted thresholds.

The sites of the proposed substation at Kincardine and the works at Kilbagie are located relatively remotely from sensitive noise receptors and thus the sensitivity of local receptors to increases in noise is limited. There are however a limited number of properties which are within relatively close proximity to the works and these will be afforded particular consideration as detailed below. Similarly, the works at Kilbagie are in close proximity to the A977 and this provides both a receptor and an existing source of background noise. There are also other existing natural noise sources

within the environment such as inclement weather, wildlife and watercourses.

Mitigation

In the absence of a detailed assessment of the likely noise resulting from the development, the following measures have been adopted to ensure that noise sensitive receptors will not experience noise levels resulting from the construction process that exceed normal accepted thresholds.

The mitigation measures to limit the effects of additional noise include both avoidance and reduction mitigation.

The most effective mitigation is avoidance and the development of the proposed route has been undertaken to provide the maximum achievable separation between residential properties and the OHL and substations. There are only very limited locations where the line is within 200m of a residential property and limited locations where it is within 500m.

Notwithstanding the generally considerable separation between noise sensitive receptors and the proposed substations and OHLs, all activities which give rise to appreciable noise will be subject to the requirements of best practice in terms of both Health and Safety Requirements and Environmental Health Requirements. The EMP developed to control the effects of the development will detail the approaches the contractor will adopt to ensure that construction noise will remain within acceptable levels.

In essence the EMP will require that during construction all contractors would be required to maintain low noise levels in the vicinity of dwellings or other noise sensitive receptors by employing sufficiently silenced machinery and by distancing, or where practicable, screening noisy activities or items of plant, as outlined in BS5228-1 and 2 : 2009.

This will be achieved through the following approaches to limiting noise:

- Locating infrastructure (including temporary construction compounds) as far as practically possible from residential properties and any other noise sensitive receptors;
- Programming the construction processes to reduce the time period for which noise



sensitive receptors will experience construction noise;

- Utilise a number of accesses to avoid concentration of vehicle movements in limited locations;
- Adoption of good practice methodologies to reduce felling and construction noise;
- A 48 week working year and construction over a five day working week has been assumed. Construction activities will be undertaken during daytime periods only, between approximately 07:00 to 19:00 during the summer months and 07:30 to 17:00 during the winter (or as daylight allows). Where there are no human or environmental sensitivities working outwith these times may be locally possible to optimise operational opportunities subject to agreement with the Local Authority Environmental Health Department;
- All construction activities will be undertaken in accordance with good practice as set out in BS5228-1 and 2 : 2009;
- All equipment will be maintained in good working order and will be fitted with appropriate noise control at all times (for example, silencers, mufflers and acoustic hoods);
- All site employees will be advised of the noise sensitive nature of the receptors (human and others) and be informed of any requirements for quiet working practices where required;
- Site terrain, material stockpiles and suitable work locations will be used to screen work locations and increase the separation between noise sensitive receptors and sources of construction noise; and
- A site contact number will be provided for local residents to allow them to access further information or notify the contractor and/or EHO of any issues related to this.

Through this suite of measures the effects of construction noise on any noise sensitive receptors will be limited to within accepted thresholds.

Operational Noise and Vibration

Context

The impact of high voltage transmission line audible noise is a consideration when refurbishing and/or upgrading an existing OHL such as this. As part of the new substation at Kincardine, two 400/275kV auto-transformers will be installed at the site. Like the OHLs, this apparatus also has the potential to produce noise.

This section summarises two reports, which are included in full in Volume 3, Appendix D and E that detail assessments of potential noise impacts associated with operation of the proposed substation at Kincardine and the upgraded OHL.

Methodology

Upgraded OHL

The protocol by which the noise impact will be assessed requires that the pre-existing baseline, or background, noise levels are measured, under appropriate dry meteorological conditions, at noise sensitive receptors within close proximity of the transmission line. It is also required to note the nature of the ground surface at these receptors so that the contribution to background noise, attributable to rainfall, can be estimated.

SgurrEnergy has measured background noise levels at key receptors and has predicted the likely impact of the re-conducted line on the noise sensitive receptors.

Proposed Kincardine Substation

The noise impact assessment of the operational noise of the auto-transformers at the proposed substation at Kincardine - which are the only proposed pieces of plant or apparatus that will produce noise at the substation - has been carried out on the basis of a baseline noise survey, the established auto-transformer sound level and a commonly adopted impact criterion. Three loading scenarios have been considered in this analysis, these being a non-loading, a 50% loading and a 100% loading scenario. The power levels for the 50% and 100% loading scenarios are estimated figures.

Conclusions

Upgraded OHL

In dry weather, no receptors are expected to experience noise levels greater than 5 dB above background, at which level complaints become likely.



In wet weather, three receptors fall in the range 5 dB to 10 dB increase above background. It should be noted that, of these three receptors, only one is currently a residential location. The other two receptors are located near potential property development and as such future considerations should be made at these receptor locations.

Proposed Kincardine Substation

It has been predicted that the impact criterion will be met at Hawkhill Farm, which is the only residential property within 500m of the proposed substation, for the non-loading and 50% loading scenarios. The criterion will not be met at Hawkhill Farm for the 100% loading scenario.

It should be noted that several pessimistic assumptions regarding the propagation of noise from the substation have been made. It is therefore likely that the level of noise received at Hawkhill Farm will be less than the values calculated within the report.

Mitigation

Upgraded OHL

Mitigation measures are not considered necessary.

Proposed Kincardine Substation

It is recommended that SPT consider what levels of mitigation are required, taking into account the likely loading of the transformers. Appropriate mitigation measures should be included in the EMP.

8.3.1 Electro-Magnetic Fields (EMFs)

Context

This section summarises the assessment of EMF effects associated with operation of the uprated OHL and the new substation at Kincardine. This has been produced by National Grid and is included in full in Appendix F.

Electric and magnetic fields (often referred to as EMFs) and the electromagnetic forces they represent are an essential part of the physical world. Their sources are the charged fundamental particles of matter (principally electrons and protons). Electromagnetic forces are partly responsible for the cohesion of material substances and they mediate all the processes of chemistry, including those of life itself. Electric and magnetic fields occur naturally within the body in association with nerve and muscle

activity. Humans also experience the natural static magnetic field of the Earth and natural static electric fields in the atmosphere. Energised high-voltage power-transmission equipment, along with all other uses of electricity, is also a source of EMFs. These EMFs have the same frequency as the voltages and currents that produce them, which is 50 herz (Hz) in the UK. Electric fields are produced by voltages and are measured in volts per metre (symbol V/m) or kilovolts per metre (kV/m). Magnetic fields are produced by currents and are usually measured in microteslas (symbol μ T) or nanoteslas (nT).

At high enough levels, EMFs have established direct effects on the human body. Principally, both electric and magnetic fields induce small currents in a person exposed to them. These currents, if high enough, can interfere with the action of nerves; this is the principal effect protected against by the exposure limits that exist to protect the public in the UK.

As well as these established effects, over the past 30 years it has been suggested that exposure to power-frequency magnetic or electric fields of the magnitude encountered in the environment could be linked with various health problems. The most persistent of these suggestions relates to childhood leukaemia. A number of epidemiological studies have suggested a statistical association between the incidence of childhood leukaemia and the proximity of homes to power transmission and distribution wires or power-frequency magnetic-field strengths in the homes. However, no causal link has been established between cancer (or any other disease) and magnetic or electric fields and indeed there is no established mechanism by which these fields could cause or promote the disease.

The question of possible health effects of environmental power-frequency fields has been thoroughly reviewed in recent years by the UK's Health Protection Agency (HPA, formerly the National Radiological Protection Board, NRPB, now part of Public Health England, PHE) and other authoritative national and international bodies. All these bodies reach similar conclusions, as summed up by, for example, the NRPB:

"In the view of NRPB, the epidemiological evidence that time-weighted average exposure to power frequency magnetic fields above 0.4 μ T is associated with a small absolute raised risk of leukaemia in children is, at present, an observation for which there is no sound scientific explanation. There is no clear evidence of a carcinogenic effect of ELF EMFs in adults and no plausible biological explanation of the



association that can be obtained from experiments with animals or from cellular and molecular studies. Alternative explanations for this epidemiological association are possible: for example, potential bias in the selection of control children with whom leukaemia cases were in some studies and chance variations resulting from small numbers of individuals affected. Thus any judgements developed on the assumption that the association is causal would be subject to a very high level of uncertainty.”

Control of EMFs in the UK

Resulting from and taking account of these authoritative reviews of the science, Government has set policy to provide appropriate protection to the public, restated most recently in October 2009. When considering EMF issues in relation to an OHL or substation, the key question is whether the line complies with Government policy on exposure levels. If an OHL or substation were to be found not to be compliant with Government policy on exposure levels, there could be a safety issue, and mitigation steps should be taken to bring the OHL into compliance. Where, however, an OHL is compliant, as this particular proposed uprated OHL is, that adequately addresses any safety issue, and no further mitigation is needed.

This Government position is that power lines and substations should comply with the 1998 ICNIRP Guidelines in the terms of the 1999 EU Recommendation, and also with one additional precautionary policy relating to OHLs, a policy of optimal phasing. These are the only policies relating to EMFs that power lines are expected to comply with. Specifically, there are no restrictions on how close homes can be to power lines or vice versa. This policy applies in Scotland as in the rest of the UK.

Field magnitudes

The magnetic field produced by currents in a group of conductors falls with distance from the conductor. Overall, the magnetic field is highest at the point of closest approach to the conductors and falls quite rapidly with distance. Similarly, the electric field is usually highest at the point of closest approach to the conductors and falls with distance.

Calculations have been performed here for the proposed uprated OHL for both electric fields and magnetic fields. Calculations are the best way of assessing fields in these circumstances and are acceptably accurate. The proposed uprated OHL will be a double-circuit line of L2 construction operating

with both circuits at 400 kV and with transposed phasing. The highest rating that will be able to be applied continuously in an intact system is a power of 1340 MVA per circuit, equivalent to a current of 1930 A per circuit. The design minimum ground clearance is 7.6 m as specified in the industry standard 43-8 (ENA 2004).

Using these conditions, the maximum electric field is calculated as 8160 V/m and the maximum magnetic field as 43.5 μ T. These calculations are for the maximum continuous current the line could carry and hence for the maximum field. However, in practice, the current that is carried is lower than the maximum (and also clearances above ground are usually greater than the design minimum clearance) so typical fields will be lower.

Fields from the equipment contained within substations fall quite rapidly with distance, and outside the perimeter fence, are usually at background levels, or fall to background levels within a few metres. The highest fields around a substation are caused by the OHLs entering them. The proposed substation is of Gas Insulated Switchgear (GIS) construction, which eliminates the external electric field altogether, and substantially reduces the magnetic field compared to other designs.

Compliance with Government policy on EMFs

The exposure limits for members of the public that apply as a result of Government policy in the UK are 9000 V/m and 360 μ T. The maximum fields produced by the proposed uprated OHL were calculated above as 8160 V/m and 43 μ T. These are less than the exposure limits, and therefore the line will be compliant. The proposed uprated OHL will have transposed phasing and will therefore also comply with the policy on phasing.

There is no requirement or encouragement in Government policy for SPT to maintain any particular separation between the power line and homes on grounds of EMFs, and no justification to move the power line in order to maintain any particular separation.

The fields from the proposed substation will be smaller than those from the OHL. Therefore, as the OHL is compliant, the substation will also be compliant with the guideline levels.

Other issues



Whilst some studies on effects of power lines on farming do report minor changes possibly attributable to EMFs, there appears to be no single effect that can be regarded as established, and the preponderance of the evidence has failed to find any effects.

“Active Implanted Medical Devices” (AIMDs) encompasses a range of devices, e.g. defibrillators and cochlear implants, though the commonest device remains the pacemaker. It is possible to cause interference with an AIMD by means of a large enough external electric or magnetic field. However, the relevant regulatory body has stated that it does not consider that transmission line EMFs constitute a significant hazard. Neither it, nor the electricity industry, is aware of any instance of a patient having their electronic implantable device, such as a pacemaker, interfered with by a high-voltage OHL.

In certain circumstances, a person exposed to a high electric field could experience small spark discharges known as microshocks on touching other objects, producing a prickling sensation similar to that caused by the static discharges commonly experienced in dry atmospheric conditions after frictional contact with a nylon carpet or car seat. Normally, any sensation is confined to the momentary spark discharge as contact is made or broken. These are not regarded as a health hazard and controls relating to them are in place.

Mitigation

Because the proposed uprated OHL and substation are compliant with Government exposure limits and other relevant policies, there are no significant residual effects, and no need for mitigation.

Conclusions

It is the policy of SPT that all of its assets should comply with the relevant Government policy on exposure levels. This ensures the appropriate level of safety. When considering EMF issues in relation to an OHL or substation, the key question is whether the line complies with Government policy on exposure levels. If a proposed OHL were to be found not to be compliant with Government policy on exposure levels, appropriate mitigation should be applied to alter the design to bring it into compliance. Where, however, an OHL is compliant, as this particular line is, there are no grounds for further mitigation, and no grounds from EMF considerations to refuse development consent.

8.4 Traffic and Transport

8.4.1 Context

The potential for traffic and transport effects associated with the construction and operation was investigated during the initial scoping assessment. The assessment considers the effects of the proposed GIS only and does not include for an assessment of the construction or operational vehicle movements associated with the overhead line and sealing end compound upgrade works. The works proposed at the sealing end compounds were considered as part as part of the cumulative assessment.

Vehicle movements associated with the OHL upgrade portion of the project was scoped out of the assessment as they were deemed unlikely to result in a significant effect on traffic and transport on the local road network.

The number of vehicle movements associated with the construction of the proposed substation at Kincardine was anticipated to be higher; however, effects were not anticipated to be significant. Nevertheless, to aid in the avoidance of doubt, a traffic and transport assessment was carried out to identify and assesses any potential effects the proposed substation development may have on traffic and transportation within the area. This assessment has been produced by Iberdrola Engineering & Construction and is summarised below. The full assessment is enclosed as Appendix B.

8.4.2 Study Methodology

The assessment, which took the form of a desktop study, focuses on the road network in the vicinity of the proposed substation at Kincardine. The study considers existing road cross sections, geometry and traffic flows based on available traffic data and identifies how construction, including associated traffic movements, will affect the existing road network.

All construction traffic is assumed to access the site via the existing at grade junction off the A977 for Kincardine Power Station. The route to the proposed substation is then via private access road currently owned by Scottish Power Generation. Prior to the A977, construction traffic will remain on the trunk road network where possible and traffic will be dispersed on the wider road network as the distance from the site increases, thus reducing traffic effects at



specific locations further away from the proposed development. The assessment therefore, focuses on the roads immediately around the proposed substation which includes; A977, A876, A985 and A907.

Operational access to the site will only be required for inspection and maintenance activities as the site will be generally unmanned and operated remotely. Only a small number of vehicle trips are therefore expected during the operational phase. The significance of potential traffic and transport effects due to general operational traffic are therefore considered low. Consequently, operational traffic has not been considered further as part of this assessment.

The assessment has been undertaken through consultation with Fife Council and Transport Scotland and in accordance with the Guidelines for Environmental Assessment of Road Traffic (IEMA Guidelines 1993). The following guidelines have also been used to inform the traffic and transport assessment:

- Transport Assessment and Implementation: A Guide (Scottish Executive 2005);
- The Design Manual for Roads and Bridges. Volume 05, Assessment and Preparation of Road Schemes;
- The Design Manual for Roads and Bridges. Volume 11, Environmental Assessment, 2008;
- Scottish Planning Policy SPP17 – Planning for Transport (Scottish Executive); and
- Planning Advice Note: PAN75 – Planning for Transport (Scottish Executive).

In order to establish baseline traffic conditions along the proposed construction traffic routes, traffic count data was obtained from Transport Scotland. Analysis of the data has allowed for a full assessment to be carried out of the significance criteria presented in the Guidelines for Environmental Assessment of Road Traffic (IEMA Guidelines 1993).

8.4.3 Assessment results

Study Area

The proposed substation will be accessed from the existing private access road currently belonging to Scottish Power Generation, which connects via an at grade major / minor junction arrangement to the A977 which is the nearest public road and forms part of the trunk road network.

The A977 immediately south of the substation is an urban trunk road single carriageway with a 40 mph speed limit approaching Kincardine. This section of road has numerous residential properties on a parallel road set back from the A977 with occasional vehicle access to both commercial and residential properties. Further south this road transitions to a typical 30mph urban link through Kincardine. The road over this section contains footpaths on either side with residential and small scale commercial properties located on the A977 of which a number has direct vehicle access from the A977. Bus stops and several pedestrian crossing points are also located along this section of road and local primary and secondary schools are found close by. Both sections of road are lit and look to be in relatively good condition.

The A977 northbound of the junction transitions from an urban trunk road single carriageway road as defined above to a semi-rural single carriageway trunk road with national speed limit approximately 400m north of the proposed substation entrance. On this section of road there are only sparsely isolated residences and agricultural areas adjacent to the A977. This section of road is not lit and appears to be initially 7.3m wide, widening to accommodate 1m hardstrips prior to the roundabout with the A876. The road appears to be in good condition and thought to be suitable for HGV's.

Traffic Flows

Comparing current traffic flows with their theoretical limits suggests that the local road network within the area of the study is currently operating well within its respective capacity. This indicates that these roads have a low degree of sensitivity (in terms of traffic volumes) to changes in flows.

Road Traffic Accidents

No concerns were raised during initial consultation regarding road safety or accident 'blackspots' on the road network forming part of the assessment.

No planned changes to either the local or trunk road network within the area to be assessed were highlighted during the initial consultation period. Fife Council did confirm however, there are plans for them to adopt the section of trunk road through Kincardine as a result of the A876 Kincardine bypass.

Planned Changes to the Road Network

Several structures (bridges, underpasses and culverts) have been identified within the study area. During



consultation no issues were raised with bridges or culverts on the trunk road network which forms most of the routes assessed.

A disused railway bridge and an active railway bridge are located on the private access road leading to the proposed site. It is understood the private access road and the disused railway bridge is owned and operated by Scottish Power Generation and the active railway bridge by network rail. Review of previous data suggests a 40t weight restriction is in place on the active railway bridge. Scoping emails have been sent to network rail however, further consultation and potentially survey work is required to ensure the adequacy of these structures for construction and operational traffic, most notably Abnormal Indivisible Loads (AIL's) as this is the primary road route to the substation.

Trip Generation

Subject to securing the relevant consents, the construction works associated with the proposed substation at Kincardine will commence mid 2016 and carry on until 2018. Construction traffic would be variable during the period depending on the site activity. The major construction works; earthworks, civil engineering etc. are understood to be undertaken during the first 12 months of the construction period. Construction will continue until 2018; however, it is envisaged the number of construction vehicles, particularly HGV's will reduce significantly due to the type of site activities being undertaken.

The greatest number of HGV's trips is expected during the platform forming stages Q3 2016 and Q4 2016 as it is anticipated imported fill will be required to form the platform to the required level to alleviate the potential flood risk from the River Forth.

There is estimated to be 2 AIL trips required to deliver the super grid transformers to the site during August 2017. All abnormal loads will be subject to specific method statements. An outline assessment of the anticipated route is contained in the Traffic and Transport Assessment report contained in Volume 3, Appendix B.

It is understood the overall construction site will include sufficient space for parking of site staff. Therefore, it is not anticipated that construction staff will require to park on public roads in the vicinity of the site.

Traffic Effects

The existing traffic figures were assessed in relation to estimated construction traffic figures.

In order to provide the worst case assessment the month of September was used to assess the traffic flows. Q3 2016 is expected to experience the highest volumes of construction traffic with August and September experiencing the highest construction traffic flows from that quarter and September generally experiencing the lowest background traffic figures during this period, hence effects will be greatest during this month.

The Guidelines for Environmental Assessment of Road Traffic states that on links where existing traffic is generally free flowing an increase in traffic flows of more than 30% is considered significant. In sensitive areas increases of more than 10% should be assessed.

In addition to the above the Transport Assessment and Implementation: A Guide (Scottish Executive) - 2005 suggests the significance of an increase to traffic figures depends not only on the percentage increase of traffic but the effects on the available capacity.

The observed traffic figures on the A977 adjacent to the site suggest even with the inclusion of construction traffic the road will continue to operate well within capacity.

The overall percentage increase in traffic volumes is less than 4% indicating **no significant effects**. The increase caused by the peak construction hour traffic flow compared to the existing average peak hour flow is 12.7% again indicating **no significant effects**, as the routes are not considered sensitive.

The maximum percentage increase in HGV traffic on the A977 is approximately 71% both north and south of the proposed substation which represents a **significant** increase to baseline conditions.

The baseline (2012) total traffic and HGV traffic flows for the A977 at the locations considered are relatively low considering the status of the road, approximately 66 HGV's (one way) per day at both locations. Further investigation shows that traffic flows on this section of the A977 significantly reduced during 2008 following the completion of the A876 Kincardine Bypass. 2007 daily traffic figures for the same month and locations on the A977 approaching from the north and south were almost 4 times larger with a slightly larger percentage HGV usage (from the south - 8136 NB [4.7%HGV], 7639 SB [4.8%HGV]). The worst case percentage increase in HGV traffic relative to the 2007 year flows would be less than 13%.



Whilst the estimated increase in HGV construction traffic would maintain the road well within its theoretical capacity and would be significantly less than the baseline HGV traffic observed on the route prior to the construction of the bypass in 2008, the perceived increase of HGV trips on the A977 north and south for this short duration is considered to be **significant**.

Based on the assessment criteria employed, the likely effect to journey times, loss of amenity, noise, cyclists and pedestrians is considered to be more significant on the A977 from the south due to the more urban nature of this section of the route; specifically due to the number and proximity of residential/commercial properties, vehicular accesses and pedestrian footways/crossing points; in addition to other amenities in the wider area such as schools. Therefore the effect of HGV traffic on the A977 from the South is considered moderate to major.

The A977 from the north is more rural in nature therefore the effect is considered to be less significant over this section. The effect of the increase in flows over this section is considered to be moderate.

Wider Route Assessment

The percentage increase caused by construction traffic for both routes linking the A977 are less than or equal to 2% and the percentage increase in HGV traffic allowing for the worse case increase is less than 30%. The routes are not considered sensitive therefore the effect of construction traffic is deemed not significant.

Accessibility for Emergency Services

The Traffic Management Plan, as recommended in the Construction Traffic Management Good Practice section of the Traffic and Transport Assessment Report contained in Volume 3 of the ES, shall set out any specific arrangements required as part of the construction works identified in agreement with the emergency services. The contractor shall continue consultation with the emergency services during construction and update the TMP accordingly based on the results.

Pedestrian Effects

No known core path networks or pedestrian rights of way are generally expected to require diversion as part of the development. Sections of the A977 do contain pedestrian footways and pedestrian crossing points but it is considered that the increase in traffic

with the mitigation measures in place is minor with the majority of car and van movements occurring out with peak times.

The delivery of the AIL's may require localised amendment to pedestrian footways but this will be subject to detailed method statement and consultation with all relevant overseeing organisations.

The overall effects on pedestrians have therefore been assessed to **Not Significant** at this stage.

8.4.4 Mitigation

In addition to good practice control measures outlined in the Construction Phase Traffic Management Good Practice section of the Traffic and Transport Assessment Report contained in Volume 3 of the ES, it is recommended that the majority of construction vehicles (HGV's) accessing the substation avoid the route through Kincardine and access from the north, utilising the A876/A907 and the A977 southbound.

No major modifications are recommended for the alignment or cross section of the A977 from the north to mitigate potential traffic and transport effects caused by construction HGV's. Modification is suggested to the junction of the private access road from the existing substation to the A977 to alleviate congestion from construction traffic turning right into the private access road and to improve visibility, particularly looking northbound onto the A977, which appeared to be obscured by vegetation.

It is further recommended that construction traffic should not be held on the A977 including the lay by's on the approach to the private junction. Instead holding of HGV's should be within the construction site boundary or on the private access road.

The significance of the increase of construction traffic, particularly HGV's with the inclusion of the mitigation measures listed above is considered **moderate** due to the remaining capacity of the road network.

8.4.5 Conclusions

In conclusion, the effect from construction traffic on most of the routes assessed were deemed not significant, however, significant effects from HGV traffic was identified over a short length of the A977 north of the proposed site and from the A977 through Kincardine based on the guidelines set out in the Guidelines for Environmental Assessment of Road Traffic.



The report recommends that HGV traffic through Kincardine should be restricted and modification to the existing private access junction to the A977 be carried out.

Operational traffic effects were deemed to be minimal as the facility would be unmanned and hence would not be expected to generate vehicle trips other than for occasional maintenance.

8.4.6 Cumulative Effects

As well as the direct effects of the project the cumulative effects of all the developments known to be taking place during this period have also been considered. The term 'all developments' refer to those within the surrounding area of the proposed Kincardine substation and utilising the access roads identified as significant in the above traffic and transport assessment. The other developments considered as part of the cumulative assessment consist of;

- Reinsulating of XL Over Head Line (OHL) route; and
- Third party developments.

8.4.7 Reinsulating of XL Over Head Line (OHL) route

The reinsulating of the XL route falls under two transmission license boundaries, Scottish Power Transmission (SPT) and Scottish Hyrdro Electric Transmission plc (SHETL). The XL route runs from Kincardine to Kintore. Therefore the vast majority of the works on the OHL will be completed outwith this assessment area and construction traffic will be dispersed on the wider road network. As such, it is anticipated that the associated daily construction traffic volumes generated within the study area will be minimal and will therefore not amend the study conclusions above.

It is understood that new access roads to the OHL will not be required, instead existing access routes will be used. Construction vehicles will therefore only be required to deliver materials and personnel to a collection area and then to the location of the works. This will generally consist of 4x4 Hiabs, transit vans and tractor winches. The OHL works are believed to be completed in stages over a 3 year period, 2015 to 2018 inclusive, when electrical outages are available. Construction traffic will be spread over this period

therefore; daily traffic flows are believed to be minimal.

8.4.8 Kilbagie Sealing End Compounds

The OHL sealing end compounds at Kilbagie are understood to require staged construction between July 2017 and September 2018. The sealing end compounds will be accessed both during construction and operation from the A977. The construction works will consist of earthworks, civils and mechanical and electrical installation. Operational works will be restricted to inspection and maintenance only and are therefore not considered significant.

As the developments are small in comparison, it is anticipated that the maximum one way daily traffic flows required during construction will be 8 vehicles per day. This is likely to be required for short periods only, particularly during the earthworks forming and concreting phase. Generally the construction vehicle movements are likely to be significantly lower.

The construction of the sealing end compound takes place between Q3 2017 and Q3 2018, when the main earthworks and civils construction at Kincardine substation are complete. No additional cumulative effects have therefore been considered as the increase in traffic from the sealing end compound occurs after the mains earthworks and civils construction phases for the Kincardine substation when construction traffic is relatively low. The worst case period remains Q3 and Q4 2016 therefore the conclusions and recommendations of the report are unchanged.

8.4.9 3rd Party Developments

It is noted that consent was granted by Fife Council on 17th November 2010 for a large scale housing development comprising 350 units (reference 07/00252/wopp), approximately 1 mile east of the Kincardine substation works. It has not been confirmed whether the housing development has started works since planning permission was approved, however as stated in the decision notice the development which the permission relates must begin no later than two years from the date of decision, meaning the developer has either begun works or has ceased development on the site.

It is envisaged that during the construction stage of the residential development the A977 will be used for access to the site. This could potentially cause an increase in level of traffic to the area due to the accumulative effect of construction traffic for both developments.



Having identified a potential interaction between the Kincardine Substation works and housing development South of Riverside Terrace it is proposed that it is highly unlikely the programmes for the two developments would coincide and consequently the cumulative effect is negligible.

8.4.10 Cumulative Mitigation / Best Practice

No significant cumulative traffic and transport effects have been identified with other known developments within the study area which utilise the same access roads. Where possible staging of construction and therefore construction traffic movements should be considered to try and avoid major deliveries to/from the Kincardine substation development and particularly the Kilbagie sealing end compounds. No further mitigation measures have therefore been proposed.

The best practice procedures contained in Annex 1 should be applied where appropriate to all developments associated with the construction works.

8.4.11 Cumulative Summary

A review of other developments likely to be taking place within the assessment period and area has been undertaken in order to assess the cumulative effects.

The review has involved identification and assessment of other similar developments known to be taking place within the study area. It has concluded that there will be no significant cumulative effects resulting from the project, when considered in combination with other similar development projects. As a result no additional mitigation is required over and above those identified within main traffic and transport section above.



9. CUMULATIVE EFFECTS

9.1 Introduction

This chapter addresses the assessment of potential cumulative effects associated with the proposed development; the objective being to identify whether any significant cumulative effects could occur as a result of the interaction of the proposed works and other developments within the geographical area.

It is however recognised that, by the nature of the proposed development, the potential for significant cumulative effects is low and the sections below provide justification for this position.

The assessment of cumulative effects is a consideration within EIA due to the following:

- EIA Directive 85/337/EEC - requires the assessment of 'the direct effects and any indirect, secondary, cumulative, short, medium and long term permanent or temporary, positive and negative effects of the project';
- EIA Directive 97/11/EEC - states that criteria for assessment includes 'the cumulation with other projects'; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (amended 2008); and
- European Commission Document 'Guidelines for the assessment of indirect and cumulative effects as well as impact interactions, 1999' provides additional guidance.

9.2 Methodology

In terms of the potential for cumulative effects, consideration has been given as to whether they could occur in two ways:

- i. The potential cumulative effects of both the construction and operational requirements with existing operations or planned developments in the surrounding area; and
- ii. The cumulative effect of the interaction of a combination of predicted effects on a particular receptor; this is addressed within each chapter of the ES.

9.3 Assessment

In terms of the potential for cumulative environmental effects with other planned or operational developments the following has been considered:

- Reinsulating of XL Over Head Line (OHL) route; and
- Third party developments.

XL Over Head Line (OHL) route

The reinsulating of the XL route falls under two transmission license boundaries, Scottish Power Transmission (SPT) and Scottish Hydro Electric Transmission plc (SHETL). The XL route runs from Kincardine to Kintore. Therefore the vast majority of the works on the OHL will be completed outwith this assessment area. The only potential cumulative interaction is in relation to construction road traffic. This has been assessed in Chapter 8, section 8.4.7 and deemed not significant with minimal cumulative effects predicted.

Third party developments

It is noted that consent was granted by Fife Council on 17th November 2010 for a large scale housing development comprising 350 units (reference 07/00252/wopp), approximately 1 mile east of the Kincardine substation works. Potential cumulative effects were considered only likely in relation to construction traffic. This has been assessed in Chapter 8, section 8.4.9 and it is concluded the potential for cumulative effects is negligible.

Furthermore it is considered that the proposed construction activities can be adequately controlled through the application of an Environmental Management Plan (EMP). This is a 'live' document and will be utilised throughout all subsequent stages of the project to ensure the necessary mitigation measures are implemented and are not diluted, overlooked or misunderstood.

For these reasons, the potential for significant cumulative effects as a result of construction of the development are considered to be low.

In terms of operational interactions, the proposed development will not significantly alter the current infrastructure or its maintenance requirements, consequently, the potential for significant cumulative effects as a result of operation of the development is considered to be low.



9.4 Conclusions

No significant cumulative effects have been identified. Any negative cumulative effects identified are considered to be minor or negligible and relate to the initial construction works rather than the long term operation of the development.

It is considered that any minor negative cumulative effects associated with the construction phase can be adequately controlled through the application of a EMP. This document will be utilised throughout all subsequent stages of the project to ensure the necessary mitigation measures are implemented and are not diluted, overlooked or misunderstood.

Overall the potential for significant cumulative effects as a result of the construction and operation of the proposed development are considered to be low.



10. RESIDUAL EFFECTS

Considering the nature of the proposed development (*i.e.* an upgrade and refurbishment of an existing OHL and new cable sealing end compounds) the potential for significant residual effects is considered to be limited. Taking into account the results of the EIA and the limited potential impacts predicted by the assessment, the potential for significant residual effects was anticipated to be low. A summary of the assessment which supports this position is set out below.

The EIA assessed the potential for significant environmental effects as a result of the project. The assessment has been scoped, such that, it was agreed significant effects were only predicted for the following topics:

- Water Environment
- Flora & Fauna; and
- Landscape & Visual Impact Assessment (LVIA).

For the water environment assessment significant effects have been predicted, but with the successful application of the recommended mitigation measures the residual effects can be reduced to minor and therefore not significant.

The Flora and Fauna assessment has shown that no significant ecological effects are predicted with mitigation measures embedded in the design of the project having contributed to this conclusion. Recommendations have been made with regards to adherence to best practice guidance and the project EMP which will set out compliance requirements. If the latter are adhered to the residual effects are predicted to remain as not significant- none or minor significance.

For the LVIA the assessment has concluded that the residual effects will range from minor to moderate and therefore not significant.

Please note, the predicted residual effects are conditional upon the effective implementation of the mitigation measures presented in each corresponding chapter.



11. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Prior to the commencement of works, a Environmental Management Plan (EMP) will be produced based on the outcomes of this ES (i.e. mitigation measures) and the Construction Method Statements (CMS) which will describe the nature of works proposed and the environmental protection measures being applied to ensure that all activities are carried out to minimise the environmental effects.

The EMP will be produced based on best practice guidance developed by organisations such as the Institute for Environmental Management & Assessment

11.1 Controlling Environmental Effects

The Construction Environmental Management Plan (EMP) will be produced to ensure that due cognisance is made of the impact of the development on the environment and to outline the means by which the effects of the works are to be minimised. The document will be read in conjunction with SPT's Construction, Health, Safety and Welfare requirements. The EMP will help control and guide the working practices used during the construction of the development, and will be reviewed and amended as necessary throughout construction. The document will also incorporate SNH and SEPA guidelines by reflecting current best practice in protecting the environment during the works.

The content of the EMP will contain at least the contents of the "Schedule of Mitigation" developed from this ES and all legal and other requirements and such other guidance and requirements as to provide best practice environmental management.

In addition to the EMP, the appointed contractors will be required to produce and implement an Environmental Management System (EMS) that meets the requirements of ISO 1400 and which reflects the content of the EMP. Compliance with the requirements of the EMS and EMP will be a contractual obligation for the appointed contractor and will be audited by a representative of SPT.

The appointed contractors will be required to produce Construction Method Statements (CMS) to detail the methodology and control of any works identified in the EMP as potentially environmentally sensitive.