KINGSCOURT TO WOODLAND

CONSTRAINTS REPORT

VOLUME I

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soluziona

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CONSTRAINTS REPORT

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KINGSCOURT TO WOODLAND

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List of Abbreviations

ACA	Architectural Conservation Area
BMW	Border Midlands & Western Region
CER	Commission for Energy Regulation
cSAC	candidate Specific Area of Conservation
CSO	Central Statistics Office
DoEHLG	Department of Environment, Heritage and Local Government
EIS	Environmental Impact Statement
EMF	Electro Magnetic Fields
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographical Information Unit
GPS	Geographical Positioning System
GSI	Geological Survey of Ireland
ICNIRP	International Commission on Non-Ionizing Radiation Protection
LCT	Landscape Character Types
NDP	National Development Plan
NHA	National Heritage Area
NIAH	National Inventory of Architectural Heritage
NPWS	National Parks & Wildlife Services
NSS	National Spatial Strategy
OPW	Office of Public Works
OS	Ordnance Survey
pHNA	proposed National Heritage Area
RMP	Record of Monument & Places
RPG	Regional Planning Guidelines
RPS	Record of Protected Structures
SAC	Special Area of Conservation
SPA	Special Protection Areas
SPG	Strategic Planning Guidelines
TSO	Transmission System Operator

1 EXECUTIVE SUMMARY

1.1 TERMS OF REFERENCE

Soluziona with TOBIN Consulting Engineers have been commissioned by EirGrid to prepare a Constraints Report for the construction of a new 400kV line to connect the existing Woodland Station (400kV) (near Dunshauglin, County Meath) and the site identified for the new substation near Kingscourt, County Cavan.

This report details the options considered for potential overhead line route options between the above termination points. The methodology employed for the identification of three route options was a combination of desktop studies, consultation with interested parties and site visits. The site visits served to verify road and river crossings and noted any areas where there were potential conflicts. Subsequent to the site visits revised route options were modified and mapped.

1.2 STRATEGIC PLANNING CONTEXT

The National Spatial Strategy (NSS) has recognised Drogheda and Navan as part of the Dublin hinterland, and has designated Dundalk as a gateway and Cavan and Monaghan as hubs. The area is well served by updated road and rail infrastructure and by the gas network. It is therefore clear that the area will continue to see strong economic growth and thus there will be an increase in electricity demand. It is also the main conduit for power flows to and from Northern Ireland, which can be expected to increase following the construction of the additional North-South Interconnector.

In addition recent studies have shown that as a result of increasing demand for electricity in this region, if one of the existing high voltage lines in the area is out of service due to maintenance and a fault occurs on another line, the remaining lines will be overloaded and this may lead to widespread power cuts in the area, with resultant loss of supply to customers. With the present network, it will not be possible to maintain a good quality and reliable electricity supply into the future.

1.3 SOCIO-ECONOMIC

The study area consists of an approximately 58km stretch from Woodland in County Meath to Kingscourt in County Cavan. The increase in population in this region is currently putting pressure on the existing electricity infrastructure in this region. Therefore this proposed power line is required to meet the growing demands of the population.

The relatively large number of farmers in this region (average farm size of approximately 50ha) will result in a large number of farmers who may be impacted upon by the proposed development. However the impact will be low, with a small loss to productivity to agriculture as a result of the proposed power line development. There will be some minor impacts to sensitive and vulnerable landscapes, however where feasible these areas will be avoided. There will be some impacts during construction including noise and additional traffic volumes. The proposed development would have a positive long-term impact on this region.

1.4 LANDSCAPE

A desktop study of the Draft Meath County Development Plan 2007-2013 and the County Cavan Development Plan 2003-2009 including relevant published literature was carried out. Key landscape characteristics such as vegetation, major and minor ridgelines, land uses, designations and settlement areas were mapped using Ordnance Survey 1:50,000 mapping as a background.

The Constraints Report highlighted the following points:

Route Option 1

- Very high or high sensitivity viewsheds are not crossed by this route option;
- This route option traverses a medium sensitivity viewshed for 2.3km;
- This route option crosses Existing Driving Routes, Waymarked Paths and Cycle Routes three times compared to four by each of the other route options;
- This route option traverses an area of high sensitivity to power lines for 25.8km compared to 21.0km, 20.5km and 20.6km by the other route options;
- Roads are crossed 39 times.

Route Option 2

- Very high or high sensitivity viewsheds are not crossed by this route option;
- This route option traverses a medium sensitivity viewshed for 6.2km;
- This route option traverses an area of high sensitivity to power lines for 21km;
- Roads are crossed 39 times.

Route Option 3A

- Very high, high or medium sensitivity viewsheds are not crossed by this route option;
- Major rivers are only crossed two times;
- This route option traverses an area of high sensitivity to power lines for 20.5km;
- Roads are crossed 35 times.

Route Option 3B

- Very high, high or medium sensitivity viewsheds are not crossed by this route option;
- Major rivers are only crossed two times;
- This route option traverses an area of high sensitivity to power lines for 20.6km;
- Roads are crossed 33 times (which is the lowest number of the four route options).

1.5 ECOLOGY

The National Parks and Wildlife Services (NPWS) database of designated nature conservation areas was reviewed to identify any designated sites lying within five kilometres of the proposed route options. The publication *'Ireland's Wetlands and their Waterbirds: Status and Distribution'* by O Crowe, published by Birdwatch Ireland in 2005 was examined to identify sites that are not designated for nature conservation but are regularly used by numbers of birds.

The Constraints Report highlighted the following points:

Route Option 1 crosses the River Boyne and River Blackwater candidate Special Area of Conservation (cSAC) at three separate locations. Two areas designated as Natural Heritage Areas (NHA) and one other cSAC (Killyconny Bog) lie within five kilometres of this route. Also two Wintering Bird Sites lie in close proximity. This route has no impact on the Whooper Swan flock that winters between Kells and Navan.

Route Option 2 crosses the River Boyne and River Blackwater cSAC at two separate locations and lies within three kilometres of Killyconny Bog cSAC. Two Wintering Bird Sites occur within five kilometres of Route Option 2. This route option has no impact on the Whooper Swan flock that winters between Kells and Navan.

Route Option 3 (3A and 3B have similar consequences). This route option is the most easterly of the routes. It crosses the River Boyne and River Blackwater cSAC at two separate locations and it also lies within three kilometres of two NHAs. This route option also passes within five kilometres of four Wintering Bird Sites and through the Blackwater Valley between Kells and Navan, with a potential to impact on the wintering Whooper Swan flock.

The main ecological constraints are the presence of sites designated as nature conservations, and in particular, the River Boyne and Blackwater. Route Option 1 crosses the River Boyne and River Blackwater cSAC at three separate locations, while Route Options 2 and 3 cross these rivers at two locations. Further studies should be carried out at a later stage

to determine which habitats are present at these crossing locations in order to avoid any impacts on priority habitats.

1.6 WATER

The River Boyne, in the south of the study area, dominates the natural surface water environment. It flows in a southwest to northeast direction through the towns of Trim and Navan and has three main tributaries; Tremblestown/Athboy River, Knightsbridge River and the Clady River. In general, there is a high drainage density throughout the centre and south of the study area. North of Nobber in County Meath the drainage density decreases as the relief and the number of lakes increase. All the lakes within the survey area are less than 0.5km^2 with the exception of Proudstown Reservoir, which is 1km^2, located northwest of Navan.

The Constraints Report highlighted the following points:

Route Option 1 crosses seven rivers and it passes within 500m of two rivers from Kingscourt to Woodland. This option lies in close proximity to 5 lakes, the closest of which is White Lough, 0.5km away.

Route Option 2 crosses seven rivers from Kingscourt to Woodland and lies in close proximity to four lakes, the closest of which is Breakey Lough, 1km away.

Route Option 3 crosses eight rivers from Kingscourt to Woodland (one river is not a crossing point but is within close proximity of Route Option 3A). This route option lies in close proximity to 4 lakes, the closest of which is Clooney Lough, 450m away.

The 3 route options chosen do not encounter any Regionally Important Aquifers or karstified bedrock, with the exception of a 0.2km area of karstified rock along Route Option 3A.

1.7 GEOLOGY

A detailed bedrock classification desktop study was undertaken to highlight the various geological bedrock formations underlying the study area. The Geological Survey of Ireland (GSI) bedrock geology map for County Meath was examined in conjunction with the GSI aquifer classification map for County Meath.

There are a variety of soils in the study area between Kingscourt and Woodland. Cutover Peat[1] (Cut) and Fen peat (FenPt) are evident in a number of regions within the study area. In particular, areas of cut away[2] peat are located towards the centre and western areas of the site. Made Ground is evident in all built-up areas including the larger urban settlements of Woodland, Ashbourne, Dunshaughlin, Navan, Kells, Carlanstown, Nobber and Kingscourt.

This report highlights those parts of the study area where subsoil is defined as "cutover peat" which would not be ideal sites for locating pylons. The main reason for this constraint is that, as a subsoil, cutover peat is not of sufficient strength to provide stability for the proposed infrastructure. Subsidence and general instability during construction and operation over the lifetime of the pylons may be a significant issue. However it would not preclude the erection of pylons as certain civil engineering mitigation measures can be put in place to provide stability.

When the preferred route is selected, it is recommended that all predicted impacts are addressed and that a thorough site walkover is carried out in order to avoid complications during construction and operation.

1.8 CULTURAL HERITAGE

To assess the potential impact of the proposed development a variety of data sources were consulted. These included:

- National Monuments – A database available through the www.heritagedata.ie website;
- Record of Monuments and Places (RMP) – databases obtained from the national monuments section of the Department of Environment Heritage & Local Government;
- Record of Protected Structures (RPS) – datasets obtained from Meath & Cavan Local Authorities;
- National Inventory of Architectural Heritage (NIAH) – Datasets obtained from the architectural section of the DoEHLG;
- County Development Plans were also consulted with regard to further heritage designations.

The Constraints Report highlighted the following points:

[1] Cutover bog describes any site where there is still an economic reserve of peat remaining, usually 1.5m or more.

[2] Cutaway bog describes a site where peat has been removed systematically by industrial means.

Route Option 1:

Within a 1000m-radius surrounding Route Option 1 a total of 171 sites were assessed. Within the immediate buffer (see Table 10.1 for details) there are 13 sites and located in the extended viewshed (up to 1000m) there are 158.

- There is a National Monument, approximately 635m east of this route option. The site (ME016-006) is classified as a church and is the location of a number of crosses in Castlekeeran townland;
- There are four NIAH sites including, a bridge, a forge, a house and an outbuilding within the vicinity of the proposed power line;
- Within the immediate buffer zone there are 3 RMP monuments. Within the extended viewshed 103 RMP sites may be impacted upon;
- Thirty protected structures are situated within the extended buffer of this route option. Six structures are located within the immediate vicinity of the proposed power line;

Route Option 2:

Within a 1000m radius surrounding Route Option 2 a total of 154 sites of cultural heritage are assessed. Within the immediate buffer there are 11 sites and located in the extended viewshed there are 143.

- There are two National Monuments located within a kilometre of Route Option 2. ME016-006, an ecclesiastical complex at Castlekeeran townland lies approximately 400m east of the proposed power line. ME024-017 a church, cross & base at Rathmore townland is located approximately 360m from this route option;
- There are two NIAH sites, a bridge and a presbytery/parochial/curate's house within the vicinity of the proposed power line;
- There are 95 RMP sites within 1000m of this proposed route option;
- Thirty-one protected structures are situated within the extended buffer along Route Option 2.

Route Option 3A:

Within a 1000m radius surrounding Route Option 3A a total of 184 sites of cultural heritage significance are perceived to be impacted upon. Within the immediate buffer there are 14 sites and located in the extended viewshed there are 170 sites.

- There is a National Monument, at Robertstown townland on this route option. The site (ME011-006) is classified as a fortified house and is located 610m east of the proposed power line;
- There are two NIAH sites including a bridge and a school within the vicinity of the proposed power line;

- There are 101 RMP sites within 1000m of this proposed route;
- Forty-eight protected structures are situated within the extended buffer along Route Option 3A.

Route Option 3B: Within a 1000m radius surrounding Route Option 3B a total of 190 sites of cultural heritage significance are perceived to be impacted upon. Within the immediate buffer there are 12 sites and located in the extended viewshed are 178 sites.

- There is a National Monument, at Rahood townland on this route option. The site (ME011-007) is classified as a bivallate ringfort and is located 390m east of the proposed power line;
- There are two NIAH sites including a bridge and a school in the vicinity of the proposed power line;
- There are 112 RMP sites within 1000m of this proposed route;
- Forty-eight protected structures are situated within the extended buffer along Route Option 3B, nine of which are located within the immediate vicinity of the proposed power line.

1.9 EVALUATION OF CONSTRAINTS

Chapter 11 of this Constraints Report details how each route option was compared and contrasted. This section will synopsise these evaluations. The classification for each section of a route option has been determined by examining the level of sensitivity of the area that it passes through. Refer to Table 11.1 “Matrix Developed for Classification of Route Options”.

Route Option 3B is the shortest route option at 53.42km, with Route Option 3A being very similar at 53.56km in length. Route Option 1 is the longest at 63.03km in length, this is approximately 10km longer than Route Option 1. In all of the route options, the single biggest factor affecting the classifications of the lines is the presence of landscape visual impact areas.

Refer to Figure 11.1 and 11.2 “Classified Route Options” for details of the Route Option Classifications.

Table 1.1 below depicts the classifications assigned to each of the route options to allow for direct comparison. It quantifies the length of power line that falls into each of the classification categories, ranging from “Very High Sensitivity” to “Low Sensitivity”.

Table 1.1 Route Classification Summary

Sensitivity	Route 1 (km)	Route 2 (km)	Route 3A (km)	Route 3B (km)
Very High	0.62	0.50	0.41	0.44
High	9.86	10.99	10.81	10.60
Medium	6.06	4.74	1.88	2.68
Med-Low	4.31	0.11	8.48	5.41
Low	39.20	42.53	31.99	34.30
Total Length (km)	63.03	58.87	53.56	53.42

From Table 1.1 above it is apparent that all route options are comparable in the length of “very high-sensitivity” areas that will be affected, although Route Options 3A and 3B. The main reason the Project Team is leaning towards Route Option 3A and 3B as the Emerging Preferred Route Options is that Route Options 1 and 2 pass through the viewshed of a prominent landmark with a significant scenic view, while Route Option 3A and 3B do not. This designated landmark and scenic viewpoint is the Tower of Loyd, which is located in The People’s Park approximately two kilometres north west of Kells.

2 BACKGROUND AND TERMS OF REFERENCE

Soluziona with TOBIN Consulting Engineers have been commissioned by EirGrid to prepare a Constraints Report for the construction of a new 400kV power line to connect the existing Woodland Station (400kV) (near Dunshauglin, County Meath) and the site identified for the new substation at Kingscourt, County Cavan. The power line will be built and operated to 400kV construction standards. The location of a new substation at Kingscourt is currently being reviewed as part of the 400kV Interconnector route from Northern Ireland.

Refer to Figure 2.1 'Study Area Location' in Volume II.

The scope of works for this project includes the following:

- Install approximately 58km of 400kV Overhead Transmission Line between Woodland Station (near Dunshaughlin, County Meath) and the site identified for the new substation of Kingscourt (County Meath);
- Install a new 400kV line bay in Woodland Station, and associated civil, SCADA, control wiring and protection works;
- Link this power line to the new 400/220kV Station near Kingscourt, as part of the Interconnector Project.

The purpose of a Constraints Report is to identify key environmental issues within the study area, in which the potential route options for the electricity transmission may have an impact. This report has been compiled based on desktop studies, site visits and consultation with a number of interested parties. The constraints described in this report cover physical, legal and environmental issues, in a local, regional and national context.

This Constraints Report will include an assessment of cultural heritage, ecology, geology, water, socio-economic and landscape impacts.

Potential route options identified during the desktop study were verified during the site visits, which included driving the route options to check all road and river crossings and to note any potential conflicts with the desktop study.

This report provides a context for selecting the preferred route option, which will be submitted to the relevant Planning Authorities and which will be subject to a full Environmental Impact Statement (EIS) to accompany the Planning Application.

This report is completed in accordance with the tender that was submitted to EirGrid, having regards to the Request for Proposal "Specialist Consultancy Services" as provided by EirGrid in the tender request.

2.1 STRUCTURE AND PROJECT TEAM

This report has been principally compiled by Soluziona and TOBIN Consulting Engineers. Soluziona and TOBIN Consulting Engineers have in turn appointed the following specialist sub consultants, who have also contributed to this report:

- Moore Group (Cultural Heritage); and
- Scott Wilson (Landscape).

The Constraints Report is compiled in two volumes:

Volume 1: Main Text; and

Volume 2: Constraint Maps.

2.1.1 General Factors Examined

The following specific factors were mapped:

- Urban Settlement;
- Forestry;
- Sites of Ecological Sensitivity (NHA's, SAC's, SPA's);
- Sensitive & Vulnerable Landscapes;
- Scenic Routes;
- Geology and Surface Water Features; and
- Archaeological & Architectural features.

The following factors are also acknowledged as being potential route determinants:

- Locations of residences, churches, playing pitches, schools and businesses; and
- Unstable ground conditions.

2.2 SITE LOCATION

The study area chosen is situated in a north-south axis between the existing Woodland 400kV substation in County Meath and a proposed substation near Kingscourt County Cavan. The study area is bounded to the north by Kingscourt town in County Cavan, to the south by Woodland substation in County Meath. The area is bound to the east by the Hill of Tara and the town of Navan and to the west by the towns of Trim and Athboy. Settlement locations within the study area include Athboy, Dunshauglin, Kells, Navan, Nobber, Moynalty, Mullagh and Trim.

Within the physical landscape two main rivers will be traversed, the River Blackwater to the north and the River Boyne to the south. The River Boyne, in the south of the study area, dominates the natural surface water environment. It flows in a southwest to northeast direction through the towns of Trim and Navan. The River Blackwater flows in a northwest to southeast direction from Kells before entering the Boyne at Navan. The largest surface water body is Proudstown Reservoir approximately 1km^2, located northwest of Navan.

The topography surrounding the study area is of rolling lowland and drumlin landscape. The only considerable elevations are the hills of Loughcrew in the western extremity of County Meath. Lough Sheelin forms a small part of the county boundary towards Cavan. The quantity of bog is small in proportion to that of the general surface area, and very unequally distributed. The landuse within the study area is predominantly exploited with agricultural activities.

The study area encompasses approximately 67,000 hectares, predominantly in County Meath and a small area situated in County Cavan.

2.3 METHODOLOGY

The methodology for this constraints report consisted of a desktop study and site visits as detailed below.

2.3.1 Desktop study

The initial task associated with this project was to define the study area. The study area is dominated by a number of features including Hill of Loughcrew and the River Boyne and River Blackwater. Initial route options were marked on a map, avoiding these features, together with towns and villages. (Refer to Figure 2.2 'Initial Route Options Assessed' in Volume II)

A number of general line route options were mapped and assessed and an initial desktop study commenced, which detailed the major physical and environmental constraints that may hinder a route option. Typical constraints included designated areas, areas of archaeological & architectural significance, scenic routes, vulnerable and sensitive landscapes along with all developments and infrastructure. (Refer to Figure 2.3 'Initial Route Options Assessed with Constraints' in Volume II)

When the constraints were overlaid onto the Discovery Series Mapping, it became apparent that certain route options that were initially mapped were not feasible. It was established that the initial route option to the east of the study area along the existing 220kV power line was not feasible due to the number of one off buildings in this area. This option was discarded completely as it was impossible to find a route anywhere to the east of the study area that would allow a minimum distance of 50m from one off buildings. In addition the route option to the west of the study area, was modified, as it was located in close proximity to The People's Park near Kells; as such this route option traversed a scenic view – very high sensitivity. A revised Route Option 1 was identified which runs to the west of Athboy and avoids the highly sensitive landscape.

Following from the mapping of all major constraints, a number of revised route options emerged and are broadly shown on Figure 2.4 & 2.5 'Revised Route Options Studied' in Volume II.

To aid in the identification of residential dwellings and commercial buildings, GeoDirectory digital data was purchased. This provides the grid coordinates and use of each postal address within the study area, except for known urban areas, which were already highlighted as constraints. The dataset was imported to a Geographic Information System (GIS) as a set of point features, and a buffer zone of 60m around each point was created. This buffer distance was chosen to allow for an approximate building size plus about 50m space around each building, as required by EirGrid. Note that the GeoDirectory was not purchased for towns, as these areas are not suitable for this type of development.

Three route options were chosen for further assessment and investigation, which avoid the majority of constraints listed above. These route options were subject to site visits in order to verify the information gathered during the desktop study.

2.3.2 Site Visits

Site visits in the study area were undertaken in order to supplement existing mapping and information obtained during the desktop study, and in particular to:

- Assess optimum crossing of roads, rivers and other obstacles (power lines etc.);
- Identify all existing dwellings and recreational facilities;
- Identify all existing commercial / industrial properties and concerns;
- Verify Scenic View Points;
- Verify Forestry areas (based on 1:50,000);
- Identify churches/schools;
- Assess the topography (disadv. difficulties in erecting pylons/ adv. to hide power lines etc.) and
- Assess Planning Site Notices.

The route options were driven and all crossings points on roads were checked for sufficient clearances from existing dwellings or other possible constraints. In the event of narrow crossings the distance was measured between dwellings to ensure that all line route options were located at least 50m from dwellings. Also noted were any developments that were in progress and planning site notices. The locations of these were mapped using a handheld GPS. All driveways or avenues that routes crossed were assessed and route options modified where possible to avoid crossing these.

In the event of the initial crossing point proving to be unavailable due to new developments or located close to schools, playing pitches etc., alternative crossing points were investigated in the immediate vicinity and details noted. Road and river crossings were noted and the comments were given a number and mapped onto the GIS mapping for use in further refinement of the route options. Visual inspections were also taken at the River Boyne and Blackwater crossing points, and at general areas of high visibility.

After evaluating the data gathered from the site visits and the desktop study, further modifications and refinement to the line route options was completed and route alternatives were added. Refer to Figure 2.6 “Combined Constraints Mapping”, Volume II.

The constraints are discussed in more detail in the following chapters and a description of the line route options are detailed in Chapter 3. See Figure 2.1 below for a flow chart of stages in the identification of 3 route options for further assessment.

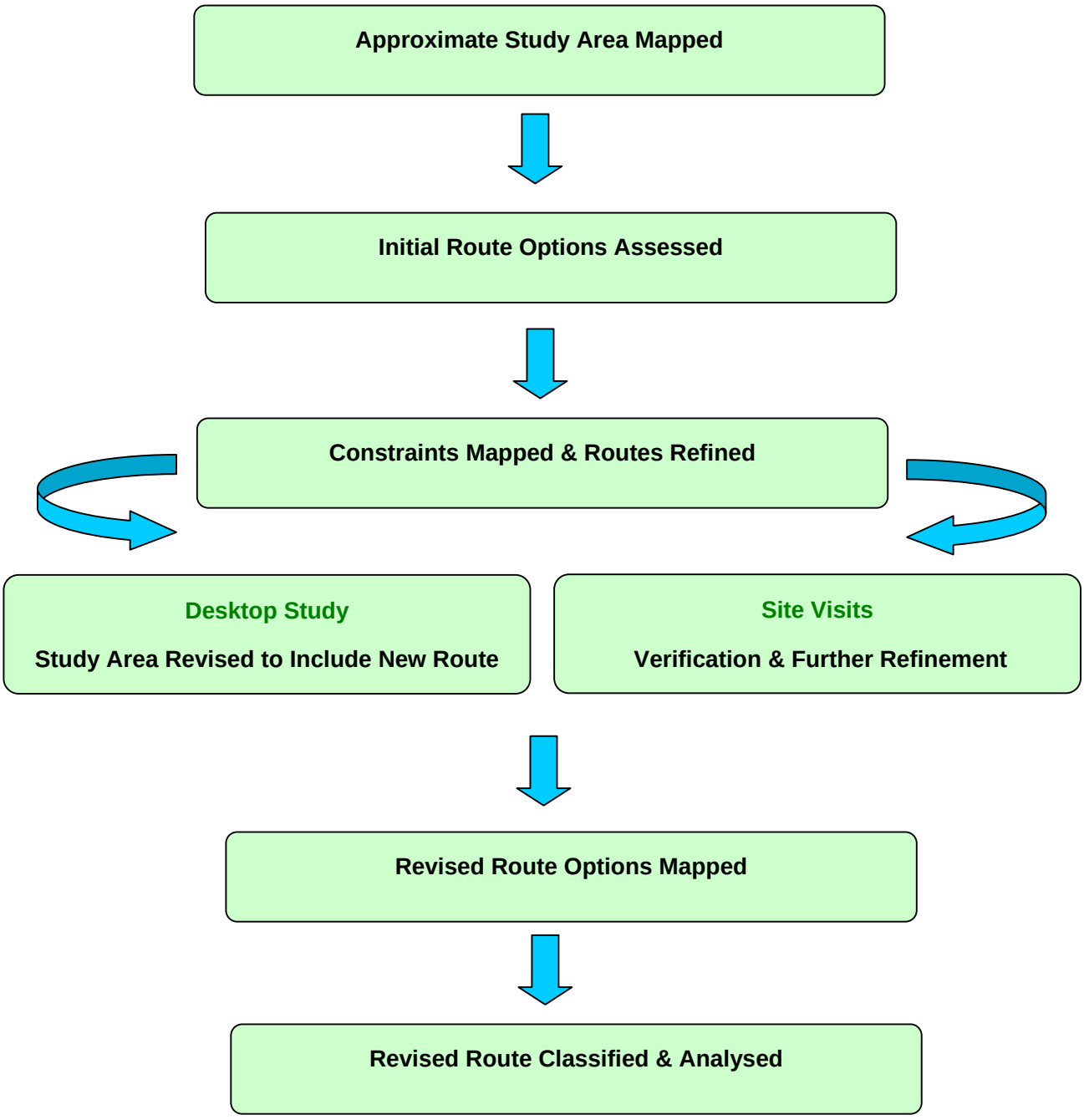


Figure 2.1 Flow Chart of Works Completed

2.3.3 Conclusions

Potential route options were identified from the initial desktop constraints mapping exercise. These route options were identified by the avoidance of major constraints and areas of high population density. The landscape in this area generally has the ability to incorporate such a development with minimal impact on the landscape.

The initial route options were modified after the site visits and when defined crossing points had been established. It should be noted that these potential route options have only been verified by brief site visits and not detailed site investigations.

It is accepted that by the nature of this development, the power line will be visible in the landscape but with careful route selection and mast placement its impact can be reduced. The landscape through which the proposed route would pass is generally of a high quality where landscape character and visual amenity are potentially sensitive to change from a development of this nature. In the western side of the study area, where there is a vulnerable landscape and considered of very high sensitivity, the route option was rerouted west to avoid this area. In addition an initial route option to the east of the study area was avoided due to the presence of a large number of one off buildings. Higher ground was avoided to ensure that masts and lines are not seen on the skyline.

There are a number of dwellings along the roads along with substantial farm buildings throughout the study areas; potential routes were chosen to avoid these. In addition route options were modified to ensure an adequate distance from schools and playing pitches was achieved.

This Constraints Report concludes that there are currently various options for the siting of overhead line routes. However the following is a list of impacts, which will have an effect on the final line route selection:

- Crossing points are limited in some areas; and
- Projected population growth will continue to impact on route selection at road crossings.

It is assumed that the proposed route options will not be interfered with by the following:

- Major developments not known at this time including, major road developments, gas pipelines etc;
- Additional areas designated as SAC's, NHA's or SPA's;
- Additional archaeological sites or monuments added to the existing listings;
- Additional scenic views or vulnerable landscapes added by the local authorities; and

- Additional planning restrictions on routeings close or adjacent to designated areas of protection etc.

3 PROJECT DESCRIPTION

3.1 SITE LOCATION

The proposed electricity transmission line will run in a north-south direction from the existing Woodland 400kV station, near Dunshauglin, County Meath to the site identified for the new substation in Kingscourt, County Cavan. This covers an area of approximately a 58km stretch by approximately 16km in width. Figure 2.4 & 2.5 “Revised Route Options Studied” in Volume II, indicates 3 potential route options studied, in general terms.

Within this area, 3 potential route options have been proposed. These route options are only indicative at this stage, they are designed to represent the western (Route 1), central-western (Route 2) and eastern (Route 3) routes. Variations and combinations of these are considered when choosing the final route, which will be submitted for planning. In choosing these route options, several factors have been taken into account, in order to identify the most feasible routes:

- Distance to populated places;
- Good access;
- Environmental Impact;
- Visual Impact;
- Geology and soils;
- Crossings with other existing infrastructure;
- Topography;
- Protected or restricted areas;
- Landuse;
- Technical & Economic Basis; and
- Cultural Heritage.

The three general route options are referred to in this report as:

Route Option 1 runs to the western part of the study area, staying to the west of the towns of Trim, Athboy and Kells and approximately 5km north of the town of Ballivor and approximately 1km east of the town of Mullagh.

Route Option 2 runs between the central and western section of the study area, staying to the east of the town of Trim and Athboy, west of the town of Kells and then runs parallel to Route Option 1, running approximately 2.5km to the east of the town of Mullagh

Route Option 3 follows Route Option 2 initially before running in a due north direction, running to the west of the town of Navan and to the east of the town of Kells. Approximately 6km north of the N3, this route option splits into two options 3A and 3B, before joining together west of Whitewood Lough.

Refer to Figure 2.4 & 2.5 “Revised Route Options Studied” Volume II and Figure 2.6 for ‘Combined Constraints Mapping’ Volume II.

As part of a related project, the Interconnector Project with Northern Ireland, a new substation site is required in the vicinity of Kingscourt, County Cavan. At present, only an approximate area with potential sites for this substation is known. When a final site is determined for Kingscourt substation, the detailed route for the remainder of the Kingscourt line will be finalised.

3.2 PROJECT DESCRIPTION

The main purpose of this project is the re-enforcement of the electricity grid in the northeast, and linking with the interconnection project in Northern Ireland. This upgrade is designed to strengthen the power system infrastructure, improving the security and quality of supply for existing customers. It also ensures that existing industries are given a major boost when competing for business and inward development in the area.

The entire project will be composed of:

- Approximately 58km of 400kV Overhead Transmission Line between Woodland Station (near Dunshaughlin, County Meath) and the site identified for the new substation of Kingscourt (County Meath);

- A new 400kV line bay in Woodland Station, and associated civil, SCADA, control wiring and protection works;
- A new 220/400kV Station near Kingscourt, as part of the Interconnector Project.

3.3 STRUCTURES TO BE USED

In the design of this overhead line, latticed towers with a cold forming manufacture process will be used. For this project, a new efficient and optimal design of towers has been developed. The main feature of these towers is the reduced visual impact due to a lower number of members in the structure, compared with old designs used in previous power lines.

A drawing of a typical suspension tower to be used, with indicative dimensions, is shown in Figure 3.1.

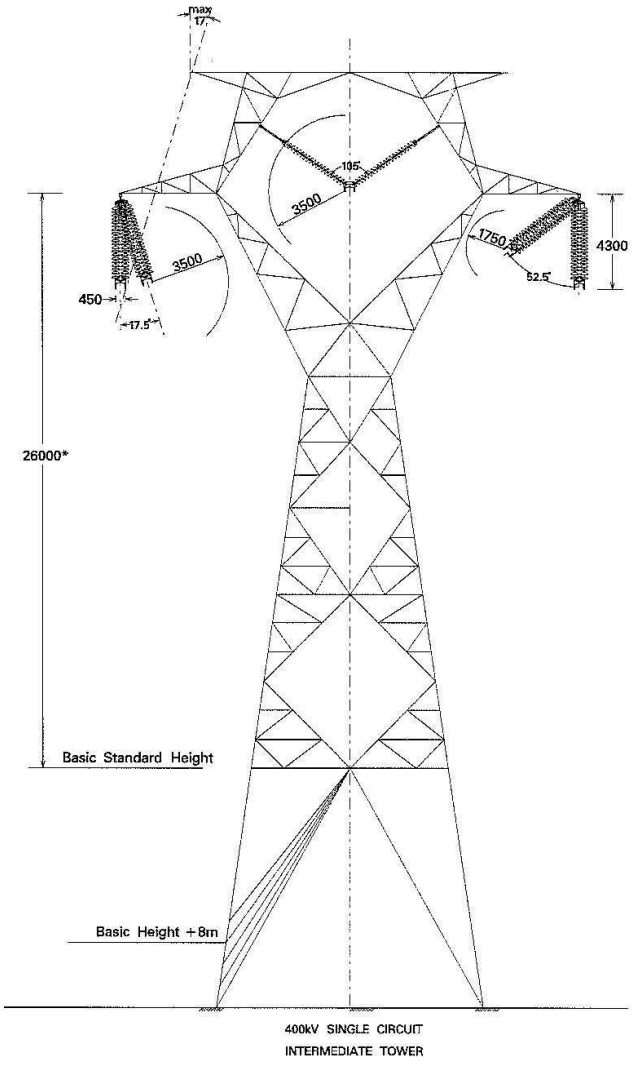


Figure 3.1 Drawing of a typical suspension tower

4 STRATEGIC PLANNING ISSUES

4.1 INTRODUCTION

When planning and designing new infrastructures for electric power transmission, a great number of issues need to be considered, including the various designs and technical options which are discussed in this chapter, and the impact that the new infrastructure will have in the terrain, environment, cultural heritage, population or economy.

4.2 PROJECT NEEDS

The corridor from Dublin to the North East is a key strategic corridor. Additionally, the National Spatial Strategy (NSS) has recognised Drogheda and Navan as part of the Dublin hinterland, and has designated Dundalk as a gateway and Cavan and Monaghan as hubs. The area is well served by updated road and rail infrastructure and by the gas network. It is clear that the area will continue to see strong economic growth and therefore there will be an increase in electricity demand. It is also the main conduit for power flows to and from Northern Ireland, which can be expected to increase following the construction of the additional North-South Interconnector.

Recently completed studies have shown that as a result of increasing demand for electricity, if one of the existing high voltage lines in the area is out of service due to maintenance and a fault occurs on another line, the remaining lines will be overloaded and this may lead to widespread power cuts in the area, with resultant loss of electricity supply to customers. With the present network, it will not be possible to maintain a good quality and reliable electricity supply into the future. Consequently it will be very difficult to attract inward investment and development.

In addition, the combination of this power line will facilitate greater power flows to and from Northern Ireland, allowing greater competition in the electricity market.

4.3 STRATEGIC OPTIONS

When such a need has been detected, several options can be taken into consideration in order to cover and manage the demand of energy in the area:

- Control demand and energy conservation programmes: by means of using more efficient processes and devices in industries and domestic dwellings, and trying to change the behaviour of energy consumers to a more responsible one. This option may not be the norm in high dynamic areas where the economic activities and investment are expanding;
- Provide additional and alternative generation where it is demanded: this is a good option in terms of stability of the electric system, but unfortunately, it is not always possible to install new generation units where the demand is increasing, due to site issues, fuel availability, etc;
- Transmit fuel (gas) rather than power: the underground infrastructures required for this option experience the same problems of costs, maintenance and impacts as underground power lines, as discussed in Section 4.5.

4.4 SUPPLY OPTIONS

Transmission lines using high voltages (220kV or 400kV), is the option that is normally considered all over the world to carry great amounts of electric power. The other option is to carry high currents at lower voltages, but the disadvantages of this option is the great size of the conductors needed, and the high values of power losses and voltage drops. For all these reasons, transmission at high voltages is the option more commonly used.

To calculate the power transmitted (MW) in a three-phase system, the following expression is used:

$$\sqrt{3} \cdot U \cdot I \cdot \cos\phi$$

Where:

U	Operation Voltage (kV)
I	Current transmitted (A)
cos ϕ	Power factor

In the other hand, power losses can be calculated as follows:

$$3 \cdot R \cdot I^2$$

Where:

R	Resistance of the conductors (Ohms)
I	Current transmitted (A)

For a given amount of power, there are two options of carrying it:

- **High voltage and low current:** the advantage of this is that the size (section) of conductors is not too bulky, and the power losses due to ohmic effects and voltage drops are small. The isolation distances are farther apart, resulting in bigger support structures for the conductors. In high voltage lines, the support structures are bigger compared to low voltage because more distance from the ground is required etc.

- ***Low voltage and high current***: the consequence is that size of conductors needs to be very big and the power losses due to ohmic effects and voltage drops are greater (strong dependence on the square of the electric current), with negative economic and technical effects (infrastructures are more expensive, power losses and a greater voltage drop in the nodes of the grid).

Having established that the transmission of electrical power at high voltages is the option that is most likely to supply future energy needs in the areas specified, this report evaluates a number of route options taking into account the environmental, planning and practical consequence.

4.5 CONNECTION OPTIONS

When a new high voltage power line is planned, there are three main options regarding the nature or configuration of the line:

- Overhead;
- Underground; and
- Submarine Cables (does not apply in this project).

Usually, in projects of long lines running in rural areas, overhead lines are employed, mainly for the following reasons:

- An overhead line can provide a more secure electricity supply than an underground cable, as an overhead line is easier to maintain and repair;
- An underground cable fault can take weeks to repair, as it can be very difficult to locate the position of the fault and the repair process itself is slow;
- If cables are laid under agricultural land or cross-country the trench will have a considerable environmental and agricultural impact. It could also be necessary to maintain permanent access for the heavy machinery needed to facilitate emergency fault repair;
- If cables are laid along existing roadways instead of cross-country, extensive road closures are necessary during the trenching process. After installation high voltage cables cannot be disturbed and this could make it more difficult to undertake road widening or other works;
- Underground high voltage cables can be from 6 to 10 times more expensive than the equivalent overhead line.

4.6 ROUTE OPTIONS

Having concluded that a high voltage overhead line is the optimal option to carry the required amount of power in this project, it becomes necessary to justify the range of options for connection points (point of origin and destination).

Several studies carried out by the Transmission System Operator (TSO), show that in this region the demand for electricity is high. As a consequence, a new upgrade in the area is needed to avoid power cuts in the area in the case of N-2 contingency (two elements out of service). The studies show that the best option to mesh and reinforce the grid in this area, taking into account the future development and the Interconnector Project with Northern Ireland, is to build a new

400kV power line between the existing 400kV substation of Woodland and a new 400 kV substation near Kingscourt, County Cavan, which will be the starting point for the new interconnector.

4.7 DESIGN OPTIONS

This line, between the existing Woodland 400kV station and the future Kingscourt station, will be operated at a 400kV voltage level.

The standards to be used in the construction of this line, will be the following:

- Three-phase single circuit line;
- Cold formed supports, with low visual impact, and heights between 22m and 45m (see Section 3.3), instead of the old designs, which has a large number of members comprising the structure, and therefore results in a higher visual impact;
- Twin aluminium-steel conductors in each phase, 600mm^2 section, type ACSR Curlew, which is the standard conductor for 400kV lines;
- Composite chains for isolating and attaching the conductors to the towers, instead of glass insulators chains used in the past. The advantages of composite chains include easier installation, the lower visual impact and weight, and an improved electromechanical behaviour.

5 SOCIO ECONOMIC

5.1 INTRODUCTION

EirGrid is planning a major reinforcement of the electricity infrastructure in Counties Meath and Cavan, which will improve supplies to all customers in the region. This upgrade is designed to strengthen the power system infrastructure, improving the security and quality of supply for existing customers. It also ensures that existing industries are given a major boost when competing for business and inward development in the area.

Recently completed studies for the region have shown that as a result of increasing demand for electricity, if one of the existing high voltage lines in the area is out of service due to maintenance and a fault occurs on another line, the remaining lines will be overloaded and this may lead to widespread power cuts in the area, with resultant loss of supply to customers. With the present network, it will not be possible to maintain a good quality and reliable electricity supply into the future. Consequently it will be difficult to attract inward investment and development.

This chapter describes the existing planning and socio economic issues with regard to the proposed development. As the study area is quiet large the socio economic and planning impacts of the proposed development are dealt with at county level rather than at a local level.

5.2 METHODOLOGY

A desktop study was carried out in order to examine all relevant information pertaining to planning and socio economic activity in the study area. The relevant national, regional and local planning guidelines were examined along with County Development Plans and Local Area Plans were consulted regarding any planning issues.

Fáilte Ireland tourist literature for Cavan and Meath were examined in relation to tourism amenity in conjunction with websites of relevant tourism sites and amenities for the area. In addition Ordnance Survey maps were used to identify land use and possible amenity sites such as golf courses and walking routes, which may be located within the study area.

5.3 PLANNING

This section will examine the planning and development context of the proposed electricity infrastructure from Woodland, County Meath to Kingscourt in County Cavan. It illustrates that the proposed development is consistent with these plans.

5.3.1 National Planning Guidelines

National Spatial Strategy 2002-2020

The National Spatial Strategy (NSS) is a statutory planning document designed to achieve a better balance of social, economic, physical development and population growth between regions, until 2020. Sustainable development is at the core of the NSS. Its focus is based on people, places and building communities.

Prime considerations relevant to the development of energy infrastructure is the strengthening of the energy networks on an all island basis and in the West, North West, Border and North Eastern areas in particular.

Meath is located in the Great Dublin Region and the Spatial Policy for this Area includes a more efficient Greater Dublin Area and its vital national role should be secured in terms of improved mobility, urban design quality, social mix, international and regional connections.

This strategy states that Cavan will act as a hub given its central location in the border area, its position on the N3 corridor, its strategic position vis-a-vis a large surrounding mainly rural hinterland and the development dynamic it has sustained in recent years. Cavan's' role as a hub will build on its performance as a strategically placed county town as well as its energising role for its wider rural hinterland.

National Development Plan 2007-2013

The National Development Plan (NDP) is a statutory document that is drawn up every six years under the remit of the Department of Finance. This NDP integrates strategic development frameworks for regional development, for rural communities, for all-island co-operation, and for protection of the environment with common economic and social goals.

The NDP states that, the ability of the economy to perform successfully depends critically on the supply of adequate, affordable and environmentally sustainable energy. It also states that security of supply is of paramount importance to ensuring the continued economic development of the country and the spending under this plan will help ensure that objective. The NDP states

that without an expectation and delivery of a secure supply of energy, investment and output of the economy will suffer. Therefore, during the National Development Plan period, there will be significant investment in crucial infrastructure. Ensuring the efficient operation of a competitive energy market will be critical to the success of the economy.

This NDP states that over the period 2005-2010, energy demand is projected to increase by 1.6% per annum. This level of increase can be expected to be maintained to 2013. Within this overall growth figure, annual electricity demand is expected to grow by 3.1%.

White Paper - The Energy Policy Framework 2007 -2020

The White Paper sets out the Government's Energy Policy Framework 2007-2020 to deliver a sustainable energy future for Ireland. The Government's overriding policy is to ensure that energy is consistently available at competitive prices with minimal risk of supply disruption.

The underpinning Strategic goals include:

- Ensuring that electricity supply consistently meets demand;
- Delivering electricity and gas to homes and businesses over efficient, reliable and secure networks; and
- Being prepared for energy supply disruptions.

All of the above goals are consistent with the proposed power line development.

5.3.2 Regional Planning Guidelines

The Minister issued the Regional Planning Guidelines Direction to Regional Authorities in 2003. Using his powers under Section 21(1) of the Planning and Development Act, 2000 the Minister has directed Regional Authorities to make Regional Planning Guidelines (RPG's) for the whole of their regions.

The principle objective of the guidelines is to put in place a broad planning framework for the region and to provide an overall long-term strategy for the making of development and local plans for each of the local authorities in its administrative area. In relation to these regional guidelines, the County of Meath is located in the Greater Dublin Region and the County of Cavan is located in the Border Region.

Regional Planning Guidelines- Greater Dublin Region 2004

The Greater Dublin Area incorporates the Dublin Regional Authority and the Mid East Regional Authority and the geographical area of Dublin City, Fingal, Dun Laoghaire-Rathdown, South Dublin, Kildare, Meath and Wicklow. This documents states that Ireland's continued economic growth has resulted in a marked increase in the consumption of electricity since 1999. In light of its duty to promote security of supply, the Commission for Energy Regulation (CER) has initiated a number of measures to increase generation capacity in Ireland. It is expected that when the network renewal programme is completed, it will deliver considerable improvements in quality and safety in the Distribution Network.

Regional Planning Guidelines-Border Region 2004

The Border Region consists of the counties of Donegal, Sligo, Leitrim, Cavan, Monaghan and Louth. Priorities include the improvement in reliability of supply to the Northwest, Border and North Eastern parts of the country and strategic strengthening of the electricity grid serving particular clusters of employment related demand in peripheral areas.

The upgrading of local and regional electricity network to meet existing and projected demands is seen as a priority for development in County Cavan.

5.3.3 Local Planning Guidelines

Every local authority is obliged under Section 6 of the Planning and Development Act, 2000 to produce a new Development Plan every six years. The Meath and Cavan County Council Development Plans provide a framework for the continued growth and success of the counties during the plan period.

This following local planning guidelines are relevant to this study area:

Cavan

- **Cavan County Development Plan 2003-2009**

The strategy of the County Cavan Development Plan 2003 - 2009 aims towards the achievement of three distinct goals:

  - To facilitate the sustainable economic and social development of the county, through the promotion of a positive climate for economic initiatives in the towns, villages and rural areas;
  - The conservation of the natural and built environment of the county; and
  - The improvement of Cavan's physical infrastructure.

The aim of the plan is to improve Cavan's towns, villages and countryside physically while providing for economic development, so that they become more attractive places for living and working and as places in which to invest, to relax and to spend some leisure time in.

Meath

- **Draft Meath County Development Plan 2007-2013**

Meath County Council are now in the process of reviewing the County Development Plan for the period 2007 – 2013. All policy referred to in this report is taken from the Draft Meath County Development Plan 2007-2013 and its relevant amendments.

Meath County Council states in this development plan that the availability of energy is of critical importance to the continued development and expansion of employment in County Meath. The growth in the national economy has placed strain on the national electricity generating capacity. The ESB National grid, in its Generation Adequacy Report (2003 –2009), has identified significant generation shortfalls as electricity demand continues to grow at approximately 3.5% per annum. The supply of electricity has been opened up to increased competition and new generation plants may connect to the electricity network to transport power from wherever it is produced to where there is a demand for it.

The Planning Authority recognises the essential requirements for electricity production and distribution. The two main energy networks serving Meath are electricity and gas. With increased residential development in the county and a drive for more industrial, commercial and employment generating uses, it will be important to ensure that the capacity of the energy networks is sufficient to meet these demands.

It is the policy of Meath County Council in terms of Energy Networks to support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and projected residential, commercial, industrial and social needs of the County.

It is policy of the Meath County Council in the Draft County Development Plan to facilitate the provision of energy networks in principle. In the assessment of proposed energy network extensions, the following issues will be taken into account by the Planning Authority:

- The development is required in order to facilitate the provision or retention of significant economic or social infrastructure;
- The route proposed has been identified with due consideration for social, environmental and cultural impacts;

- The design is such that it will achieve the least environmental impact consistent with not incurring excessive cost;
- Where impacts are inevitable, mitigation features have been included; and
- Protected and Designated areas – proposed NHA's, SPA's and candidate SAC's, areas of archaeological potential, landscapes of exceptional or high value, international or national importance and high sensitivity, proximity to structures that are listed for preservation, national monuments, etc. have been taken into account.

5.4 EXISTING ENVIRONMENT

This section will examine the existing environment and socio-economic impacts within the study area.

5.4.1 Population

This section will look at the population change over the period 2002-2006 in this region. Population trends give us an indication of the demographic trends and the requirement for electricity in the study area. This information is based on data that has been sourced from the Central Statistics Office (CSO). Table 5.1 below illustrates the population change between 2002-2006, in the State, Leinster, Ulster (part-of) County Meath and County Cavan.

Table 5.1 Population Change 2002-2006*

	2002	2006*	% Change
State	3,917,203	4,234,925	8.1%
Leinster	2,105,579	2,292,939	8.9%
Ulster (part-of)	246,714	266,733	8.1%
Meath	134,005	162,621	21.4%
Cavan	56,546	63,961	13.1%

Source: CSO, 2006 *Preliminary Report

The figures in Table 5.1 illustrates that population has undergone an increase in both Counties Meath and Cavan. The population increase in Meath (21.4%) and Cavan (13.1%) are significantly higher than the national average (8.1%). 54% of the national population live in Leinster and 6% live in Ulster (part-of), 7% of Leinster's population live in Meath and 24% of Ulster's (part-of) population live in County Cavan.

Settlement locations within the study area include the towns and villages of Athboy, Dunshaughlin, Kells, Navan, Nobber, Moynalty, Mullagh and Trim. There is also a high density of one-off buildings within the study area.

The settlement structure in Cavan according to its County Development Plan is one that is comprised predominantly of individual rural housing, a well distributed pattern of towns and villages throughout the county but with low population levels, a weak urban hierarchy of main towns dominated by Cavan town, a continuing demand for urban generated housing around the main towns and a sparsely populated western area.

In Meath urban areas are rapidly growing, particularly in southern and eastern areas due to proximity to the Dublin metropolitan area and the Dublin – Belfast transport corridor. One off buildings in rural areas is also an increasing trend and is more prevalent in the west and northwest of the county in recent years. This population increase in Meath is nearly three times the national average. This increase in population puts further pressure on the existing electricity infrastructure in the region.

Meath has had unprecedented growth within the residential sector, however the employment sector and economic development generally has remained low, and it is unable to keep pace with the increases in residential population. The improvements proposed for the electrical infrastructure will improve the already existing infrastructure and will better place the region in achieving economic development. It will improve supplies to all customers in this region. In addition, the combination of this line together will facilitate greater power flows to and from Northern Ireland, allowing greater competition in the electricity market.

The predominance of one off buildings and ribbon development in the region will affect the positioning of the electricity transmission line. It is the Policy of Meath County Council in relation to transmission lines in its Draft County Development Plan ‘to ensure that the development of high tension power lines will be restricted, and that new high tension lines will not be permitted adjoining existing dwellings, except where no other alternative can be shown to exist’. Where feasible power-lines will be erected at a distance of 50m from dwellings. This will ensure that this development will have no Health and Safety risks.

5.4.2 Landuse

Landuse in Cavan is rural and agricultural in nature. The county is characterised by drumlin countryside dotted with many lakes and small hills. The northwest area of the county is particularly sparsely populated and mountainous. The towns and villages of the county are distinctive centres that provide for various employment, service and social needs.

In Meath agriculture, particularly pasture is the predominant landuse spread evenly throughout lowland areas of the county. A mixture of large-scale commercial farms and stud farms adjacent or linked to historic demesne landscapes are particularly evident in the south and east of Meath, with smaller-scale, mixed-use farmland in upland areas and the rolling drumlin landscape of the north and west.

According to the Agricultural Census data in 2000, 71% of the landuse in Cavan is devoted to farming while in Meath agricultural landuse is 77%. There are a total of 5,485 farms in Cavan and 4,463 in Meath. The size of farms in Cavan are predominately under 50 hectares. This is similar for County Meath however they do have 320 farms that are over 100 hectares indicating large-scale farming activity.

5.4.3 Tourism and Amenities

According to Fáilte Ireland there were approximately 246,000 people employed in the tourism sector in 2005. About 30% of these (74,000 jobs) were in the Border, Midland and Western region. Meath is located in the Midlands East tourist region and Cavan is located in the North West tourist region. The latest available statistics from Fáilte Ireland are for the year ending December 2005. According to these statistics approximately 6.8 million overseas visitors arrived in Ireland in 2005 generating total revenue of €3.5 billion. The peak period for overseas visitors to Ireland in 2005 was October to December accounting for 22% of all visits, with the least number of visitors in April accounting for only 8%, (Fáilte Ireland, Tourism Facts, 2005).

Table 5.2 Overseas Tourism to Meath and Cavan, 2005

	Britain (000s)	Europe (000s)	N. America (000s)	Other (000s)	Total (000s)	Revenue (m)
No. Of Visitors-Ireland	3,640	1,903	937	284	6,763	3,486.8
Meath	66	29	18	4	117	34
Cavan	64	8	15	4	91	36

Source: Failte Ireland, 2006

Table 5.2 above shows that there were approximately 117,000 overseas visitors to Meath in 2005 and 91,000 overseas visitors to Cavan and they generated a total revenue of €70 million.

Cavan

The rivers and lakes of the county, including Lough Oughter, are of particular scenic and amenity value. They offer a significant resource in terms of angling for both overseas and domestic visitors. Other attractions in Cavan include the Shannon-Erne Waterway, the forest parks, historic and archaeological remains and sports and leisure facilities. The current Cavan County Development Plan states that:

- With regard to **Scenic Views**, it is the policy of the Planning Authority in the current Cavan County Development Plan to restrict development that would obstruct views and to minimise visual intrusion by only permitting compatible uses;
- With regard to **Scenic Routes** it is the policy of the Planning Authority to restrict development that would obstruct or significantly detract from the views of high scenic value from these designated scenic routes;
- With regard to **Riverside Amenity Areas** it is the policy of the Planning Authority to regulate all development on lands adjoining these rivers in order to maintain their amenity value;
- With regard to **Lakeside Amenity Areas** the Planning Authority policy is to regulate development of adjoining lands to ensure that public use is not prejudiced by incompatible use or adverse visual impacts;
- With regard to **Major Lakes and Lake Environs** the Planning Authority policy is to regulate all development that would detract from public use and enjoyment of these areas.

The most important/sensitive views were found to be, to and from the Hill of Tara, the Church at Skryne and panoramic views from The People's Park at Kells.

There are no riverside or lakeside amenity areas located within the study area. There are also no major lakes and lake environs. Dunaree Forest Park is located just 1km north of Kingscourt and is located within the study area.

Meath

Meath has a large number of visitor attractions, the most famous being the Brú na Bóinne Visitor Centre which incorporates the internationally recognised megalithic tombs and passage graves at Newgrange, Knowth and Dowth. In marketing terms, Newgrange, Trim Castle and Tara have the highest profile in both the domestic and overseas markets and are very popular destination for day trips by tourists staying in Dublin. Apart from the Boyne Valley there are a number of high quality visitor attractions based on the county's archaeological and historical heritage. These include the Trim Visitor Centre and Kells Heritage Centre. Both Trim and Kells are designated

heritage towns. Loughcrew, the Royal site of Tara, Tailteann, the Hill of Ward, Christian sites at Slane, Donaghmore, Killeen, Dunsany and Duleek, monastic ruins at Bective and Trim, great 16th and 17th Century stately houses and eight prestigious gardens throughout the county all bear testimony to Meath's rich historic past.

The objective listed in the Meath County Development Plan with regard to Landscape and Views is 'to protect areas of recognised landscape importance and significant landscape views from construction of large-scale visually intrusive energy transmission infrastructure. In such circumstances it is an objective to seek alternative routing or transmission methods'.

The views within the study area include panoramic views from the Hill of Tara and from the People's Park in Kells, views of and from Skryne Church, views of Slane, views of the County Cavan hills and a number of localised short distance views.

Walking Routes and Cycle Routes

A number of Waymarked Paths and Cycle Routes traversing the study area are also marked on the 'Tourist Attractions Map' of the Meath Landscape Character Assessment that accompanies the Draft Meath County Development Plan 2007-2013 (Refer to Appendix 6.3)

The marked routes run from Drogheda to Navan, further south from there to the Hill of Tara and westwards towards Trim. The routes continue northwards to Athboy and Kells and further northeast from there towards Ardee in County Louth.

There are no policies with regard to Existing Waymarked Paths and Cycle Routes in the Draft Meath County Development Plan 2007-2013.

It is policy of Cavan County Council with regard to Walking Routes to ensure that these routes are neither obstructed nor prejudiced by unsympathetic developments. Cavan County Council has designated three walking routes but these are not located within the study area.

Golf Courses

Golf is a popular activity for tourists and locals alike and there are approximately seven golf courses within the study area and are these are listed in Table 5.3 below.

Table 5.3 Golf Courses within the study area

Name	Location	Type of Course
Glebe Golf Club	1.5km East of Trim	18-Hole Golf Course
Black Bush Golf Club	1.5km West of Dunshaughlin	18-Hole Golf Course
Knightsbrook Golf Club	Trim Town	18-Hole Golf Course
County Meath Golf Club	1.5km Southwest of Trim	18-Hole Golf Course
Headfort Golf Club	1km East of Kells	36-Hole Golf Course
Royal Tara Golf Club	Bellinter 8km South of Navan	27-Hole Golf Course
Navan Golf Club	Navan	18-Hole Golf Course

Airfields

It can be seen from OS mapping that three airfields are located within the study area. Trim airfield is located approximately 4km northwest of Trim and has one grass runway that is 560m long.

5.4.4 Health and Safety

Public exposure to Electric Magnetic Fields (EMF) is regulated by a variety of voluntary and legal limits. The most important of these are international guidelines drafted by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) together with various national safety standards. Guidelines are designed to avoid all identified hazards, from short and long term exposure, with a large margin of safety incorporated into the limit values. Actual exposure levels are nearly always far below recommended limits.

Emissions from the power lines will comply with these 1998 ICNIRP guidelines and the European Council recommendation 1999/519/EC at the edge of the wayleave. Outside the wayleave the development will not impact on dwellings. Refer to Figure 5.1 ‘Commercial and Residential Building Locations’ Volume II.

5.5 PREDICTED IMPACTS

5.5.1 Population

The predominance of urban development, one off housing and ribbon development in the region will affect the positioning of the electricity transmission line. Where feasible power lines will be erected at a distance of 50m from dwellings.

5.5.2 Landuse

The relatively large number of farms in Meath and Cavan will result in a large number of farmers who may be affected by the proposed development. However there will be a small loss of both productivity and production to agriculture as a result of the proposed power line development.

5.5.3 Tourism and Amenities

This development will strive to have a negligible impact on the tourist industry in the region. It will avoid where possible scenic routes and designated scenic areas. The proposed development will not impact on golf courses in the study area. Prospects and Views are outlined in detail in Chapter 6.6. Impacts on walking routes and cycling routes are assessed in more detail in Section 5.6 of this chapter.

5.5.4 Health and Safety

Where feasible the proposed power line routes will be located at a minimum distance of 50m from residences ensuring that there will be no impact from EMF (See Figure 5.1 ‘Commercial and Residential Building Locations’, Volume II).

5.5.5 Construction and Operational Phase

Employment will be created by the construction of this development. Materials such as concrete and other standard materials will be sourced locally where possible. Other more specialised materials such as the transformer, substation switchgear, tower steel, conductors, insulators and other line hardware will be sourced outside the study area. Once operational, routine maintenance of the line will be required.

5.6 EVALUATION OF ROUTE OPTIONS AND CONCLUSION

The 3 route options are compared below. Table 5-3 below provides details on the number of buildings located within 65 metres of the proposed power line routes and table 5-4 provides details of the number of buildings within 80 metres of the proposed power lines. These values are based on the assumption that that the GeoDirectory point is in the centre of each building, and use a measurement from the route centre line.

This gives an approximate idea of the number of buildings that are in the vicinity of the proposed route, not the number that would be directly impacted by the power line. As this is a desktop study it is impossible to know what the exact extent of each building is, so we can only identify how many buildings are in the vicinity of the power line. The precise distance of each building from the edge of the power line will be investigated in the EIS.

Buildings that are both Residential and Commercial (e.g. a shop with house upstairs) are classified as Residential. "Unknown" buildings have not had a use defined yet. These may be sites where building is in progress or a planning application has been approved but no structure exists yet. It should be noted that the chosen route would be revised when a more detailed study is carried out to stay as far away from buildings as is feasible. Upon closer inspection of the areas where the routes pass within 65m of buildings it is apparent that many of the buildings can be avoided entirely with only minor adjustments to the route line.

Table 5.4 Number Of Buildings within 65m of the Route Centreline

Route	**No. Of Buildings within 65m of the Route Centreline**			
	Residential	Commercial	Unknown	Total
Route 1	5	0	1	6
Route 2	2	0	0	2
Route 3A	2	0	0	2
Route 3B	2	0	0	2

Table 5.5 Number Of Buildings within 80m of the Route Centreline

Route	No. Of Buildings within 80m of the Route Centreline			
	Residential	Commercial	Unknown	Total
Route 1	11	0	2	13
Route 2	3	0	0	3
Route 3A	5	1	1	7
Route 3B	6	1	1	8

Positive Points about Route Option 1:

- This route option crosses Existing Driving Route, Waymarked Paths and Cycle Routes crossings three times compared to four by each of the other options.

Negative Points about Route Option 1:

- This route option has the highest number of buildings in the vicinity with six buildings located within 65m and thirteen within 80m.

Positive Points about Route Option 2:

- This route impacts has the lowest number of buildings in the vicinity in comparison to the other routes with two buildings located within 65m and three within 80m.

Negative Points about Route Option 2:

- This route option crosses Existing Driving Route, Waymarked Paths and Cycle Routes crossings four times.

Positive Points about Route Option 3A:

- This route has fewer buildings in the vicinity than the corresponding route 3B. Seven buildings are within 80m of 3A while eight buildings are located within 80m of 3B.

Negative Points about Route Option 3A:

- This route option crosses Existing Driving Route, Waymarked Paths and Cycle Routes crossings four times.

Positive Points about Route Option 3B:

- This route option only has two buildings within 65m of the route centreline compared to 6 for Route Option 1.

Negative Points about Route Option 3B:

- This route option crosses Existing Driving Routes Waymarked Paths and Cycle Routes four times;
- This route has more buildings in the vicinity than the corresponding Route 3A. Seven buildings are within 80m of 3A while eight buildings are located within 80m of 3B.

The Regional Planning Guidelines for the Greater Dublin Region 2004 state “It is expected that when the network renewal programme is completed, it will deliver considerable improvements in quality and safety in the Distribution Network”. While the Regional Planning Guidelines for the Border Region 2004 state that “The upgrading of local and regional electricity network to meet existing and projected demands is seen as a priority for development in County Cavan”.

6 LANDSCAPE

6.1 INTRODUCTION

This chapter of the constraints report describes the existing visual and landscape constraints to the design of the proposed Kingscourt to Woodland EirGrid power line, within the defined study area. This includes the mapping of any designated areas, mapping of the landscape character and landuse within the study area. It also includes a listing of important views and of sensitive receptors to the construction of a power line. Due to the size of the study area this assessment was carried out as a desktop study only.

6.2 METHODOLOGY

6.2.1 Desktop Study

A desktop study of the Draft Meath County Development Plan 2007-2013 and the County Cavan Development Plan 2003-2009 including additional key relevant published literature was carried out. Key landscape characteristics such as vegetation, major and minor ridgelines, land uses, designations and settlement areas were mapped. This was carried out using Ordnance Survey 1:50,000 mapping.

6.2.2 Site visit

A visual survey was not carried out at this stage.

6.3 EXISTING ENVIRONMENT

6.3.1 Designations

A number of designations relating to landscape and visual constraints are listed in the Draft Meath County Development Plan 2007-2013 and the County Cavan Development Plan 2003-2009.

These are listed below:

County Meath:

Key Viewpoints

A number of Key Viewpoints are indicated within the study area on the Visual Amenity Map of the Meath Landscape Character Assessment, which accompanies the Draft Meath County Development Plan 2007-2013. Refer to "Visual Amenity Map" in Appendix 6.1.

The views listed include panoramic views from the Hill of Tara and from the People's Park in Kells, views of and from Skryne Church, views of Slane, views of the County Cavan hills and a number of localised short distance views. The direction and arc of the views are indicated on the above-mentioned "Visual Amenity Map" in Appendix 6.1.

There are a number of policies with regard to the visual character of County Meath in the Draft Meath County Development Plan 2007-2013 (Chapter 8.4.2, Page 315):

Strategic Policy: Heritage SP1 - 'To protect the physical landscape and visual character of the County.'

Policy: HER POL 83 – 'To provide adequate protection of views and vistas that contribute to the appreciation of landscape character.'

Policy: HER POL 84 – 'To maintain scenic vistas and panoramic views from key vantage points and towards key landmarks and features within the landscape.'

Policy: HER POL 85 – 'To maintain the visual integrity of sensitive and exceptional – high value areas.'

Policy: HER POL 87 – 'To protect and enhance the visual qualities of rural areas through the sensitive design of necessary development.'

Landmarks

Eighteen Landmarks are indicated within the study area on the Landmarks Map of the Meath Landscape Character Assessment, which accompanies the Draft Meath County Development Plan 2007-2013. Refer to "Landmarks Map" in Appendix 6.2.

These include the Hill of Tara, Skryne Church, Slane Castle, the Hill of Slane, the People's Park Lighthouse (Tower of Lloyd), Trim Castle, a number of other castles and Copses and other features.

Policy: HER POL 84 of the Draft Meath County Development Plan 2007-2013 (Chapter 8.4.2, Page 315) mentions the policy regarding landmarks as follows – 'To maintain scenic vistas and panoramic views from key vantage points and towards key landmarks and features within the landscape.'

Existing Driving Routes

The Tourist Attractions Map of the Meath Landscape Character Assessment, which accompanies the Draft Meath County Development Plan 2007-2013, shows two Existing Driving Routes within the study area. Refer to "Tourist Attractions Map" in the Appendix 6.3.

One route follows the N3 from the county boundary in the southeast, northwards turning west at the Hill of Tara and continuing towards Trim, Athboy and finally Kells. The second route traverses the study area from east to west, from Drogheda, through Navan to Kells and further west from there.

There are no policies with regard to Existing Driving Routes in the Draft Meath County Development Plan 2007-2013.

Existing Waymarked Paths and Cycle Routes

A number of Waymarked Paths and Cycle Routes traversing the study area are also marked on the Tourist Attractions Map of the Meath Landscape Character Assessment. Refer to Appendix 6.3.

The marked routes run from Drogheda to Navan, further south from there to the Hill of Tara and westwards towards Trim. The routes continue northwards to Athboy and Kells and further northeast from there towards Ardee in County Louth.

There are no policies with regard to Existing Waymarked Paths and Cycle Routes in the Draft Meath County Development Plan 2007-2013.

Indicative Routes for Potential Footpaths and Cycle Routes

One potential route for footpaths and Cycle Routes, located within the study area, is indicated on the Tourist Attractions Map of the Meath Landscape Character Assessment. Refer to Appendix 6.3.

This potential route would leave Navan in a northwestern direction towards Kells and continue further northwest from there.

Policy: ED POL 46 of the Draft Meath County Development Plan 2007-2013 (Economic Development, Chapter 3.3.11, Page 97) mentions proposed Walking and Cycle Routes as follows – 'To facilitate the development of a series of walkways and cycleways including signposting.'

County Cavan

Scenic Viewing Points

One scenic view relevant to the study area is listed in the County Cavan Development Plan 2003-2009. The actual viewpoint location is outside of the study area, SV 8 – Lochinleigh Gap (Schedule 2 (b), Page 70) but has a visual impact on the study area.

The description/policy with regard to Scenic Viewing Point 8 in the County Cavan Development Plan is as follows: 'Eastwest view from elevated summit of County Road (619) at crest of Cornaseus. The views are panoramic and long-distance. Restrict development that would prejudice the development of a viewing park or obstruct views and regulate development to minimise intrusions.'

6.3.2 Landscape Character

The Meath Landscape Character Assessment, which accompanies the Draft Meath County Development Plan 2007-2013 divides County Meath into **4 Landscape Character Types** and further into **20 geographically specific landscape character areas**.

The current County Cavan Development Plan does not include a countywide landscape character assessment. However, the Plan lists the Lockinleigh Mountain as a "High Landscape Area" (HL3, Schedule 2(a), Page 69) part of which is located in the very northwestern corner of the study area.

County Meath

Landscape Character Types (LCT)

The study area falls within three of the four character types, namely **River Corridors and Estuaries, Lowland Landscapes and Hills and Upland Areas**. The general recommendations for the three-affected LCT include the following, which are relevant to this study area:

Hills and Upland Areas

- To have due regard to the positive contribution that views across adjacent lowland areas and landmarks within the landscape make to the overall landscape character;
- To respect the remote character and existing low-density development in these LCTs.

Lowland Landscapes

- Preserve views of upland areas that contain the lowlands e.g. Loughcrew, Tara and Skryne.

River Corridors and Estuaries

- To recognise the importance of river corridors for scenic value, recreation, ecology, history and culture;
- To preserve historic features and their landscape settings;
- To maintain attractive and unspoilt open views particularly along estuaries where the interface between river corridors and the coast creates very attractive landscapes;
- To further define popular tourist routes such as the Brú Na Bóinne drive and create links with new routes to additional areas of interest. Vehicular and pedestrian routes should be developed in tandem.

Landscape Character Areas

Within the three relevant landscape character types, the study area covers 14 of the 20 character areas. The 14 relevant character areas range in sensitivity from low to high, and from low to exceptional. The most valuable and sensitive character areas within the study area are the Boyne Valley Character Area and the Tara-Skryne Area. The descriptions of each of the Landscape Character Types are followed by a list of recommendations, some of which are in regard to landscape and visual aspects. It was not found necessary to list all these recommendations, as they are covered by the recommendations listed for the Landscape Character Types above and by the constraints mapping.

Landscape Capacity

The Meath Landscape Character Assessment rates the capacity of each of the character areas to accommodate different types of development, including overhead cables, substations and masts. Refer to the Landscape Capacity Map of the “Meath Landscape Character Assessment”, in Appendix 6.4.

Seven of the 14 character areas within the study area, are rated to have a low capacity to accommodate power lines and four are rated to have medium capacity. The two remaining character areas are rated to have varying capacities to accommodate power lines in different locations within the areas. Therefore one area ranges from low to high capacity and one from low to medium, depending on the location within the character area.

The likely characteristics and impacts on landscape character of the 'overhead cables, substations and communications masts' development type are described as follows in Chapter 5, Landscape Trends, Capacity to accommodate change, of the Landscape Character Assessment. 'Overhead cables, substations and masts are generally large and prominent features. Their impact on landscape character will be determined by their visual prominence and size as well as their location in sensitive landscapes such as archaeologically rich landscapes or areas within scenic views. The convergence of a number of overhead cables or the massing of a large substation, or number of masts will adversely affect landscape character to some extent, depending on the sensitivity of the landscape in question.'

County Cavan

Lockinleigh Mountain High Landscape Area (HL3, Schedule 2(a), Page 69)

The description/policy with regard to the Lockinleigh Mountain High Landscape Area in the County Cavan Development Plan is as follows. 'An area of upland hill country between Bailieborough and Kingscourt with open unenclosed landscape above approximately 240 metres. The area is used for hill walking recreation. The landscape is fragile and sensitive to unsympathetic development. Uses generally unrelated to established agricultural and forestry activity will be regulated to ensure the scenic amenity value is not prejudiced. The further erection of masts will be regulated to ensure that there will be no further diminution of the visual character of the area.'

6.3.3 Land Use

The Landuse Map of the Meath Landscape Character Assessment (Refer to Appendix 6.5) shows that the vast majority of the landuse within the study area is agriculture. Apart from that there are small patches of Urban Settlement, Broad Leaved Woodland, Coniferous Forest, Mineral Extraction and Landfill, Mixed Woodland, Natural Grassland, Peat Bogs and Transitional Woodland Scrub.

There are no descriptions of landuse in the County Cavan Development Plan. For the purpose of this report it is assumed that the landuse within the small part of the study area covering County Cavan would be similar to the use described above for County Meath – generally agriculture.

6.3.4 Important views / Sensitive Receptors

The following is a list of the locations/areas with the most sensitive receptors:

- Private Properties (including residential properties, hotels, golf courses etc.);
- Public Properties (e.g. schools, parks);
- Roads (national, regional, county and local roads);
- Footpaths/Walking Routes; and
- Lakes/Rivers (also designated as vulnerable in the Development Plan).

Refer to Section 6.4.4 for impacts of the above.

6.4 POTENTIAL IMPACTS AND IDENTIFICATION OF CONSTRAINTS

This chapter is to be read in conjunction with the Figures 6.1 “Visual Impact Map”, Volume II and Figure 6.2 “Landscape Sensitivity to Power lines”, Volume II.

6.4.1 Potential Impact on Designations

Constraints in Relation to Key Viewpoints

The constraints for all viewpoints within the study area (Counties Meath and Cavan) were mapped. Apart from a number of exceptions, the views were generally mapped as being of very high sensitivity within 2km of the viewpoint, high sensitivity between 2km and 3km from the viewpoint, medium between 3km and 4km from the viewpoint and as being of low sensitivity for available views beyond 4km. The viewshed/angles of the County Meath views were fixed according to the angle shown and description given on the Visual Amenity Map of the Landscape Character Assessment. (Refer to Appendix 6.1)

For the one relevant view in County Cavan the description of the view given in Schedule 2 (b) of the development plan was used in order to fix the viewshed/angles for the constraints mapping.

Below are a number of recommendations to be followed with regard to each viewpoint-sensitivity rating. It should be noted that where the viewsheds of medium and high sensitivity cannot be avoided, appropriate detailed design might reduce adverse visual impact:

- **Very highly sensitive views** – These areas must be avoided;
- **Highly sensitive views** – These areas should be avoided, if possible;

- **Medium sensitive views** – The power line could be located within these areas, however, the detailed route design must be carried out carefully;
- **Low sensitive views** – The power line can be located within this area but should be designed carefully.

The most important/sensitive views were found to be to and from the Hill of Tara and the Church at Skryne and panoramic views from the People's Park at Kells.

Constraints in Relation to Landmarks

In order to ensure that the potential impact on landmarks is kept to a minimum, it was decided to locate a buffer zone of a 1km radius around these features. These buffer zones are to be avoided, if possible. If this cannot be achieved, a detailed visual survey should be carried out to establish suitable routing of the power line.

Constraints in Relation to Existing Driving Routes

In order to ensure that the potential impact on Existing Driving Routes is kept to a minimum it was decided to locate a buffer zone of 1km on each side of these roads. These buffer zones are to be avoided, if possible. It is however acknowledged that roads cannot be completely avoided and the detailed design in those areas should therefore be carried out carefully.

Constraints in Relation to Existing Waymarked Paths and Cycle Routes

In order to ensure that the potential impact on Existing Waymarked Paths and Cycle Routes is kept to a minimum it was decided to locate a buffer zone of 1km on each side of these routes. These buffer zones are to be avoided, if possible. It is however acknowledged that routes cannot be completely avoided and the detailed design in those areas should therefore be carried out carefully.

Constraints in Relation to Indicative Routes for Potential Footpaths and Cycle Routes

In order to highlight the potential impact on potential Footpaths and Cycle Routes it was decided to locate a buffer zone of 1km on each side of these routes. These buffer zones should be avoided, if possible.

6.4.2 Potential Impact on Landscape Character

County Meath

Constraints in relation to Landscape Character Types/Landscape Character Areas/Landscape Capacity

As described in Section 6.3.2 above the Landscape Capacity Map of the Meath Landscape Character Assessment rates the capacity of each Landscape Character area in County Meath to accommodate power lines.

For the purpose of this report and the constraints mapping, the following recommendations are made:

High Capacity Areas = Areas of low sensitivity to power lines - The power line can be routed through this area but should be designed carefully.

Medium Capacity Areas = Areas of medium sensitivity to power lines - The power line could be routed through these areas, however, the detailed route design must be carried out carefully.

Low Capacity Areas = Areas of high sensitivity to power lines - These areas should be avoided, if possible.

It is acknowledged that the routing through high sensitivity areas cannot be avoided in the case of the proposed power line. The detailed design of those sections of the power line within high sensitivity areas has to be carried out very carefully, in order to make use of any screening vegetation. The length of the power line traversing these areas should be kept to an absolute minimum.

County Cavan

Constraints in relation to the Lockinleigh Mountain High Landscape Area (HL3, Schedule 2(a), Page 69)

This area has not been mapped as it lies partly outside the proposed study area however the mapped constraints for County Cavan "Scenic Viewing Point 8" cover this area. (Refer to Section 6.4.1 above and Figure 6.1 "Landscape Visual Impact Map", Volume II)

6.4.3 Potential Impact on Landuse

Agriculture

Agriculture represents the major landuse within the study area. Generally, it can be said that the sensitivity to power lines of this landscape type is low to medium, as mature hedgerows along the field boundaries have a high potential to screen the power line in many views. Provided that the structures of the power line are located on the boundaries rather than in the middle of the fields the visual and landscape impact of the power line will be low on this landuse.

Broad Leaved Woodland, Coniferous Forest and Mixed Woodland

The landuse of some areas within the study area is described as Broad Leaved Woodland, Coniferous Forest and Mixed Woodland. While these wooded areas would have great potential to screen views of the power line, traversing the woodlands themselves should be avoided, as the required clearing would have a major visual impact.

Transitional Woodland Scrub

The sensitivity to power lines of this landuse type is rated as medium due to some existing tall vegetation. With careful siting the visual impact of the power line can be kept to a minimum.

Natural Grassland, Peat Bogs

The sensitivity to power lines of these two uses is high due to the absence of tall vegetation for screening purposes. Routing of the power line through these areas should be avoided. If this cannot be avoided, the siting of structures should be carried out very carefully in order to avoid/minimise negative visual impact of the power line.

Urban landuse, Mineral Extraction and Landfill

The proposed power line will avoid built up areas, Mineral Extraction and Landfill Areas.

6.4.4 Potential Impact on Important Views/Sensitive Receptors

In order to minimise the potentially high impact on Important Views/Sensitive Receptors the following recommendations should be implemented as much as possible.

Private and Public Properties

Power lines should be kept away from habitable properties as much as possible (minimum distance 50m) and structures should be placed behind screening vegetation, where feasible.

Roads

The number of road crossings, in particular of National and Regional roads, should be kept as low as possible. Where crossings cannot be avoided a good crossing angle (90º) should be achieved. Structures should be kept away from roads and/or should be placed behind screening vegetation where possible.

Footpaths/Walking Routes

Crossing over popular footpaths/walking routes should be avoided, where possible. Where crossings cannot be avoided a good crossing angle (90º) should be achieved. Structures should be kept away from footpaths and/or should be placed behind screening vegetation.

Rivers/Lakes

Crossing over/running nearby rivers/lakes should be avoided, where possible. In order to ensure that the potential impact on the larger rivers and on lakes is kept to a minimum it was decided to locate a **'high sensitivity' buffer zone** around these areas. These buffer zones cover **40m on each side of the rivers** and **200m from the shore of the lakes**. It should be noted that the 'high sensitivity' zone along the rivers refers to the large masts supporting the power line, as it is acknowledged that it would be impossible to avoid all rivers completely, and that they may need to be traversed by the line.

6.5 EVALUATION OF ROUTE OPTIONS AND CONCLUSION

The four route options are compared on Table 6.1 on their potential impact on some of the areas of high sensitivity listed in Section 6.4 above (some of the constraints would require further, more detailed investigation and are therefore not listed in this table, at this stage). Please note that Route Option 3 is split into Option 3A and 3B over a length of approximately 12km. For the purpose of this report Route Options 3A and 3B will be assessed as two separate options, each including the shared parts of Route Option 3.

Table 6.1 Constraints in Each Route Option

Constraint	**Route Option 1**	**Route Option 2**	**Route Option 3A**	**Route Option 3B**
Viewpoints – very high (length of line crossing very highly sensitive viewshed)	-	-	-	-
Viewpoints - high (length of line crossing highly sensitive viewshed)	-	-	-	-
Viewpoints - medium (length of line crossing medium sensitive viewshed)	2.3km	6.2km	-	-
Number of **Existing Driving Route, Waymarked Paths and Cycle Routes crossings**	3	4	4	4
Sensitive Areas – high sensitivity to power lines (length of line crossing areas of high sensitivity)	25.8km	21.0km	20.5km	20.6km
Sensitive Areas – medium – **sensitivity to power lines** (length of line crossing areas of medium sensitivity)	37.9km	38.5km	33km	32.8km
Number of **National Road crossings**	3	3	3	3
Number of **Regional Road crossings**	8	6	4	4
Number of **County Road crossings**	28	30	28	26
Number of (larger) **River crossings**	4	3	2	2

6.5.1 Conclusion

Generally, careful detailed design will be required, in relation to road and river crossings and locations of structures. Below is a summary of the positive and negative points of each route option and recommendations regarding areas requiring particular attention.

Route Option 1

Positive points about Route Option 1

- Very high or high sensitivity viewsheds are not crossed by this route option;
- This route option crosses Existing Driving Route, Waymarked Paths and Cycle Routes crossings three times compared to four by each of the other options.

Negative points about Route Option 1

- This route option traverses a medium sensitivity viewshed for 2.3km;
- This route option traverses an area of high sensitivity to power lines for 25.8km compared to 20.5 km, 20.6 km and 21.0km by the other route options;
- Roads are crossed 39 times.

Recommendation

If Route Option 1 were chosen, the visual impact of the line on the key viewpoints at the People's Park in Kells and the view of the Cavan Mountains would have to be assessed in more detail. Also the impact on areas of high sensitivity to power lines would need to be checked. Minor re-routing of the line in order to make use of screening vegetation may be required.

The locations of river crossings would also have to be checked and masts should be kept away from these rivers as far as possible.

Route Option 2

Positive points about Route Option 2

- Very high or high sensitivity viewsheds are not crossed by this route option.

Negative points about Route Option 2

- This route option traverses a medium sensitivity viewshed for 6.2km.

- This route option traverses an area of high sensitivity to power lines for 21.0km;
- Roads are crossed 39 times.

Recommendation

If Route Option 2 were chosen, the visual impact of the line on the key viewpoints at the People's Park in Kells and the view of the Cavan Mountains would have to be checked in more detail. Also the impact on areas of high sensitivity to power lines would need to be checked. Minor re-routing of the line in order to make use of screening vegetation may be required.

The locations of river crossings would also have to be checked and masts should be kept away from these rivers as far as possible.

Route Option 3A

Positive points about Route Option 3A

- Very high, high or medium sensitivity viewsheds are not crossed by this route option;
- Rivers are only crossed 2 times.

Negative points about Route Option 3A

- This route option traverses an area of high sensitivity to power lines for 20.5km;
- Roads are crossed 35 times.

Recommendation

If Route Option 3A is chosen, the visual impact on areas of high sensitivity to power lines would need to be checked. Minor re-routeing of the line in order to make use of screening vegetation may be required.

Route Option 3B

Positive points about Route Option 3B

- Very high, high or medium sensitivity viewsheds are not crossed by this route option;
- Major rivers are only crossed 2 times.

Negative points about Route Option 3B

- This route option traverses an area of high sensitivity to power lines for 20.6km;
- Roads are crossed 33 times (lowest number of the 4 route options).

Recommendation

If Route Option 3B is chosen, the visual impact on areas of high sensitivity to power lines would need to be checked. Minor re-routeing of the line in order to make use of screening vegetation may be required.

7 ECOLOGY

7.1 INTRODUCTION

This constraints report has been carried out in order to select the ideal route for an electrical grid system running through the counties of Meath and partly in Cavan. The southern end of the route starts at Woodland but at present, the termination point at the northern end of the study area has yet to be decided. Particular attention has been paid to identifying sites designated for nature conservation under European and Irish legislation.

7.2 METHODOLOGY

7.2.1 Designated sites

The National Parks and Wildlife Services (NPWS) database of designated nature conservation areas was reviewed to identify any designated sites lying within five kilometres of the proposed route options. Site synopses for these sites were downloaded from the website www.heritagedata.ie or obtained direct from NPWS if not available online.

7.2.2 Wintering Bird Sites

The publication *'Ireland's Wetlands and their Waterbirds: Status and Distribution'* by O. Crowe, published by Birdwatch Ireland in 2005 gives details of sites where wintering waterfowl are counted. This publication was reviewed to identify sites that are not designated for nature conservation but are regularly used by numbers of birds.

7.2.3 River Systems

A review of literature dealing with the fisheries values of rivers present within the area of the proposed route options was undertaken.

7.2.4 Other Areas of Ecological Value

Other data sources were reviewed to look at the distribution of rare and protected species of flora and fauna. The data sources included the Irish Wildlife Manuals (published by NPWS), and the Irish Red Data Book (Curtis and McGough, 1988).

7.3 EXISTING ENVIRONMENT

7.3.1 Designated sites

Sites can be designated for their nature conservation interest under European and Irish legislation. The three principal forms of designation are as follows:

Special Area of Conservation (SAC)

These are sites that have been designated under the EU Habitats Directive, transposed into Irish law in the European Union (Natural Habitats) Regulations, 1997. The Directive lists (Annex I) certain habitats that must be protected within SAC's. There is also a list (Annex II) of species that must be afforded protection by designation of areas of land as SAC's. Sites are designated as candidate sites (cSAC's) until they have formally been ratified by the Minister.

There are two areas that have designated as cSAC's that lie within the study area:

- River Boyne and River Blackwater; and
- Killyconny Bog.

Special Protection Area (SPA)

The EU Birds Directive came into force in 1979 and it requires each member state to designate "Special Protection Areas" for birds. The Directive contains annexes, which are lists of birds, which require particular conservation measures (Annex I), and also species, which may be hunted, and species, which may be sold. Annex I species include Whooper Swan, Greenland White-fronted Goose, Peregrine Falcon, Corncrake and Terns. Member states are also required to protect sites, which are important for migratory species such as ducks, geese and waders. The Birds Directive has been transposed into Irish law under The European Communities (Natural Habitats) Regulations SI 94/1997 and subsequent amendments. There are no SPA's affected by the proposed routes.

Natural Heritage Areas (NHA)

These are areas that have been designated under Irish legislation, the Wildlife (Amendment) Act 2000. Prior to statutory designation, sites are known as proposed Natural Heritage Areas (pNHA) but are still afforded some level of protection including recognition of their ecological value by planning and licensing authorities.

There are three areas that have been designated as NHA and two pNHA;

- Killyconny Bog NHA (this site is also designated as a cSAC);
- Girley Bog NHA;
- Jamestown Bog NHA;
- Trim wetland pNHA; and
- Doolystown Bog Pnha.

There are six sites designated for nature conservation that lie within five kilometres of the proposed route options, two cSAC's, three NHA's (including one site that is both a cSAC and a NHA) and two pNHA's. Details of the sites, their designations and principal habitats and/or species are given in Appendix 7.1. Figure no 7.1 "Designated Conservation Areas and Wintering Bird Sites, Volume II" shows the location of these sites. Table 7.1 below summarises the sites and their designations present in the study area.

Table 7.1 Site Designations

Site Name and Code	cSAC	NHA	pNHA
River Boyne and River Blackwater (002299)	✓		
Killyconny Bog	✓	✓	
Girley Bog		✓	
Trim Wetland			✓
Jamestown Bog		✓	
Doolystown Bog			✓

The largest designated site is the River Boyne and River Blackwater cSAC. This site comprises the freshwater elements of the rivers Blackwater and Boyne and their tributaries. The rivers that lie within the study for this project are the Blackwater, Boyne, Athboy, Tremblestown and Stonyford (the last three are tributaries of the Boyne). All three of the route options cross this site at least twice.

Alluvial woodland and alkaline fen are the habitats that this site is noted for. The main areas of alkaline fen are concentrated in the vicinity of Lough Shesk, Freehan Lough and Newtown Lough, all lying well to the west of the study area and it appears that none of the proposed routes would impact on this habitat type, although field surveys of the chosen route should be undertaken to

ensure that this is the case. The alluvial woodland occurs along many stretches of the Boyne, field surveys should determine whether the chosen route crosses areas of this habitat.

The other cSAC is Killyconny Bog, which lies on the Meath/Cavan County border, some three kilometres to the west of the northern end of Route Options 1 and 2. It is an area of raised bog, a priority EU habitat. It is unlikely that either of these proposed route options would impact on this site.

The remaining designated sites are all NHA's, either fully designated sites or proposed. None of the proposed route options crosses any of these sites.

7.3.2 Wintering Bird Sites

Five sites that support numbers of waterfowl in the winter period have been identified. Figure no 7.1 "Designated Conservation Areas and Wintering Bird Sites, Volume II" shows the location of these sites. Details of the sites are given in Appendix 7.2.

The main issue with wintering birds is the presence of regular wintering flock of Whooper Swans that use the grassland and arable areas adjacent to the River Blackwater, between Kells and Navan. The tailings pond for Tara mines, just to the north of Navan is a wintering bird site with a strong likelihood that birds may fly between the River Blackwater and the tailings pond. Further consultation with NPWS and the Irish Whooper Swan Study Group would confirm this. The only route option that crosses the Blackwater between Kells and Navan is Route Option 3.

7.3.3 River Systems

The main rivers within the study are the Boyne and Blackwater. As previously mentioned, these are afforded protection as they are designated as a cSAC. Additionally the Boyne is a designated salmon river under the European Communities (Quality of Salmonid Waters) Regulations 1988. This designation aims to protect and improve the quality of fresh waters that support certain species of fish. Specific water quality standards must be maintained and pollution controlled. Ireland is legally required to maintain and improve the water quality of rivers for Salmonid fisheries. The Boyne is regarded as one of the country's premier game fisheries, offering fishing for salmon, seatrout and brown trout.

O'Connor (2006) undertook a survey of the Boyne for the presence of juvenile lampreys. Three species of lamprey are found in Ireland and they are all species listed under the Habitats Directive. O'Connor recorded juvenile lamprey existing throughout the Boyne and the Blackwater. Similarly, Bailey and Rochford (2006) also found signs of otter in both rivers.

7.3.4 Other Areas of Ecological Value

A review of the literature regarding protected species found otter and lamprey to be present in the Rivers Boyne and Blackwater. All species are associated with the main rivers, which are afforded protection as they are designated as part of the River Boyne and River Blackwater cSAC.

Other species that are dependent on wetland areas and are protected under Irish Wildlife legislation (smooth newt and common frog) are also likely to be present and so as a general rule wetland areas are to be avoided or surveyed prior to construction. Areas of scrub should also be avoided, as they may be habitat for badgers, an animal protected under the Irish Wildlife Acts. Analysis of aerial photography would help to identify such areas.

7.4 PREDICTED IMPACTS

Most of the impacts that can be predicted at this stage are associated with the construction phase. Good practice guidelines should be followed to prevent any direct or indirect impacts on the designated sites and in particular the highly sensitive freshwater systems that form part of the River Boyne and River Blackwater cSAC. Each of the route options crosses the cSAC at least twice. Indirect impacts on the riverine systems could include direct pollution through discharge of oils, fuels and other liquids and increase suspended solids in the water through soil disturbance on ground adjacent to the rivers.

The other designated sites are also wetland systems and the same general points during the construction phase apply.

The Blackwater valley, between Kells and Navan supports a well-established wintering population of Whooper Swans. Swans and geese are species that can fly into power lines, particularly during poor weather. They may also be prone to disturbance during construction, if work takes place close to the sites that the swans feed or roost in. It should be noted that the Whooper Swans are only present in this area during the winter period i.e. October to March and any work outside of this period would not cause any disturbance to the Whooper Swan flock.

Direct impacts to designated sites can also occur through direct habitat loss and/or damage. This can occur during the construction through access by construction machinery and also through siting of the pylons, where the footprint of each pylon will take up an area of habitat. Pylons should be sited so as to avoid direct impacts on designated sites.

7.5 EVALUATION OF ROUTE OPTIONS AND CONCLUSION

Route Option 1

This route crosses the River Boyne and River Blackwater cSAC at three separate locations. Two areas designated as NHA and one other cSAC (Killyconny Bog) lie within five kilometres of this route also two Wintering Bird Sites lie in close proximity. This route has no impact on the Whooper Swan flock that winters between Kells and Navan.

Route Option 2

This route crosses the River Boyne and River Blackwater cSAC at two separate locations and lies within three kilometres of Killyconny Bog cSAC. Two Wintering Bird Sites occur within five kilometres of Route Option 2. This route has no impact on the Whooper Swan flock that winters between Kells and Navan.

Route Option 3

Route 3A and 3B have similar consequences. Route Option 3 is the most easterly of the routes; it crosses the River Boyne and River Blackwater cSAC at two separate locations. It also lies within three kilometres of two NHA's. This route also passes within five kilometres of four Wintering Bird Sites and through the Blackwater Valley between Kells and Navan, with a potential to impact on the wintering Whooper Swan flock.

The main ecological constraint is the presence of sites designated for nature conservation, and in particular, the River Boyne and River Blackwater cSAC. Option 1 crosses the river at three points whereas the other two routes cross it at two locations. Further study should be aimed to determine which habitats are present at these crossing locations in order to avoid any impacts on priority habitats.

A second constraint is the presence of regular wintering flock of Whooper Swans that use the grassland and arable areas adjacent to the River Blackwater between Kells and Navan. These large birds can potentially fly into power lines and may be prone to disturbance during the construction phase. Further study and consultation may also establish whether there is a regular flightline between the Blackwater Valley and the Tara Mines tailings ponds, just north of Navan. The only route option that passes through this area is Route Option 3

8 WATER

8.1 INTRODUCTION

The information contained below is concerned with a description of the existing surface water and groundwater environment. This section describes the following:

- The Surface Water Environment, which includes the following information:
  - Regional and localised drainage and surface water features;
  - Information on catchment hydrometrics; and
  - Existing surface water quality.
- The Groundwater environment, which describes the Regional hydrogeological setting of the site.

8.2 METHODOLOGY

The assessment of the water environment consisted of:

- A desktop study of available information;
- Liaison with various statutory bodies; and
- Interpretation of all data.

Information retained by the Geological Survey of Ireland (GSI) and Environmental Protection Agency (EPA) was accessed to provide the hydrological and hydrogeological setting of the site. Relevant documents and datasets used to provide the setting of the site included EPA Water Quality Data, topography maps and GSI Hydrogeological Data.

8.3 EXISTING ENVIRONMENT

8.3.1 Surface Water Drainage - Rivers

The River Boyne, in the south of the study area, dominates the natural surface water environment. It flows in a southwest to northeast direction through the towns of Trim and Navan and has three main tributaries: Tremblestown/Athboy River, Knightsbridge River and the Clady River.

The River Blackwater flows in a NW-SE direction from Kells before entering the Boyne at Navan. The Moynalty River, a major tributary, enters the Blackwater River midway between Kells and Navan and a smaller tributary, Yellow River, joins the Blackwater River 4km northwest of Navan.

A large network of smaller unnamed streams, flowing in a northwest-southwest direction, are found north of the Moynalty River.

The River Dee flowing in a easterly direction from Nobber in County Meath to Ardee in County Louth along with its tributary, Kilmainham River, form a large element of the drainage network in the north of the study site.

A high density of small streams comprising of Dangan River, Clonymeath/Moynalvy River, Skane River and Hurley River are located in the southeast of the study area. The headwaters of the River Nanny are also found east of Navan.

In general, there is a high drainage density throughout the centre and south of the study area. North of Nobber in County Meath the drainage density decreases as the relief and the number of lakes increase. The main surface water features within the study area presented in Figure 8.1 ”Surface Water Features”, Volume II.

Table 8.1 Major Rivers within Study Area

Watercourse	Direction of Flow	Receiving Waters	Location
Blackwater River	NW-SE	Boyne River	Kells to Navan
Boyne River	SW-NE	Irish Sea	Trim to Slane
Clady River	NW-SE	Boyne River	Northeast of Navan
Killary River	S-N	River Dee	6 km north of Nobber
Killmainham River	W-SE	River Dee	East of Kilmainhamwood
Knightsbridge River	SW-NE	Boyne River	3 km east of Trim
Moynalty River	NW-S	Blackwater River	Northwest of Kells
Nanny River	W-E	Irish Sea	Southeast of Navan
Tremblestown River	NW-SE	Boyne River	Athboy to Trim
Yellow River	N-S	Blackwater River	5 km NW of Navan

8.3.2 Surface Water Drainage – Lakes

All the lakes within the survey area are less than 0.5km^2 with the exception of Proudstown Reservoir, which is 1km^2, located northwest of Navan. A number of small lakes are found in the north of the study area, the largest of these, Mullagh Lough (0.35km^2), is located 3km north west of Mullagh. The remainder of the named lakes; Lough Brackan, Ballyhoe Lough, Breakney Lough, Corstown Lough Great and Newcastle Lough are small in size and are found north of the N52.

8.3.3 Hydrometric Data

The Office of Public Works (OPW) maintains a number of hydrometric stations within the study area. Not all of the main rivers listed in Table 8.1 above have hydrometric stations along their course but where they do, the details of a selection of these stations are shown in Table 8.2 below.

Table 8.2 Hydrometric Station Details within Study Area

Watercourse	Station No.	Location	Catchment	Catchment Area (km2)	Mean Annual Flow (m3/s)
Blackwater	07001	Tremblestown	Boyne	150	2.343
Boyne	07005	Trim	Boyne	1282	17.97
Boyne	07009	Navan Weir	Boyne	1610	24.68
Moynalty	07006	Fyanstown	Boyne	294	5.52
Dee	06013	Charleville	Dee	307	4.33

8.3.4 River Water Quality

The EPA monitors the quality of Ireland's surface waters and assesses the quality of watercourses in terms of 4 no. quality categories; 'unpolluted', 'slightly polluted', 'moderately polluted', and 'seriously polluted'. These water quality categories and the water quality monitoring programme are described in the EPA publication 'Water Quality in Ireland, 1998-2000' and "Water Quality in Ireland, 2001 – 2003".

The water quality assessments are largely based on biological surveys. Biological Quality Ratings or Biotic Indices (Q values) ranging from Q1 to Q5 are defined as part of the biological river

quality classification system. The relationship of these indices to the water quality classes defined above, are set out in Table 8.3 below.

Table 8.3 Relationship between Biotic Indices and Water Quality Classes

Biotic Index	Quality Status	Quality Class
Q5, 4-5, 4	Unpolluted	Class A
Q3-4	Slightly Polluted	Class B
Q3, 2-3	Moderately Polluted	Class C
Q2, 1-2, 1	Seriously Polluted	Class D

A review of a selected number of monitoring station results suggests that, in general, the majority of the rivers in the study area are slightly to moderately polluted. The Moynalty River in 2000 and 2003, for example, had a number of locations that were classified as either slightly polluted or moderately polluted. Examples of two of these locations are shown below, located at Cloggagh Bridge and Carlanstown Bridge.

The River Boyne is the largest river in this study area with a catchment area of greater than 2,400 km^2. Overall, there are 17 EPA monitoring stations along the River Boyne with the majority of these stations classifying the surface water in the River Boyne as slightly polluted. Examples of three of these stations are included below with water quality results from 1997-2003.

The EPA reports 14 monitoring stations along the River Blackwater. Similar to the River Boyne, the majority of these stations are classified as slightly polluted, although four are classified as unpolluted. Examples of two of these stations are included on Table 8.4 with the water quality results from 1997-2003.

The rivers to the north of the study area, the River Dee and its tributary and the Kilmainham River had a higher proportion of unpolluted stretches of waterways when surveyed by the EPA in 2003, compared to the rivers in the southern area of the study area.

A selection of biological survey results for the major rivers are summarised in Table 8.4 below, highlighting that the surface water in the study area is classified in the range of Moderately polluted to Unpolluted.

Table 8.4 Selection of Biotic indices (1997-2003) for the Major Rivers in Study Area

River	Monitoring Location	Biotic Index		
		1997	2000	2003
River Boyne	Ballinteer Br.	3-4	3-4	3-4
	Fords of Broc Hse.	3-4	4	3-4
	d/s Broadboyne Br.	3	3-4	3-4
River Blackwater	Donaghpatrick Bridge	4	3-4	4
	Daly's Bridge	3	3-4	3
Dee River	Bridge North of Evry Cross Rd.	4	4	4
	Bridge SE of Rockfield Hse.	4	4	3-4
Killary Water	Rosehill Bridge	3-4	3-4	3-4
Moynalty River	Cloggagh Bridge	3	3	3-4
	Carlanstown Bridge	3-4	3	3-4
Kilmainham River	Br North of Kilfannana	4	4	4

8.3.5 Groundwater environment

A large section of the study area surrounding Trim, Dunshaughlin and south of Navan is composed of Dinantian Upper Impure Limestones and is classified as a Locally Important Aquifer, which is generally moderately productive. The same formation southwest of Kells is classified as a Locally Important Aquifer - moderately productive in local zones only. Silurian Metasediments and Volcanics between Navan and Ardee and northwest of Kells are classified mainly as Poor Aquifers (Pl) – unproductive except for local zones and Poor Aquifers (Pu). In the north of the site, east of Kingscourt, a zone of Dinantian Pure Bedded Limestones is classified as a Regionally Important Aquifer – Karstified (Rk). This formation is also found in small pockets east of Navan and has been given the same classification by GSI.

8.4 PREDICTED IMPACTS

In order to provide the ideal location for the proposed electrical grid and its associated pylons, the following section highlights all predicted impacts in this study area.

Topsoil will be removed at the site of each pylon and, therefore, there is the potential for silt and clay to be removed by rainfall and surface water runoff. Peat slides are a potential impact in

areas of cutaway or blanket peat deeper than 0.5m thick or where the peat slope is greater than 15 degrees.

Siltation of nearby watercourses may be a predicted impact and care should be taken to minimise this impact through the careful removal and storage of topsoil.

As discussed in Chapter 7, Ecology, the largest Special Area of Conservation (SAC) within the study area is the River Boyne and River Blackwater cSAC. The rivers that lie within the study area are the Blackwater, Boyne, Athboy, Tremblestown and Stonyford (the latter three are tributaries of the Boyne). Good practice guidelines during construction should be followed to prevent any direct or indirect impacts on this freshwater system, such as siltation and runoff due to stripping of topsoil during pylon construction.

Machinery on site during the construction phase will include diesel-powered trucks, excavators and cranes. The potential impacts to the surface and groundwater bodies from the proposed power line route development could derive from accidental spillage of fuels, oils, and solvents, which could impact surface and groundwater quality, if allowed to infiltrate to ground during construction. To minimise any impact on the underlying subsurface strata from material spillages, all oils and solvents used during construction will be stored within specially constructed dedicated temporary bunded areas. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, should take place in a designated area, away from surface water gullies or drains. Spill kits and hydrocarbon adsorbent packs will be stored in this area and operators will be fully trained in the use of this equipment. The groundwater environment of the study area contains regionally important aquifers and as such the precautions described above are vital to prevent pollution of groundwater.

When the preferred route is selected, it is recommended that the above-predicted impacts are addressed and that a thorough site walkover is carried out in order to avoid any complications during construction and operation.

8.5 EVALUATION OF ROUTE OPTIONS AND CONCLUSION

8.5.1 Surface Water Environment

- Route Option 1 crosses seven rivers and it passes within 500m of two rivers, details of which are shown in Table 8.5 below.

Table 8.5 Rivers encountered by Route Option 1

River	Description	Crossing Point Location
Barora River	Main channel	3km south northeast of Mullagh
Moynalty or Owenroe River	Upper reaches	1.5km south east of Mullagh
Blackwater River	Main channel	6km northwest of Kells
Athboy River	Upper Reaches	6km east of Clonmellon
Boyne River	Main channel	4km south west of Trim
Knightsbrook River	Main channel	4km south west of Trim
Dangan River	Main Channel	2.5km northwest of Summerhill
Cloneymeath River	Main Channel	500m south and parallel to route. **No crossing point but proximal to Route Option 1**.
Moynalvy River		

Table 8.6 Lakes encountered by Route Option 1

Lake	Route Proximity to Waterbody
Breakey Lough	1.25km west
Lenanavaragh Lough	5km east
Mullagh Lough	3km east
White Lough	<0.5km east
Newtown Lough	5.5km east

Route Option 1 lies in close proximity to five lakes, the closest of which is White Lough, 0.5km away.

- Route Option 2 crosses seven rivers from Kingscourt to Woodland, details of which are shown in Table 8.7 below.

Table 8.7 Rivers encountered by Route Option 2.

River	Description	Crossing Point Location
Barora River	Main channel	2.5km south east of Mullagh
Moynalty or Owenroe River	Upper reaches	2 km south east of Mullagh
Blackwater River	Main channel	5.5km northwest of Kells
Clady River	Main channel	1km south of Robinstown
Boyne River	Main channel	5.5km northeast of Trim
Boycetown River	Main channel	7.5km northeast of Summerhill
Derrypatrick River	Main channel	8.5km northwest of Woodland

Table 8.8 Lakes in proximity to Route Option 2

Lake	Route Proximity to Waterbody
Breakey Lough	1km west
Lenanavaragh Lough	5.5km east
Mullagh Lough	4km east
White Lough	5km east

Route Option 2 lies in close proximity to four lakes, the closest of which is Breakey Lough, 1km away.

- Route 3 crosses eight rivers and also the Moynalty River crosses in close proximity of Route Option 3A, details of which are shown in Table 8.9.

Table 8.9 Rivers encountered by Route Option 3A and 3B

River	Description	Crossing Point Location
Kilmainham River	Main Channel	Kilmainhamwood Village
Dee River (Route 3B only)	Small Tributary	3km from Nobber
Moynalty River (Route 3A only)	Main channel	No crossing point but within 400m east of Route Option 3A.
Yellow River	Small Tributary	7.5km northwest of Navan
Blackwater River	Main channel	6.5km northwest of Navan
Clady River	Main channel	1km south of Robinstown
Boyne River	Main channel	5.5km northeast of Trim
Boycetown River	Main channel	7.5km northeast of Summerhill
Derrypatrick River	Main channel	8.5km northwest of Woodland

Table 8.10 Lakes in proximity to Route Option 3A and 3B.

Lake	Route Proximity to Waterbody
Newcastle Lough	1.5km south west
Whitewood Lough	1km south west
Clooney Lough (Route 3B only)	450m north west
Proudstown Reservoir	1.9km north west

Route Option 3 lies in close proximity to four lakes, the closest of which is Clooney Lough, 450m away.

In conclusion, Route Option 1 is proximal to nine rivers. This proposed route crosses seven rivers and passes within 500m of the Cloneymeath and Moynalty Rivers. Route Option 1 is proximal (450m) to White Lough while the remaining lakes are at a distance of greater than 1km.

Route Option 2 crosses seven rivers, six of which are main river channels. Breakey Lough is the closest lake to the route at a distance of 1km while the remaining lakes are greater than 4km away.

Both Route Option 3A and 3B cross eight rivers. In addition, Moynalty River is close to Route Option 3A. Route Option 3A crosses seven main channels while Route Option 3B crosses six main channels. Route 3B is located 450m away from Clooney Lough and both of these route options are located 1.9km from Proudstown Reservoir, north of Navan Town.

8.5.2 Groundwater Environment

The route options chosen do not encounter any Regionally Important Aquifers or karstified bedrock, with the exception of a 0.2km area of karstified rock along Route Option 3A. Therefore, with correct environmental management during the construction phase, the risk to the groundwater environment will be minimal.

9 GEOLOGY

9.1 INTRODUCTION

This constraints report has been carried out in order to select the ideal route option for the siting of a power line through the counties of Meath and Cavan.

Particular attention has been given to highlighting all geologically sensitive areas where potential karstification of the underlying bedrock may affect the stability of individual pylons. Stability may also be an issue in areas where there is a significant depth of peat in the area of the proposed pylon foundations and stabilisation may be necessary during construction.

9.2 METHODOLOGY

A detailed bedrock classification desktop study was undertaken to highlight the various geological bedrock formations underlying the study area. The Geological Survey of Ireland (GSI) bedrock geology map for County Meath was examined in conjunction with GSI aquifer classification map for County Meath. Each formation was studied and its potential for karstification was analysed and graded in order to predict subsidence occurrence. The soils and subsoils of the area were identified using the GSI soil and subsoil maps, which have been created by Teagasc.

9.3 EXISTING ENVIRONMENT

The study area is varied in terms of its soil, subsoil and bedrock geology.

9.3.1 Soils

There are a variety of soils in the study area between Kingscourt and Woodland. The majority of the area is covered by one of the following major soil groups –

- AminPD –Deep Poorly Drained mineral soil, derived from mainly non-calcareous parent materials. Surface water gleys and groundwater gleys are included in this category;
- AminDW – Deep well drained mineral soil, derived from mainly non-calcareous parent materials. Acid Brown Earths and Brown Podzolics will be included in this category;
- BminDW – Deep well drained mineral soil derived from mainly calcareous parent materials. Grey brown podzolics and brown earths are (medium-high base status) are included in this category;
- BminPD – Deep poorly drained mineral soil derived from mainly calcareous parent materials. Surface water gleys and ground water gleys are included in this category;

- BminSW – Shallow well drained mineral soil, derived from mainly calcareous parent materials. Renzinas and Lithosols are included in this category.

In addition, alluvial soils are evident along the course of the main surface water features in this study area. In particular, alluvial soils are evident along the River Boyne and its tributaries.

Cutover Peat (Cut) and Fen peat (FenPt) are evident in a number of regions within the study area. In particular, areas of cut peat are located towards the centre and western areas of the site. A 3km diameter of cutover peat is located approximately 6km west of Navan town and two areas of 1km diameter cutover peat are located approximately 5km south west of Kells. An approximate 3km diameter of cutover peat is also located to the east of Carlanstown at the centre of the study area.

Made Ground is evident in all built-up areas including the larger urban settlements of Woodland, Ashbourne, Dunshaughlin, Navan, Kells, Carlanstown, Nobber and Kingscourt.

9.3.2 Subsoils

There are a variety of subsoils in the study area between Kingscourt and Woodland. Refer to Figure 9.1 “Subsoil Constraints”, Volume II. The majority of the area is covered by one of the following major subsoil groups:

- TLs –Carboniferous Limestone till;
- TLPSsS – Lower Palaeozoic Sandstone and shale till;
- TNSSs – Namurian Shales and sandstones till;
- GLPSsS/ GLs/ GNSSs – Glaciofluvial sands and gravels.

Also, similar to the topsoils listed in Section 9.3.1, there are areas of cutover peat (Cut), and made ground within the study area. Glaciolacustrine deposits (L) also exist surrounding the cutover peat to the east of Carlanstown.

It should be noted that areas classified as rock (Rck) are located to the east of the study area north and south of Slane town and to the south and southwest of Kingscourt town. Karstified rock (KaRck) has been noted to the east of Kingscourt town near the boundary of the study area.

9.3.3 Bedrock Geology

Reference to the relevant geological information, the 1:100,000 scale Sheet No. 13 – Bedrock Geological Map of County Meath (Geological Survey of Ireland (GSI), 1997), indicates that the bedrock geology within the study area is quite varied.

The southwestern area of the site is mostly underlain by the Lucan Formation (Lu). This bedrock is comprised of dark limestone and shale (calp). The south and southeastern area of the site is underlain mostly by the Loughshinny (LO) rock formation but is also underlain by areas of the Donore Formation (DR), the Walshestown Formation (WL) and the Balrickard Formation (BC). The Loughshinny Formation is comprised of dark micrite and calcarenite and shale. The Donore and Walshestown Formations are comprised of shale, sandstone and limestone and the Balrickard Formation is comprised of coarse sandstone and shale. Minor quantities of the Mullaghfin Formation (MF), Platin Formation (PT), Crufty Formation (CU) and Lower Palaeozoic rocks (LP) also exist in this region.

Towards the centre and eastern region of the study area there is a large variation in the geological formations that are reported by the GSI. The formations appear to be dipping in a northeast to southwest direction and are separated by a number of fault lines. The River Boyne is a significant surface water feature in this area and these formations are underlying the town of Navan, County Meath and the Boyne Valley.

The geological bedrock formations in this area include Ballysteen Formation (BA), Moathill Formation (MH), Meath Formation (ME), Waulsortian Limestones (WA), Liscarton Formation (LC), Old Red Sandstone (ORS) and Rathkenny (RK) which are all located north of Navan town.

To the northeast of Navan, White Island Bridge Formation (WI), Meath Formation (ME), Brittstown Formation (BW), Navan Beds (NAV), Ardmulchan Member (BXam), Beauparc Member (BXbc), Fennor Formation (FN), Carracastle Formation (CX), Syenite (Sy), Hill of Slane Formation (HS) and Broadford Formation (BF) are located.

The Rathkenny formation extends approximately 15km north east of Navan town. This formation is comprised of Black shale and chert. North of Rathkenny lies the Salterstown Formation (SA) and the Clontail Formation (CL).

The northwestern area of the region is underlain primarily by the Clontail Formation (CL)- a calcareous red-mica greywacke formation. To the west of Kingscourt, the Castlerahan Formation (RA) comprised of dark quartz greywacke and conglomerate is the primary geological unit.

The centre north and northeastern areas of the study area, are dominated by the Navan beds (Nav), the Cruicetown Group (undifferentiated) (CRT), the Fingal Group (undifferentiated) (FNG) and the Milverton Group (undifferentiated) (MLV) formation. A Caledonian syncline is noted by the GSI within the Fingal Group formation.

The geology around the town of Kingscourt is quite varied and is often described as the "Kingscourt Outlier". The Kingscourt Outlier comprises of the Ardagh Shale Formation (AD), the Carrickleck Formation (CR), the Corratober Bridge Formation (CO), the Cabra Formation (CB), the Kingscourt Gypsum Formation (KG), the Westphalian (undifferentiated) (WES) formation, the Fingal Group (undifferentiated) (FNG) and the Kingscourt Sandstone Formation (KS).

The outlier is bounded to the west by the northsouth "Kingscourt Fault", which, though mainly post-Triassic, has a Variscan component.

9.3.4 Potentially Karstified Areas

According to the GSI there are two formations within the study area that are classified as "Regionally Important Karstified (diffuse) –Rkd (diffuse)" formations. The Milverton Group Formation (MLV), located to the northeast of Kingscourt town, is an area of bedrock described as Regionally Important Karstified bedrock (diffuse). It has a radius of approximately 11km. The Platin Formation (PT) is a small area of bedrock located to the southeast of Navan town. This formation is also described as Regionally Important Karstified bedrock (diffuse) – Rkd. An overview of the karstified bedrock geology is illustrated in Figure 9.2 "Bedrock Geology Significant Features", Volume II.

9.4 PREDICTED IMPACTS

In order to provide the ideal location for the new electrical grid and its associated pylons, it is important to highlight all potential constraints within this study area.

Certain subsoil classifications could be described as possible constraints for this development. In particular, it would be assumed that parts of the study area where subsoil is defined as “cutover peat” would not be ideal sites for locating pylons. The main reason for this constraint is that, as a subsoil, cutover peat is not of sufficient strength to provide stability for the proposed infrastructure. Subsidence and general instability during construction and operation over the lifetime of the pylons have a significant impact.

The areas of bedrock described as geological units with a potential for karstification could also be described as areas of potential subsidence. These areas should not be excluded for this reason alone but it is recommended that a site-specific investigation should be carried out prior to locating a pylon in these areas. The main reason for this precautionary measure is that areas prone to karstification may have weaknesses below the ground surface such as fractures, faults and caves which may lead to subsidence if placed under pressure from an overlying pylon.

Topsoil will be removed at the site of each pylon and therefore there is the potential for silt and clay to be removed by rainfall and surface water runoff. Siltation of nearby watercourses may be a potential impact and care should be taken to minimise this impact through the careful removal and storage of topsoil. Peat slides are a potential impact in areas of cutaway or blanket peat deeper than 0.5m thick or where the peat slope is greater than 15 degrees.

Machinery on site during the construction phase will include diesel-powered trucks, excavators and cranes. The potential impacts to the underlying soil and geology from the proposed power line route development could derive from accidental spillage of fuels, oils, and solvents, which could impact soil, bedrock and groundwater quality, if allowed to infiltrate to ground during construction. To minimise any impact on the underlying subsurface strata from material spillages, all oils and solvents used during construction will be stored within specially constructed dedicated temporary bunded areas. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area of the site, away from surface water gullies or drains. Spill kits and hydrocarbon adsorbent packs will be stored in this area and operators will be fully trained in the use of this equipment.

When the preferred route is selected, it is recommended that all predicted impacts are addressed and that a thorough site walkover is carried out in order to avoid complications during construction and operation.

9.5 EVALUATION OF ROUTE OPTIONS AND CONCLUSION

The three route options were evaluated in terms of soil, subsoil and bedrock geology.

Soils/Subsoil

The length of cutaway peat and fen peat was measured along each route option and detailed in Table 9.1 below.

Table 9.1 Length of Cutaway Peat and Fen Peat along each Route Option

Route Option	Length of Cutaway Peat (km)	Length of Fen Peat (km)
Route Option 1	3.4km	-
Route Option 2	1.4km	-
Route Option 3A	0.2km	0.2km
Route Option 3B	0.7km	-

Bedrock Geology

The length of bedrock that was described by the GSI underlying topsoil along each route option is detailed in Table 9.2 below.

Table 9.2 Length of Bedrock along each Route Option

Route Option	Length of Rock (Rck)/ Karstified Rock (Krst) (km)
Route Option 1	0.5km (Rck)
Route Option 2	-
Route Option 3A	0.9km (Rck) /0.2km (Krst)
Route Option 3B	0.8km (Rck)

Bedrock that is close to the surface was described by the GSI along Route Option 1, Route Option 3A and Route Option 3B. Only 0.2km of Route Option 3A is overlying subsoil described as Karstified Rock.

Overall, bedrock geology along the route options was evaluated and, as shown in Figure 9.2 “Bedrock Geology Significant Features Volume II”, none of the proposed route options will overlie a formation described as “Regionally Important Karstified bedrock (diffuse)” – Rkd. Also, an

insignificant proportion of Route Option 1, Route Option 3A and Route Option 3B will encounter bedrock near the surface with only 0.2km of Route Option 3A encountering Karstified Rock.

10 CULTURAL HERITAGE

10.1 INTRODUCTION

Moore Group was commissioned to carry out a cultural heritage impact assessment of the route study area in advance of route selection of the development of a of 400kV power line, from Woodland in County Meath to Kingscourt in County Cavan. The following report documents the proposed project, the existing environment at the site, the predicted impacts and an evaluation of the route options in non-technical terms. This desktop study aims to assess the potential impacts of the proposed route options on the receiving archaeological, architectural and cultural heritage within the route study area.

Within the study area there is a wealth of built heritage, from castles to cottages, including the great passage tombs of Brú na Bóinne, and Loughcrew, planned towns and villages such as Slane and Moynalty, great country houses, farmsteads, monastic settlements, churches, mills, canals and railways. Within this great variety of building types and uses are structures of architectural heritage significance and distinctive character that are deemed worthy of protection. Mitigation measures will propose ameliorative measures to safeguard any monuments, features or finds of antiquity and cultural importance. The study was carried out on behalf of Tobin Consulting Engineers for EirGrid. Cultural heritage assessment may be required as part of the planning process “in response to developments which may be located in the vicinity of archaeological monuments” (The Heritage Council. 2000).

10.2 METHODOLOGY

The major potential impact on the cultural heritage resource for this type of development is visual. By its very nature the construction of a power line has a degree of flexibility in the placement of its pylons and once a route has been chosen, poles can be positioned to avoid known archaeological sites, where possible. To assess the potential impact of the proposed development as many data sources as possible were obtained or consulted. These included data sets for:

- National Monuments – A database available through the www.heritagedata.ie website;
- Record of Monuments and Places (RMP) – databases obtained from the national monuments section of the Department of Environment Heritage & Local Government;
- Record of Protected Structures (RPS) – datasets obtained from Meath & Cavan Local Authorities;
- National Inventory of Architectural Heritage (NIAH) – Datasets obtained from the architectural section of the DoEHLG;
- County Development Plans were also consulted with regard to further heritage designations.

All the data sets were then imported into ArcGIS for further mapping and geospatial analysis.

There is a published "Code of Practice between ESB National Grid and the Minister of the Environment, Heritage and Local Government in relation to Archaeological Heritage". This document details the principles applied for the protection of Ireland's archaeological heritage during the development of high voltage transmission system. However there are no guidelines published for route selection based upon the potential for visual impact on the Cultural Heritage, "Guidelines for Visual Impact Assessment". The Consultation Draft of Guidelines for Planning Authorities for Landscape and Visual Impact Assessment were consulted but did not give a coherent framework for this type of route selection study. The following methodology was therefore developed and used in this report. Each site classification (bridge, church, rath, tomb etc.) was awarded a potential for visual impact of high, medium or low. It should be noted that there were no classifications in the data set for the RPS and therefore as upstanding architectural features they were all given a potential for visual impact of high.

To further inform the selection process buffers were created around all the Cultural Heritage sites within ArcGIS using the criteria outlined in the table below.

Table 10.1 Classification Ratings and Buffers Employed

CLASSIFICATION	BUFFER	HERITAGE SITE TYPE
Very High Sensitivity	<250m from Very High feature centre point	National Monuments & Significant upstanding RMP sites
High Sensitivity	<150m from High feature centre point	NIAH, RPS, High rated RMP sites
Medium Sensitivity	<100m from Medium feature centre point	Medium rated RMP
Medium to Low Sensitivity	<50m from Low feature centre point	Low rated RMP
Low Sensitivity	No Heritage Sites	No sites within the above criteria

This report was compiled through a desktop study of recorded archaeology and architecture. This study was predominantly based on the State's Record of Monuments and Places and the RPS data. The main purpose of this desktop study is to assess the impact on the receiving archaeological, architectural and cultural environment.

In assessing the visual impact of the proposed development in the archaeological, architectural and cultural heritage the following were considered:

- The preservation of the character of the landscape where and to the extent that the proper planning and sustainable development of the area requires it, including the preservation of views and prospects and the amenities of places and features of beauty or interest;
- The protection of structures, or parts of structures, which are of special architectural, historical, archaeological, artistic, cultural, scientific or technical interest;
- The preservation of the character of architectural conservation areas, historic urban areas.

10.3 EXISTING ENVIRONMENT

Landscape

The topography surrounding the study area is of rolling lowland and drumlin landscape. The only considerable elevations are the hills of Loughcrew in the western extremity of the County Meath. Within the physical landscape two main rivers will be traversed, the River Blackwater to the north and the River Boyne to the south. Lough Sheelin forms a small part of the county boundary towards Cavan. Major urban centres at Navan, Trim, Kells and Kingscourt are all avoided with the proposed route options. The quantity of bog is small in proportion to that of the general surface, and very unequally distributed. Landuse within the study area is predominantly exploited with agricultural activities.

Defining landscape character enables an understanding to be formed of the inherent value and importance of individual landscape elements and the processes that may alter landscape character in the future. The cultural aspects of the landscape cannot be divorced from its physical and visual characteristics so all of these elements are considered. In choosing the most appropriate route, the visual impact on the county's rich natural and built heritage has a significant bearing.

The landscapes in County Meath and south County Cavan are constantly evolving in response to natural forces and human activity. Glacial movement shaped the topography into its present form and human activities have been largely responsible for land cover since farming began. There have been several phases of history which have left their marks on the landscape and which are evident today as a patchwork of elements including passage tombs and pre Christian earthworks, early Christian ecclesiastical buildings, Norman castles and walled settlements, 17th – 18th Century demesnes and field patterns and 18th – 19th Century buildings and structures. Overall the route options avoid the most prominent archaeological landscapes at Brú na Bóinne, the Hill of Tara and the Loughcrew/Slieve na Caillaigh complex within the study area.

The Local Government (Planning and Development) Act, 2000, specifically, Part II, S.10, (e) and the 1st Schedule, Part IV, (7) requires that every Planning Authority in making a development plan must include objectives for the; ‘Preservation of the character of the landscape where, and to the extent that the proper planning and sustainable development of the area requires it, including the preservation of views and prospects and the amenities of places and features of natural beauty or interest.’

10.3.1 Historical Background

Research comprised of a paper study of all available archaeological, historical and cartographic sources. The following is based on a document search and paper study. County Meath is traditionally known as the 'Royal County' because it contained the seat of the ancient High Kings of Ireland at the Hill of Tara. Meath is said to derive from the name Midhe. He was the son of Bratha and the principal druid of the mythological clan Neimhidh. The territory is now much smaller than its extent in ancient times when it would have included southeast Cavan but within its present boundaries are some of the most important sites in the mythology, archaeology and history of Ireland.

Prehistory

Evidence of Palaeolithic communities has yet to be confirmed in Ireland. The much-referenced flake of the Munsterian period (200,000–130,000 BP) from Mell, County Louth was probably transported here during the Midlandian glaciation (115,000–10,000 BP) by advancing ice-sheets and not human action, while other examples of early lithic assemblages are considered either natural occurrences or are from uncertain contexts (Waddell 1998, 8–9).

The earliest recorded phase of human occupation in Ireland is the Mesolithic period (7500–4500 BC) when groups of hunter-gatherers were living at subsistence level close to rivers and lakes and along the coastline, surviving on the limited flora and fauna available in the post-glacial period. They were a mobile society relying on wild resources for food, which was hunted and gathered using stone tools as well as boats, nets and traps. Settlement was in temporary and semi permanent groups of huts constructed of wood slung with hide, which may have operated as seasonal or hunting camps. Late Mesolithic material is known from County Meath at Moynagh Lough (O'Sullivan 1998, 52–53), the crannóg comprised an oval mound and was revealed as a multi-period site with activity continuing until late in the 8th century (www.heritagecouncil.ie). Although some Mesolithic flints have been found along the River Blackwater and near Newgrange in County Meath, the earliest substantial evidence for human habitation in this area dates to the Neolithic period. Cavan has been inhabited for over 5,000 years and there is much evidence for occupation from prehistoric times throughout the county. The West Cavan area is particularly rich in archaeological sites. Throughout County Cavan many people lived in crannogs, many of which were used for hundreds of years. However, the Mesolithic period remains the most under-represented in the archaeological record for Meath and South Cavan in general and the country as a whole.

Farming was first adopted in the Middle East but spread gradually across Europe in succeeding centuries, arriving in Ireland about 4000 BC. This transition in Ireland changed an economy based principally on hunting and foraging to one primarily of cereal cultivation and livestock rearing. Tending of crops and animals required a more sedentary lifestyle and larger permanent settlements were built. The megalithic (from the Greek mega – large and lith – stone) monuments

of the Neolithic people built as communal tombs or for ceremonial purposes, are relatively common in the landscape. New methods were adopted for shaping stone tools and the first long distance trade networks were established. As a consequence, within Meath and elsewhere, large tracts of forest cover were cleared, permanent settlements were established, pottery was first used, and elaborate burial rites were developed which centred on large communal ritual monuments. While the megalithic tombs of Brú na Bóinne, Fourknocks, Loughcrew and elsewhere are the most visible and recognisable monuments of the period, a number of settlement sites are known from the county: for example, Newtown (Halpin & Gowen 1992), Creewood and Knowth (Moore 1987, 49). Neolithic artefacts are also common. The Brú na Bóinne archaeological complex is one of two UNESCO World Heritage Sites in Ireland affording an international protection for this rich archaeological landscape. The presence of two passage tomb cemeteries (Loughcrew and Brú na Bóinne) as well as isolated passage tombs (including Fourknocks and the mound of the hostages at Tara), and other megalithic monuments strongly suggests that a vibrant Neolithic and early Bronze Age economy existed in this area.

As stone tools were replaced by the use of copper, later combined with tin to make bronze, the structure of society also changed over centuries. Henges were constructed in Ireland in a broad period beginning around 2000BC, and were sometimes constructed around or beside previous Neolithic megaliths. Thirteen examples have been identified in County Meath in the vicinity of passage tombs, by far the highest concentration is in the Boyne Valley of County Meath, already home to the great passage tombs of Knowth and Newgrange. The monuments take the form of flat-topped banks encompassing circular or oval spaces with entrances facing either east or west and can measure 100 to 200 metres (330 to 660 feet) across. They are frequently located on slopes or, in a small number of cases, on the bottoms of river valleys; their builders contrived to give them a prominent siting within their immediate settings. Within these henges, archaeologists have found the systematically cremated remains of animals as well as evidence of wooden and stone posts. This indicates that henges were centres for a religious cult, which had its heyday in the first half of the Bronze Age. While some communal megalithic monuments, particularly wedge tombs continued to be used, the Bronze Age is characterised by a movement towards single burial and the production of prestige items and weapons, suggesting that society was increasingly stratified and warlike. In late Bronze Age Ireland the use of metal reached a high point with the production of high quality decorated weapons, ornament and instruments, often discovered from hoards or ritual deposits. It is likely that the developed communities of the Boyne Valley were among the first to incorporate metal technology and their settlements have been excavated at a number of locations across Meath, including Monknewtown and Knowth (Waddell 1998, 117), and more recently at a number of sites along the route of the M1 Drogheda Bypass. The Bronze Age period is best known perhaps for the delicate gold artefacts and elaborate pottery styles, many of which have been identified in Meath and Cavan. While we have little evidence for Bronze Age settlement in the Boyne Valley after 1800 BC, settlement flourished in the east of the county where recent excavations have uncovered numerous sites, both enclosed and unenclosed from the period 1500 BC onwards.

The Iron Age/Early Historic Period

The Iron Age however is known as a 'dark age' in Irish prehistory. Iron objects are found rarely, but there is no evidence for the warrior culture of the rest of Europe, although the distinctive La Tené style of art with animal motifs and spirals was adopted. Life in Iron Age Ireland seems to have been much as it was in the early historic period – mixed farmers living in or around small defended settlements known as ringforts or stone cashels. In the first centuries AD, there began an expansion of population from west of the Shannon of groups who claimed common ancestry to Niall Níogiallach, Niall of the Nine Hostages, and who came to be known as the Uí Neill, the principal dynasty of the northern half of the country in the medieval period. The Uí Neill were split between northern and southern septs, with the Southern Uí Neill consisting of Síl Áedo Sláine (The Seed of Áed of Slane) and Clann Cholmáin Máir (The Children of Colmán the Great) who held sway over the ancient kingdoms of Brega and Míde. The area between Dunboyne and Navan would have fallen within the hegemony of the Síl Áedo Sláine, whose principal residences were at Lagore, Oristown and Knowth (Byrne 2001, 87). Lewis Topographical Dictionary records the following description, "The 'Eblani,' whose territory also extended over Dublin and Kildare, are mentioned by Ptolemy as being settled in this county. According to the native divisions it formed part of one of the five kingdoms into which Ireland was partitioned and was known by the name of 'Mithe Methe, Media or Midia,' perhaps from its central situation. Other writers, however, derive its name from the Irish 'Maith' or 'Magh,' a "plain," or "level" country, a derivation indicative of its natural character. It was afterwards divided into two parts, 'Oireamhoin,' or "the eastern country," which comprehended the portion now known by the name of Meath; and 'Eireamhoin,' or "the western country," comprehending the present counties of Westmeath and Longford, with parts of Cavan, Kildare, and the Kings County (Offaly). The prince of East Meath was O'Nial, hereditary chieftain of 'Caelman' or 'Clancolman,' who is distinguished in the native annals by the name of the 'southern O'Nial.' The district surrounding the hill of Taragh (Tara) was originally called 'Magh Breagh.' On this hill, called also 'Teamor,' from 'Teaghmor,' "the great house," was held the general assembly of the states of the kingdom, which met triennially, from a very early period to the end of the sixth century. Here was preserved the 'Labheireg,' or "stone of destiny," on which the monarchs of Ireland were placed at their inauguration, and which, after having been removed to Scotland, was carried away by Edward 1st, among the other trophies of his victory, to Westminster, where it still remains.

Christianity was largely accepted across the country during the period, which saw a flourishing in the production of intricate metalwork, manuscripts and sculpture under the patronage of wealthy monasteries. This was also the period that witnessed the missions of various Irish Saints abroad and the establishment of a distinct Irish church. Missionaries converted the inhabitants of County Cavan to Christianity in the 6th Century. St Feidhlim founded a church at Kilmore, while St Mogue set up an abbey at Drumlane. The economy was based on farming and various legal tracts provide valuable information on the variety of land uses and the range of crops and breeds reared; archaeological excavation has generally concurred with the information in these tracts. The settlement pattern in this period was largely rural and isolated, exemplified by ringforts and crannogs. However, some ecclesiastical sites had attained considerable size and complexity

during the medieval period while the Vikings had established permanent bases at Dublin, Waterford, Limerick and elsewhere.

County Meath increased in importance in the centuries following. The fertile land, and the large numbers of cattle supported by it, ensured the wealth of the people of the area (Dunleavy-Reynolds, 1974). The Irish Annals include references to Viking raids on monasteries throughout the country. The monks at Iona, Scotland, were driven from their island retreat by Viking raids and endeavoured to complete their illuminated manuscript at Kells, to the north of the county, in 807 AD. Kells was subsequently plundered and burnt along with other ecclesiastical foundations (Edwards 1990, 173). A Viking style burial of possible native Irish was discovered in a railway cutting at Navan, to the northeast of Trim, in 1845. Excavations revealed the skeletons of two individuals, the skull of a horse, a bronze bridle bit and harness and other 8th-century ornamental work (Wilde 1849).

Meath suffered as a result of its prominence and wealth throughout the period. There were bloody clashes throughout the eight to eleventh centuries as various groups tried to achieve or consolidate power as the following entry in The Annals of the Four Masters (AFM) indicates; “An army was led by Donnchadh Mac Gillaphadraig and the Osraighi into Meath; and they burned as far as Cnoghbha and Droichead-atha” (AFM 1039.9), while some years later “an army was led by the Ulidians, Leinstermen, and foreigners, into Meath, to demand the hostages of the men of Breagha. Their hostages were put to death by Conchobhar Ua Maeleachlainn, together with Toirdhealbhach Ua Cathasaigh; after which the forces burned the country, both churches and fortresses” (AFM1049.9) 1. Bhreathnach (1999, 16) highlighted this point in her examination of the petty kingdom of Deiscert Breg (Southern Brega), where she lists the references in the various annals to raids, plunderings and burnings in the region between Dunboyne and Slane.

Later Historic Period

Interestingly, the location of the most important sites circa the tenth–twelfth centuries developed as important manorial centres following the Anglo–Norman conquest. One result of this prolonged internecine warfare and mistrust of rival dynasties was to facilitate Anglo-Norman expansion through the country in the late twelfth and early thirteenth centuries. In 1172, Meath was given to Hugh de Lacy, who immediately began organising its colonisation and settlement (Graham 1974, 40), involving the sub-infeudation of the county into areas roughly corresponding to modern barony divisions. In the Later Middle Ages, Cavan was a border area under the control of Irish chieftains. The Anglo-Normans had settled to the West and South as they tried to conquer Cavan but were driven back. They built a castle at Lough Oughter and a motte and bailey at Belturbet. In 1579 County Cavan took on its present boundaries.

These baronies were divided up into smaller units known as manors. There was an overwhelming growth in settlements in this period; many of these remain at the heart of modern towns and

villages, for example, Navan, Ratoath, Athboy, Trim, Dunboyne, and Dunshaughlin (Bradley 1988, 34–46). The primary form of settlement in medieval Meath was based on the manorial centre. Generally, this comprised a fortification (usually a motte or later a tower house), a manorial church and a number of dwellings, which could be nucleated or scattered around the manor. An example of one of the most important Norman military castles in the general area is Trim castle, built on the site of a Motte. A total of ninety-eight villages from this period have been identified in Meath (Graham 1974, 48), with many abandoned from the seventeenth century onwards.

Ecclesiastical centres were established which were also prolific during medieval times. Lewis lists the following major religious structures in his description of county Meath, “The monasteries of which no ruins remain are those of Ardbraccan, Ardceath, Ardmulchan, Ardsallagh, Athboy, Ballybogan, Beaumore near Colpe, Beaubeg, Calliagh, Cloonmanan, Disert-tola, Donaghmore, Donneycarney near Colpe, Donoughpatrick, a priory of the Virgin Mary and the Magdalen Hospital at Duleek ; abbeys at Dunshaughlin, and Indenen near Slane ; a house of Regular Canons, an hospital of St. John the Baptist, and a chantry, all at Kells ; a house of Regular Canons and a nunnery at Killeen; an abbey at Navan, on the site of which the cavalry barrack is now built ; priories at Odder and Rosse, south of Taragh ; an abbey of Regular Canons and a chantry at Skreen ; a monastery of Grey Friars, on the site of which the sessions-house at Trim stands ; a nunnery, a Greek church, and a chantry at Trim ; Dominican friaries at Kilberry, Lismullen, and Dunshaughlin ; besides several others now existing only in name. Columbkill's house, a stone-roofed cell, said to by one of the oldest stone-built houses in Ireland, is still traceable at Kells in which town there are also several stone crosses, one in particular of beautiful workmanship. In the cemetery at Castlekieran, in which are the ruins of a small church, is also a very fine stone cross richly sculptured”, (Lewis Topographical Dictionary).

In the early 17th Century Cavan was settled by planters from England and Scotland, who laid the foundations for many towns and villages such as Belturbet, Killeshandra and Virginia. In the next century their descendants constructed large houses and estates many of which are still standing today. The countryside prospered with the growth of the linen industry. The process of turning flax plants into linen took place locally. During this time the population grew dramatically, and in 1841 nearly a quarter of a million people lived in Co. Cavan- over four times the current population. When the potato crop failed for two successive years in 1845 and 1846, there was widespread starvation and hardship. After the Famine, Cavan became a very rural area, with many lively market towns and villages, but few industries. Population numbers decreased in Meath and Cavan as a result of death and widespread immigration to America, Canada, Australia and New Zealand. The partition of Ireland in 1922 made Cavan into a border area once again, though it was spared involvement in the conflicts of recent years. In post medieval times urban centres developed around large settlement areas and a brief history of each found within the study area is described below.

Kells: The monastery at Kells is thought to have been first founded around 804 A.D. It was founded by monks fleeing from St Colmcille's Iona monastery, to escape Viking invasions. In 1152, the Synod of Kells completed the transition of the Roman Catholic Church of Ireland from a monastic church to the diocesan church that continues today. While called the Synod of Kells, this important Synod was transferred to Mellifont, County Louth, and held there in March 1152. Kells was raised to a Diocese by the Synod, but was later reduced to parochial status. At the end of the 12th century Hugh de Lacy was granted the whole of Meath and under the Anglo-Normans the religious establishments at Kells flourished. Kells, as border town of the Pale, was the scene of many battles, between Anglo, Irish and Norman fighters. During Tudor times, it was used as a mustering place for soldiers. From 1561 to 1800 Kells returned two Members of Parliament to the Irish House of Commons. The period of the Irish Potato Famine saw the population of Kells drop by 38% as measured by the census records of 1841 and 1851. The Workhouse and the Fever Hospital were described as full to overflowing. In recent years the town has expanded considerably with many Dublin commuters moving to the town.

Trim: The town is home to Western Europe's largest Norman castle, Trim Castle (or King John's Castle) which was built in the late 12th century following the Norman Invasion of Ireland's eastern seaboard. Trim and the surrounding lands were granted to Hugh de Lacey, a Norman knight. Richard II of England stayed there before being ousted from power 1412. Once destined to be the country's capital, the town has also occupied a role as one of the outposts of the Pale. It was also designated by Elizabeth I of England, as the planned location for Trinity College, a then Protestant university now located in Dublin. In 1649 after the sacking of Drogheda, the garrison of Trim fled to join other Irish forces and the town was occupied by the army of Oliver Cromwell. There were minor local disturbances in neighbouring villages, in the Irish Rebellion of 1798 following the dispersal of the Wexford rebellion. Trim was represented by its most notable son, the Duke of Wellington in the Irish Parliament before the Act of Union with Great Britain in 1801. The 19th century saw the construction of Trim Courthouse, St. Loman's Catholic church, St. Patrick's Anglican church, the Wellington column, the current Bank of Ireland building, and Castle Street by Lord Dunsany. During the Irish War of Independence (1919-1921) Trim was burned as a reprisal action by Crown forces. Following the Great Irish Famine of 1846-1849, the practices of agriculture in the hinterland altered, with a change in emphasis from tillage to stock raising. This resulted in a change in the business life of Trim. Trim developed as a market town for the productive agricultural hinterland. Some small scale local industries were developed including envelope, and leather product manufacturing. However in the main the town continued to mainly be a service centre for its immediate area.

Dunshaughlin: is named after Saint Seachnaill, a contemporary of Saint Patrick, who established a church at the town in the 5th century. Dunshaughlin (or more specifically, the townland of Lagore) is famous for an ancient crannog or settlement from the 7th century where a number of Irish antiquities were discovered. Approximately 1.6 km south of the village is a preserved workhouse abolished by the Irish State in the early twenties. In the post-famine years, the workhouse rarely had more than a few dozen inmates. During the First World War, the

building was used to accommodate Belgian refugees, some of whom died there and were buried in the paupers' graveyard. In 1920-21, the building was taken over as a barracks by the Black and Tans during the Irish War of Independence. Following the creation of the Irish Free State in 1922, the workhouse system was abolished. The workhouse buildings subsequently had a variety of uses including a courthouse and school.

Kingscourt: was founded near the site of the old village of Cabra, by Mervyn Pratt esq., towards the end of the 18th century, and was completed by his brother, the Rev. Joseph Pratt. The town has a rich and varied history. Cabra Castle, is a fine example of a Norman-style castle, and is located near the town. The castle was originally called Cormey Castle and was a rebuilding of an earlier Cormey Castle, which had been destroyed during the Cromwellian War. As in neighbouring County Meath by the mid 19th century the famine swept through County Cavan. In 1841, the population in Cavan was 243,000, and by 1851 it had dropped to 174,000. With emigration, famine deaths, and occupation by the British, the population of Cavan would later drop to a low of 55,000. However, the census of 1861 shows that it was still overwhelmingly Catholic (81 percent) with the remaining population divided between Presbyterians and members of the Church of Ireland.

Athboy: is a small agricultural town located on the Yellow Ford River, near the County Westmeath border. In medieval times it was a walled stronghold of the Pale. Owen Roe O' Neill took it in 1643, and six years later Oliver Cromwell camped his army on the Hill of Ward nearby. Also known as Tiachtga, the Hill of Ward was a central location for a large gathering for the celebration the pagan feast of Samhain in prehistoric and early historic times. The tower of the Protestant church is a remnant of a fourteenth-century Carmelite priory. Behind the church are the remains of the town walls. To the west of the town lies the ancient townland of Caucestown. This area is the famed stronghold of the Bracken (O Bracain) Clan, whose bravery on the battlefield was renowned throughout the Province of Leinster for centuries.

Navan: This section derives largely from the Meath Urban Archaeological Survey by John Bradley. Navan lies at the point where the River Blackwater flows into the River Boyne. The medieval core of the town is situated on a triangular ridge overlooking the river junction. Navan is traditionally associated with Nuachonbail where St Fechin established an early monastery. No reference to the monastery exists in the Annals but an Augustinian House was inexistence here before the Normans. The monastery was subsequently patronised by Jocelin de Angulo who was granted Navan and Ardbraccan by Hugh de Lacy some time before 1186. De Angulo built a motte on the south side of the Blackwater and he or his son was probably responsible for the laying out of the town. Nothing is known of the early town and documentary evidence of its existence, as a borough does not occur until 1462. The town lay on the edge of the pale and in 1539 was plundered by O'Neill and O'Donnell prompting parliament to impose a charge of 3s 4d on every ploughland in Meath and Westmeath in order to build walls around the town. The early importance of the town was its situation with control of the crossing points although there was

only one bridge, Pollboy Bridge over the Blackwater until the New Bridge was constructed, probably in the early 18th Century. It was in this century that the town expanded beyond its walls that were largely demolished. In the later Middle Ages the Abbey was the centre of an important shrine to Our Lady. It was located on the north side of the town between the town wall and the River Blackwater. It was dissolved in 1540 and a description at the time seems to suggest a fortified site based around a castle within a precinct wall. All trace has since disappeared. After the dissolution the Abbey passed into the hands of John Wakely, which included a house and other buildings, three watermills and a salmon weir. The visitation book of Bishop Dopping records that the nave and chancel were in ruins by 1682. A military barracks was later built on the site. Today Navan has replaced Trim as the administrative capital of County Meath. The town is also home to Tara Mines, Europe's largest lead and zinc mine.

10.3.2 Archaeological and Architectural Heritage Background

There are 537 sites included listed as either National Monuments (5), on the record of Monuments and Places (270), National Inventory of Architectural Heritage (171) and on the Record of Protected Structures (91) within a 1000m metre radius of the proposed route options. All site locations are represented on Figure 10.1, Archaeological and Architectural Features, Volume II.

Archaeological Data

Record of Monuments and Places (RMP)

The RMP is a database recording all archaeological sites in Ireland known to the National Monuments Service established under Section 12 of the 1994 National Monuments (Amendment) Act. It is based on Ordnance Survey 6" sheets, which indicate the location of each monument or place of archaeological interest. For each, a file contains further documentary and photographic data or information relating to an archaeological event such as a site visit, survey or excavation. These are housed in the National Monuments Services in Dublin. The record is constantly updated and focuses on monuments that pre-date 1700. Within the RMP there are two levels of protection. Firstly there is a basic protection for all RMP sites and these include all archaeological sites known to the Department of the Environment, Heritage and Local Government (DoHELG). All recorded monuments also have a constraint zone surrounding the site of 75 metres, which is also protected. Secondly, there are National Monuments, which are afforded a higher level of protection. Any works affecting these sites must be granted directly from the Minister for the Environment. Newgrange and Trim Castle in County Meath are all examples of National Monuments. A 2km wide corridor along each route option was analysed for this study, and included an assessment of the potential visual impact on the archaeological landscape in the study area. There are a number of structures that would be of high visual impact, these are upstanding structures such as churches, castles, abbeys and overgrown remains of elevated enclosures and mounds and archaeological landscapes. The perceived impact is lower where the smaller scale of the features would reduce impact. This can be very subjective and further

inspection will be necessary at the EIS Stage. Table 10.2. indicates RMP sites that are located within a one kilometre radius of the proposed route options.

RMP	Altar-tomb	1
	Architectural fragment	1
	Barrow	1
	Barrow - mound barrow	6
	Battery	1
	Bawn	1
	Building	2
	Burial	2
	Castle - unclassified	3
	Church	22
	Cist	1
	Crannog	4
	Cross	6
	Cross-slab	1
	Earthwork	16
	Enclosure	45
	Excavated feature	1
	Field system	7
	Font	2
	Fortified house	2
	Fulacht fiadh	2
	Grave-slab	2
	Henge	1
	High cross	3
	Holed stone	1
	Holy well	5
	House - 16th/17th century	1
	House - medieval	1
	House - Neolithic	1
	Hut site	1
	Megalithic tomb - unclassified	1
	Moated site	2
	Motte	5
	Motte and bailey	3
	Mound	1
	Non-antiquity	1
	Ogham stone	1
	Pit	2
	Portal-tomb	1
	Rath	79
	Ring-barrow	1
	Rock scribing \ art	1
	Settlement deserted	1
	Souterrain	4
	Standing stone	6
	Stone sculpture	1
	Structure	3
	Tomb	1
	Tower house	7
	Wedge-tomb	3
	(blank) Tota	3
RMP Total		270

Table 10.2 RMP classifications and quantities for all routes

National Monuments

A National Monument is a monument (or remains of) under preservation by the State, as a result of its being considered to be of national importance. As of 2006 the legal basis for this status are the National Monuments Acts 1930 to 2004. The original national monuments act by the current Irish state was enacted in 1930 as the National Monuments Act, 1930. The original itinerary of monuments comprises those to which the Ancient Monuments Protection Act, 1882 applied. The most recent amendment act, the National Monuments (Amendment) Act 2004 includes provisions for the partial or complete destruction of National Monuments by the government.

A National Monument comprises the monument itself, as well as the site of the monument and the means of access to it. Land adjoining this may also be included as part of the National Monument, if required to protect the monument itself. Figure 10.1 Volume II depicts a map of the National Monuments in relation to the three proposed route options. The impact of the proposed development would be deemed very high on any national monument due to their archaeological importance and the legal protection afforded to sites of such status. There are 5 National Monuments within a 1000m radius of the proposed routes.:

Route 1/2:

SMR No.: ME016-006

Nat Grid Ref.: 269059/277292

Townland: Castlekeeran

Classification: Chapel, Crosses

Description: The place is called Diseart Chiarain, the Hermitage of Ciaran, who was a monk of the monastery at Kells nearby, but who is not to be confused with the founder of Clonmacnoise. The monastery was plundered by the Vikings in 949, and by Dermod Mc Murrough in 1170. In the 13th century it passed to the Knights Hospitallers and by the 16th century it was owned by the Plunketts. There are three High Crosses with moulding at the edges, but none of them bears Figure sculpture. One has bosses at the centre of the arms and another has interlacing at the end of the arms. Beside the insignificant remains of a church there is also an Early Christian graveslab, and an Ogham stone with the inscription COVAGNI MAQI MUCOI LUGUNI. In the River Blackwater beside the monastery, there is another High Cross; tradition says that it was dumped in the river by S. Columba when St. Ciaran caught him taking it to his nearby monastery at Kells.

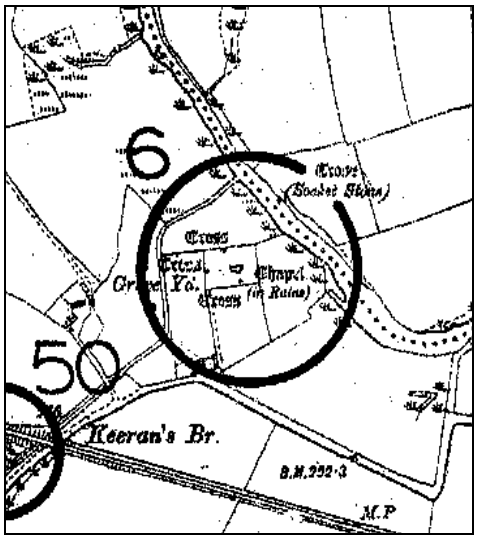


Figure 10.1 National Monument ME016-006

Route 2:

SMR No.: ME024-017

Nat Grid Ref.: 274630/266480

Townland: Rathmore

Classification: Church, cross & base

Description: The church built probably by Sir Thomas Plunkett in the mid 15th century, and dedicated to St Lawrence. It remained in use until at least 1678. Though the nave and chancel were built separately, they were both built around the same time. At each corner there is a tower; that on the northeast being a sacristy with living quarters overhead, while the belfry is at the southwestern corner. There is a fine sedilia and piscina, and a very good east window with sculptures of kings and queens on the outside. The altar has niches containing angels swinging censers, St Lawrence with the grid-iron, bishops, an abbess with a croiser, and the coat of arms of the Plunkett, Fitzgerald, Talbot, Fleming, Eustace, Bellew, Bermingham and Cusack families. There is also a double-effigy tomb of the founder and his wife erected around 1471, as well as a 15th century font. A cross to the north of the church was erected by Christopher Plunkett and his wife Catherine in 1519, and shows St Lawrence (again with grid-iron), St Patrick or an archbishop, an abbess and vine-leaves. The church resembles those at Dunsany and Killeen. The religious site is also associated with a tower house (MH024-101) and a deserted medieval village & field system. The site is located approximately 435 m southwest of the proposed Route Option 2.

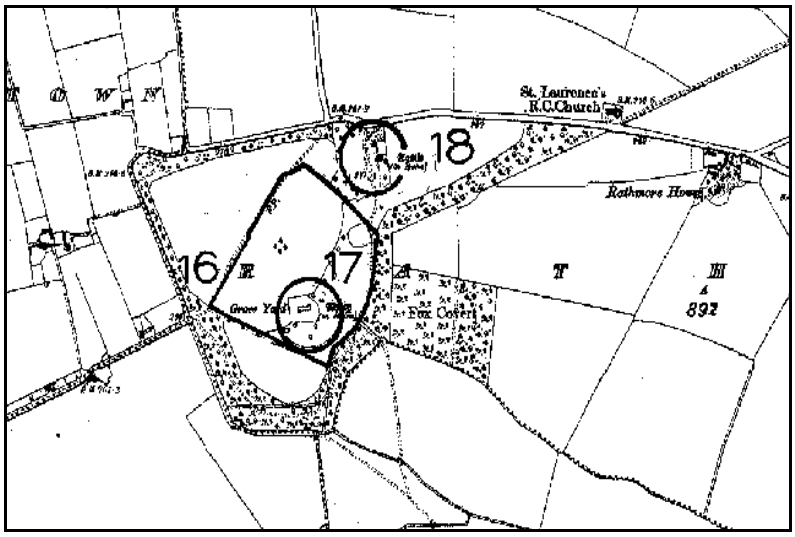


Figure 10.2 National Monument ME024-017

Route 2/3

SMR No.:	ME031-026
Nat Grid Ref.:	285940/259960
Townland:	Bective
Classification:	Abbey

Description: The abbey was founded in 1150 by Murchad O Maeil-Sheachlainn, King of Meath, for the Cistercians, and dedicated to the Blessed Virgin. It is one of the earliest Cistercian abbeys in Ireland. The Abbot sat in the Parliament of the Pale. Hugh de Lacy's body was buried here in 1195, but after a dispute it was later transferred to St Thomas's in Dublin. Of the original 12th century abbey only remnants of the south of the nave arcade, parts of the south transept, the chapter house, part of the west wing of the domestic buildings and some of the doorways in the south wing remain. In the 15th century, the buildings were fortified and great changes took place. The southern arcade of the nave was blocked up, the present cloister and many of the buildings around it (excluding the chapter house) were built. This cloister is the best feature of the abbey: one of the pillars bears a Figure carrying a crozier. The tower and the great hall in the south wing (probably the monks' refectory) were also added in this period. At some later period further alterations took place in the south transept; the oven between the south transept and the chapter house was inserted, and an external entrance to the south range was also added. The monastery was suppressed in 1536. In the following year, the abbey and its lands were leased to Thomas Agarde, and they were bought by Andrew Wyse in 1552. Subsequently it passed to the Dillon and then to the Bolton families.

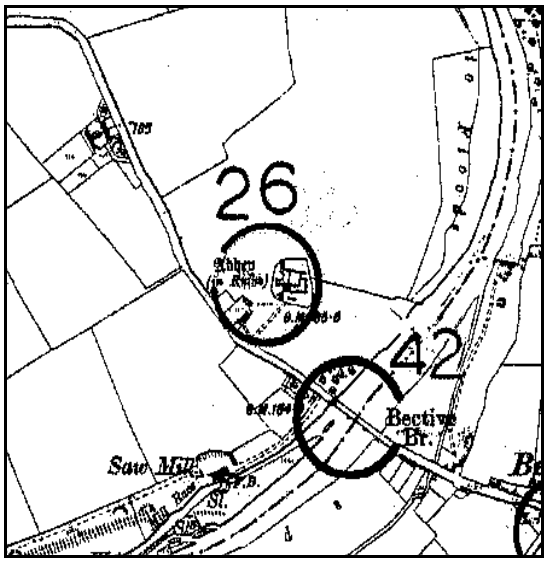


Figure 10.3 National Monument ME031-006

Route 3A

SMR No.: ME011-006

Nat Grid Ref.: 278520/284190

Townland: Robertstown

Classification: Fortified House

Description: A three-storey castle with gabled roof built in the 17th century. The ground floor is a series of vaulted rooms and the first floor is divided into three rooms. Its most unusual features are the two projecting towers on the first floor, which have corbels at the bottom; comparisons are found in Scottish castles. This site lies 610m east of the proposed Route Option 3A.

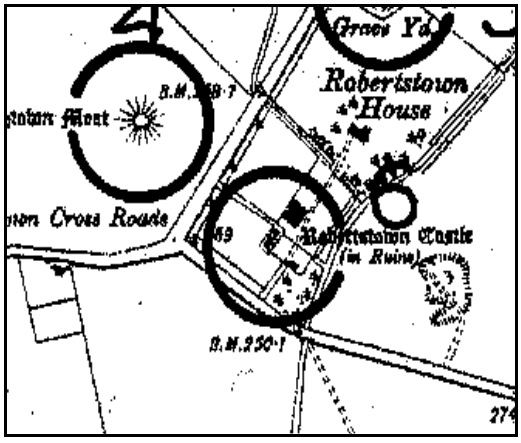


Figure 10.4 National Monument ME011-006

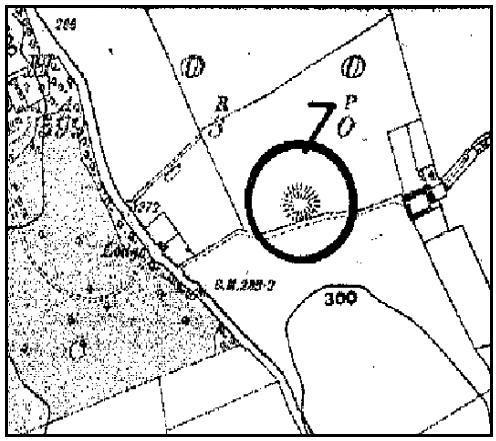


Figure 10.5 National Monument ME011-007

Route 3B

SMR No.:	ME011-007
Nat Grid Ref.:	281813/284263
Townland:	Rahood
Classification:	Enclosure

Description: A bivallate ringfort with a souterrain within the interior. This site lies 390m east of the proposed Route Option 3B.

Further Archaeological Constraint Zones

Cavan County Council have also designated the areas below as locations to be considered in proposed development plans:

Mullagh Lake: is a place of archaeological, historical and cultural significance. The site of a castle, built in 1485, is located on the lakeshore. This area has contributed significantly to the Irish and English literature. It is the birthplace of St. Killian, patron of Mullagh and a heritage centre, detailing the life and eventual martyrdom of St. Killian, is located in the village. Mullagh Lake is an amenity area with a lay-by and seats and affords fine views of the surrounding countryside and the site of the 15th century castle.

Moybologue Church: is a place of archaeological and historical significance. All that remains of the original church at Moybologue is a ruined two-storey building with a number of windows. To the south of the nave of the church is what is thought to be a priests dwelling and to the north of the nave is a number of crosses, which may have been gravestones and are dated 1684 and 1686.

Dunaree Forest Park, Kingscourt: This forest park contains a rich archaeological, historical, architectural and cultural heritage. Apart from its rich forestland there are many buildings of significance dating from the nineteenth and twentieth centuries. Cabra Cottage is one such building and to its north is the site of the old Cabra village, which is marked on early editions of ordnance survey maps. Also in the park is a bridge known as 'Cromwell's Bridge', built most likely by Cromwellian forces. There are a number of features associated with the Pratt family whom previously resided here, including a wishing well and an icehouse. The Forest Park was established in 1959 when the Forestry and Wildlife Service acquired the lands.

Architectural Data (post 1700 AD)

There is a high degree of overlap between the National Inventory of Architectural Heritage and the Record of Protected Structures. For the most part the impact on these structures is deemed high as they are upstanding structures of cultural importance for example a country house or a church.

National Inventory of Architectural Heritage (NIAH)

The NIAH is a unit within the DoEHLG engaged in compiling an evaluated record of the architectural heritage of Ireland. Where an NIAH survey of a particular area has been published, relevant planning authorities will be provided with information on structures within the area of that survey. The planning authority can assess the content of, and the evaluations in, an NIAH survey with a view to the inclusion of structures in the RPS according to the criteria outlined in these guidelines. Structures included within this inventory are deemed of architectural, historical, archaeological, artistic, cultural, scientific, technical and social interest. An inventory was compiled for County Meath in 2004. No inventory has been carried out for County Cavan and there are no plans to do so in the foreseeable future according the DoHELG.

NIAH	bishop's palace	1
	bridge	10
	building misc	1
	church hall/parish hall	1
	church/chapel	9
	country house	5
	demesne walls/gates/railings	2
	farm house	2
	farmyard complex	1
	forge/smithy	1
	gate lodge	1
	house	11
	mill (water)	1
	outbuilding	4
	post box	1
	presbytery/parochial/curate's house	3
	public house	2
	school	7
	sexton's house	1
	stables	2
	teacher's house	1
	water pump	3
	worker's house	1
NIAH Total		71

Table 10.3 NIAH classifications and quantities for all routes

Record of Protected Structures (RPS)

The law in relation to this subject is set out in the Planning and Development Acts, 2000 and 2001 and the Planning and Development Regulations, 2001 and 2002. Under new arrangements which came into operation on 1 January 2000, the system of listing buildings has been replaced with strengthened procedures for the preservation of protected structures and structures in architectural conservation areas. Other historic structures may alternatively, or in addition, be protected under the National Monuments Acts 1930 - 1994. The conservation principles of care and protection of the architectural heritage were first introduced under earlier planning legislation, which facilitated the listing of significant buildings and the formulation of policies and objectives relating to such structures. These legislative provisions were superseded by the introduction of the Local Government (Planning and Development) Act 1999 and then by Part IV of the Planning and Development Act 2000. The main features of the Act are:

1. Planning authorities have a clear obligation to create a record of protected structures (RPS) which includes all structures or parts of structures in their functional areas which, in their opinion, are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. This record forms part of a planning authority's development plan.

2. Planning authorities are also obligated to preserve the character of places and townscapes which are of special architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest or that contribute to the appreciation of protected structures, by designating them architectural conservation areas (ACAs) in their development plan (see following paragraph).
3. Development plans must include objectives for the protection of such structures and the preservation of the character of such areas to ensure proper and sustainable planning and development.

In regard to the impact of the proposed route options visual impact of each pylon will be a primary concern. There are 91 RPS structures within the three route options. Figure 10.1 “Archaeological and Architectural Heritage”, Volume II depicts the location of both NIAH and RPS structures. Should the positioning of a pylon impinge on or near a protected structure and its landscape it would be considered high visual impact.

Vernacular Architecture

Vernacular architecture encompasses the homes and workplaces of the ordinary people built by local people using local materials. This is in contrast to formal architecture, such as the grand estate houses of the gentry, churches and public buildings, which were often designed by architects or engineers. The majority of vernacular buildings are domestic dwellings. Examples of other structures that may fall into this category include shops, outbuildings, mills, limekilns, farmsteads, forges, gates and gate piers. This architecture of the ordinary people was once commonplace but is becoming increasingly rare. For example, Meath was once renowned for its thatched cottages. The majority of vernacular buildings are domestic dwellings.

Architectural Conservation Areas (ACA)

An ACA is a place, area, group of structures or townscape, which is of special architectural, historical, archaeological, artistic, cultural, scientific and social or technical interest. They also include areas, which contribute to the appreciation of Protected Structures. It is concerned as much with the setting of the structures and their interrelationship, though it may relate to urban forms of distinctiveness or to a particular relationship, or landscape settings. The effect of having a building within the Architectural Conservation Area, has the effect of de-exempting works to the exterior of any structure within the ACA where the proposed works would materially affect the character of the area concerned.

10.4 PREDICTED IMPACTS

South County Cavan and County Meath both have a significant archaeological heritage, which provides a valuable and valued cultural, educational and tourism resource. Negative impacts could permanently affect this irreplaceable resource. It is necessary to have regard to the potential environmental impacts of new infrastructure and industrial development, such as noise and air pollution, impinging on views, tranquillity and character and the consequences that such development may have for the cultural heritage landscape.

Overhead cables, substations and communications masts are listed as one of the most likely forms of development to occur, which are causing changes to the overall appearance, function and condition of the landscape. Figure 10.6 on page 102 highlights the different types of sites and structures along the three route options, which intersect the proposed routes under the criteria outlined in Table 10.1 above. These criteria assess potential impacts upon individual sites in close proximity to the proposed route options, However Cultural Heritage features are not distributed evenly throughout the landscape and there are areas which fall outside these criteria but due to the type and density of features they are worthy of mention and should be avoided if possible. Please refer to Figure 10.1 Volume II for location details.

Route Option 1: Within a 1000m radius surrounding route option 1 a total of 176 sites are assessed. Using the criteria outlined in Table 10.1 there are 13 sites, which could be impacted upon.

- There is a National Monument, approximately 635m east of this route option. The site (ME016-006) is classified as a church and location of a number of crosses in Castlekeeran townland, (See Figure 10.1 Volume II, Inset I);
- Of the listed sites within the NIAH there is a bridge, a forge, a house and an outbuilding within the vicinity of the proposed power line. The impact on these structures is perceived to be **high.** Within the extended viewshed there are schools (5), churches/chapels (4), bridges (6), country houses (2), demesne walls/gates/railings (2), stables (2), a miscellaneous building, a house, an outbuilding, a presbytery/parochial/curate's house, water pumps (2) and a teacher's house;
- RMP's are represented densely along this route option;
  - Within a 250m buffer zone there are 19 RMP monuments. Sites that will potentially suffer a **medium visual impact** are a tower house, a motte and bailey and a moated site.
  - Further away within the extended viewshed) 87 RMP sites may be impacted upon. Churches, high crosses, tower houses, a mound barrow, a battery, a burial, a cross-slab, an unclassified megalithic tomb, a moated site, a motte, an ogham stone, a ring-barrow and a wedge-tomb are located within 1000m of the proposed route.

- **No visual impact** is perceived on two field systems, a site of non-antiquity, an excavated feature and a pit. Three sites are listed as *blank,* no impact can be perceived until the site type is assessed.

- Thirty protected structures are situated within the extended buffer along Route Option 1. Six structures are located in the vicinity of the proposed route. The remaining structures are located within the extended viewshed of the proposed route and would potentially suffer a low visual impact.

Route Option 2: Within a 1000m radius surrounding Route Option 2 there is a total of 154 sites of cultural heritage significance. Using the criteria outlined in Table 10.1 there are 11 sites, which could be impacted upon.

- There are two National Monuments located within a kilometre of Route Option 2. ME016-006, an ecclesiastical complex at Castlekeeran townland lies approximately 400m east of the proposed power line (see Figure 10.1, Inset I in Volume II). ME024-017 a church, cross & base at Rathmore townland is approximately 360m from this route option (Figure 10.1, Inset P in Volume II);

- Of the listed sites within the NIAH there is a bridge and a presbytery/parochial/curate's house within the buffer zone of the proposed power line. The impact on these structures is perceived to be high. Within the extended buffer zone there are churches/chapels (5), houses (3), schools (3), bridges (2), country houses (2), outbuildings (2), a farmyard complex, a forge, a water mill and a teacher's house. A water pump and a post-box are also located within this area however there will be no impact on these protected structures;

- There are 95 RMP sites within 1000m of this proposed route:

- Within the immediate vicinity there are 3 sites that will potentially suffer a **high visual impact** including a tower house, a motte and a moated site.

- Further away within the extended viewshed 92 RMP sites may be impacted upon. Raths, enclosures, holy wells, an earthwork, churches, high crosses, mound-barrows, mottes, an altar-tomb, a barrow, a bawn, an unclassified castle, a cross-slab, a 16th/17th century house, an ogham stone, a deserted settlement, a tomb, a tower house and a wedge tomb are located within this range. Sites that may potentially receive a low impact are raths, enclosures, earthworks, crannogs, crosses, holy wells, a hut-site and a stone sculpture. **No impact** is perceived on three field systems, two fonts and a souterrain located within 250m – 1000m from the route option. One site is listed as *blank,* no impact can be perceived until this site type is assessed.

- Thirty-one protected structures are situated within the extended buffer along Route Option 2.

Route Option 3A: Within a 1000m radius surrounding Route Option 3A there is a total of 184 sites cultural heritage significance. Using the criteria outlined in Table 10.1 there are 14 sites, which could be impacted upon.

- There is a National Monument, at Robertstown townland on this route option. The site (ME011-006) is classified as a fortified house and is located 610m east of the proposed power line, (see Figure 10.1, Inset V in Volume II);
- Of the listed sites within the NIAH there is a bridge and a school within the immediate of the proposed power line. The impact on these structures is perceived to be high. Within the extended buffer zone there are houses (9), churches/chapels (4), country houses (2), farm houses (2), presbytery/parochial/curate's houses (2), public houses (2), a bishop's palace, a bridge, a church/parish hall, a farmyard complex, a gate lodge, a water mill, an outbuilding, a school, a worker's house and a sexton's house. A water pump and a post-box are also located within this area however there will be no impact on these protected structures;
- There are 101 RMP sites within 1000m of this proposed route:

➢ Within the immediate vicinity (250m) there are 3 sites that will potentially suffer a **high visual impact** including a churches, a mound-barrow, and a fortified house. Raths (5), enclosures (4), earthworks (2) and a standing stone will be subjected to **medium impacts. Low visual impact** may affect a field system.

➢ Further away within the extended viewshed 85 RMP sites may be impacted upon. Churches (12), mound barrows (4), mottes (3), unclassified castles (2), fortified houses (2), grave slabs (2), tower houses (2), a bawn, a building, a henge, a 16th/17th century house, a motte and bailey, a portal tomb and a deserted settlement are located within this range. Due to the extended distance and scale of the structures the predicted impact should be **moderate.** Sites that may potentially receive a low impact are raths (23), enclosures (9), standing stones (3), earthworks (3), crosses (2), a mound, a holy well and an architectural fragment. **No impact** is perceived on two fulacht fiadhs, a field system, a font, a holed stone and a pit located within 250m – 1000m from the route option.

- Forty-eight protected structures are situated within the extended buffer along Route Option 3A and would potentially suffer a low visual impact.

Route Option 3B: Within a 1000m radius surrounding Route Option 3B there is a total of 190 sites of cultural heritage significance. Using the criteria outlined in Table 10.1 there are 12 sites which could be impacted upon.

- There is a National Monument, at Rahood townland on this route option. The site (ME011-007) is classified as a bivallate ringfort and is located 390m east of the proposed power line, (see Figure 10.1, Inset V in Volume II);
- Of the listed sites within the NIAH there is a bridge and a school within the viciniity of the proposed power line. The impact on these structures is perceived to be high. Within the extended buffer zone there are houses (7), churches/chapels (4), country houses (2),

presbytery/parochial/curate's houses (2), public houses (2), a bishop's palace, a bridge, a church/parish hall, a farm house, a farmyard complex, a gate lodge, a water mill, an outbuilding, a school, a worker's house and a sexton's house. A water pump and a post-box are also located within this area however there will be no impact on these protected structures;

- There are 112 RMP sites within 1000m of this proposed route:

➢ Within the immediate vicinity there is one monument, a moated site which will potentially suffer a **high visual impact**. Raths (7), enclosures (4), earthworks (2) and a cross will be subjected to **medium impacts. Low visual impact** may affect a field system.

➢ Further away within the extended viewshed 96 RMP sites may be impacted upon. Churches (12), mound barrows (3), buildings (3), unclassified castles (2), mottes (2), tower houses (2), a bawn, a fortified house, a grave-slab, a henge, a 16th/17th century house, a motte and bailey, a portal tomb and a deserted settlement are located within this range. Sites that may potentially receive a low impact are raths (27), enclosures (16), earthworks (4), crannogs (2), crosses (2), structures (2) a holy well, a Neolithic house, a mound, a rock scribing/art and a standing stone. **No impact** is perceived on two field system, a font, a holed stone, and a pit located within 250m – 1000m from the route option.

- Forty six protected structures are situated within the extended buffer along route option 3B. Nine structures are located within the immediate vicinity of the proposed power line. This impact on these protected buildings would be high. The remainder of the structures are located between 250m and 1000m from the proposed route and would potentially suffer a low visual impact.

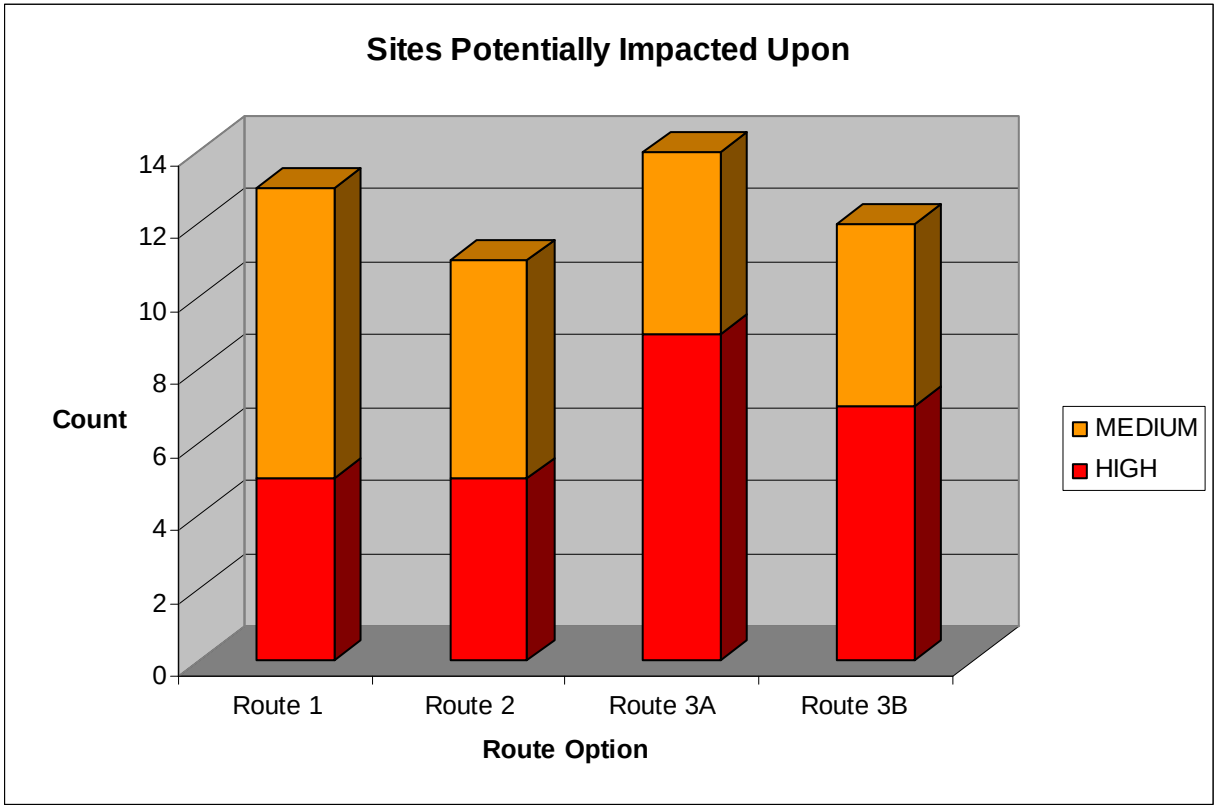


Figure 10.6 Indication of Number of Sites Potentially Impacted Upon for Each Route Option

The areas of high visual impact along the route options are discussed below. This analysis does not disregard any other sites of cultural heritage importance however highlights the locations of densely situated highly visible sites and individual sites of importance in the cultural landscape.

The areas discussed are highlighted on Figure 10.1 “Archaeological & Architectural Heritage Constraints”, Volume II.

ROUTE OPTION 1: Along Route Option 1 the following areas were identified:

Figure 10.1, Inset A in Volume II: at this location, Route Options 1 & 2 will be in close proximity to a motte. Given the general elevated location of this site type it would allow a broad viewshed over the surrounding landscape.

Figure 10.1, Inset B in Volume II: In this area Route Option 1 runs directly south of a tower house which is a listed RMP and RPS structure. At the northern extent of the highlighted area the proposed power line may be visible from an RPS building and a rath which is located on an elevated location in the landscape.

Figure 10.1, Inset C in Volume II: At the southern extent of this area, Route Option 1 lies close to an enclosure. This proposed path will also run directly alongside an earthwork. Located southwest of the route in this area are a church (RMP & RPS status) and a motte both highly visible sites in the landscape. The proposed route could have a potential impact on the aforementioned sites in this area.

Figure 10.1, Inset D in Volume II: In this area, a tower house is situated directly southwest of the suggested route. This structure is listed as an RMP and a RPS. At the northern extent of the highlighted area, a motte and bailey is located southwest of the power line. This elevated characteristic of this site type and the close proximity of the route option would suggest that the power line would be highly visible from the site locations.

Figure 10.1, Inset E in Volume II: There is a high density of raths and enclosures in this section of Route Option 1, of these two are situated directly west of the proposed power line and could suffer a negative visual intrusion.

Figure 10.1, Inset F in Volume II: This burial ground is on a prominent elevated location in the landscape. As the proposed power line is to run west of the site, views from this location would be inhibited by the construction of the power line.

Figure 10.1, Inset G in Volume II: In this area Route Option 1 runs directly west of an enclosure and an unclassified megalithic structure, the latter of which is located on a prominent topographical location. A number of RPS and NIAH structures lie west of the proposed power line in this area.

Figure 10.1, Inset H in Volume II: Route Option 1 will directly impact on an enclosure at the southern extent of the highlighted area. This route will also run directly east of a rath in this area.

Figure 10.1, Inset I in Volume II: Route Option 1 lies approximately 635m west of National Monument ME016-006 and Route Option 2 lies approximately 400m west of this ecclesiastical complex. A number of RPS structures are located in between the two route options at Carnacross townland.

Figure 10.1, Inset J in Volume II: The proposed power line will run directly west of an earthwork at the southern extent of the highlighted area. The route will directly impact upon a rath at the northern extent of this section.

Figure 10.1, Inset K in Volume II: Route Option 1 runs east of a cist burial and directly along the eastern extent of an enclosure in this area. Route Option 2 will extend west of two raths and east of an enclosure.

ROUTE OPTION 2: Along Route Option 2 insets A, I and K above, need to be consulted also.

Figure 10.1, Inset L in Volume II: Along this section of the Route Option 2/3 are a high number of monuments upon which the perceived impact would be high. These are often upstanding highly visible sites in the landscape and the proposed power line could have a high impact on the sites of cultural heritage.

Figure 10.1, Inset M in Volume II: Southwest of Route Option 2/3 there is a concentration of sites of archaeological and architectural importance. These sites are often high in elevation and are widely visible in the surrounding landscape. At the northern extent of the highlighted area the route passes close to two raths and an enclosure. The proposed power line may have a high impact on these sites and structures.

Figure 10.1, Inset N in Volume II: Approximately 1100m northeast of the Route Option 2/3 is the location of Bective Abbey, a National Monument (ME031-026). Along with this important site are 2 tower houses, 2 bridges, a number of enclosures and a church. The perceived impact on this

collection of monuments would be profound. In the northwestern extent of this section, an enclosure and a listed RPS structure could also suffer a visual impact as a result of this route option.

Figure 10.1, Inset O in Volume II: A listed RPS structure lies in close proximity northeast of the proposed Route Option 2/3.

Figure 10.1, Inset P in Volume II: This section of the proposed power line traverses an area with a high density of upstanding highly visible monuments and RPS structures. Of higher significance is a National Monument ME024-017 discussed earlier. The site is located approximately 360m from the route option.

Figure 10.1, Inset Q in Volume II: Within this section the proposed power line runs directly alongside two raths and close to a protected structure.

Figure 10.1, Inset R in Volume II: In the area highlighted the impact is perceived as high due to the cluster of sites and the elevated location allowing a broad viewshed over the surrounding landscape.

ROUTE OPTION 3: Along Route Option 3 insets A and L-O above, need to be consulted also.

Figure 10.1, Inset S in Volume II: West of Route Option 3 at Donaghpatrick townland there is a concentration of sites of archaeological and architectural importance. These sites are often high in elevation and are widely visible in the surrounding landscape. At the northern extent of the area reviewed, there is a density of RPS and NIAH buildings. The close proximity if the proposed power line would have a high impact on these sites and structures.

Figure 10.1, Inset T in Volume II: There are cluster of Bronze Age standing stones along the river bank at this section of the route option. Along with these, there is a church situated east of the proposed power line indicating this area to be a ritual landscape.

Figure 10.1, Inset U in Volume II: In the area below the impact is perceived as high due to the cluster of sites and the close proximity of the proposed power line.

Figure 10.1, Inset V in Volume II: This section of Route Option 3A runs 610m west of a National Monument (ME011-006), a fortified house along with a number of upstanding highly visible monuments including a church and a motte.

Figure 10.1, Inset V in Volume II: Just before the northern convergence of Route Option 3A and 3B there is a National Monument within 390m of the proposed power line. There is also a high density of raths and enclosures in this section of Route Option 3B. While it is clear that the route aimed to avoid the dense cluster of RMP sites the route could have a visual impact on the monuments. Moynagh Lough is also the location of the earliest recorded human activity in County Meath, discussed earlier. As a result this landscape would be deemed of high archaeological sensitivity.

Figure 10.1, Inset W in Volume II: While there is a concentration of enclosures and raths along the northern extent of Route Option 3 only one site may suffer a direct visual impact from the proposed power line.

10.5 EVALUATION OF ROUTE OPTIONS AND CONCLUSION

Figure 10.6 depicts the possible impacts, which would have a bearing on the visual landscape of the sites within an area defined by the criteria outlined in Table 10.1.

The following measures would aid in the preservation and protection of all protected archaeological sites and monuments, protected structures, conservation areas, and their settings to a degree appropriate to the need to safeguard their historic integrity. The recommendations are directed primarily at maintaining scenic vistas and panoramic views from key vantage points and towards key landmarks and features within the landscape in order to maintain the visual integrity of sensitive and exceptional - high value areas.

- Existing protected views must be maintained.
- This development due to its nature will affect the setting, views and landscape of the monuments, however mitigation measures where feasible will be implemented to protect all of the above.
- To ensure that any development, modifications, alterations, or extensions affecting a protected structure, adjoining structure or structure within an ACA are sited and designed appropriately, and are not detrimental to the character of the structure or to its setting or the general character of the ACA.
- To avoid the location of telecommunications antennae & support structures, windfarms, large-scale enterprise, extractive Industries and other such visually obtrusive structures or activities in fragile landscapes such as areas of Special Visual Quality or archaeological heritage, where views and/or prospects are to be preserved and in areas adjacent to national monuments, archaeological sites or listed buildings or structures.

County Meath has a rich archaeological heritage, which includes some of the most important archaeological sites in the country, all of which are influenced by land use and management. The mitigation measures aim too preserve the integrity of the landscape setting of important historic landscape features for the purposes of maintaining unique and unspoilt areas of landscape character, visual amenity and integrity.

Overall grading of the impacts on each of the route options can be seen above in Figure 10.6. The grading system indicates that Route Option 2 has the lowest potential impact.

11 CONCLUSION

11.1 INTRODUCTION

The following chapter combines all of the specialist studies from previous chapters and details how each route option was compared and contrasted. This chapter details the methodology for classification of each route option and subsequently explains why a particular route option has emerged as being preferable to the other options.

All of the data that had been gathered during the course of the Constraints Report has been analysed and compared using GIS as a tool to assign a classification to each part of the route options. The classifications for each section of the route options have been determined by examining the level of sensitivity of the area that it passes through.

This Chapter should be read in conjunction with Figure 11.1 and 11.2 in Volume II.

11.2 METHODOLOGY

The methodology used in determining the emerging Preferred Route included:

- **Step 1**: Developing a matrix for each of the constraints, which may impact or exclude a route option. Table 11.1 below details the constraints that were taken into account, as detailed throughout the report;

- **Step 2**: The subsequent step included colour coding the various route options using GIS i.e. very “high sensitivity” was coloured red, while “low sensitivity” was coloured green;

- **Step 3**: Analysing the classifications by tabulating the information obtained from the GIS System and using this to graph the results and compare each of the route options.

Each route option was classified, and in cases where the route passed through more than one type of classified area the highest classification was used in colour coding the route option. For example if a section of the route passed through both a “medium” sensitivity landscape area and a “high” sensitivity heritage site, then the “high” classification was used to colour code that section of the route.

Table 11.1 Matrix Developed for Classification of Route Options

Classification	Buildings	Heritage Sites	Landscape	Conservation	Subsoil	Surface Water
Very High Sensitivity	<60m from GeoDirectory point*	<250m from Very High feature centre point	In Very High Sensitivity Area	In a Designated Area	N/A	N/A
High Sensitivity	N/A	<150m from High feature centre point	In High Sensitivity Area	N/A	N/A	Water Crossing
Medium Sensitivity	N/A	<100m from Medium feature centre point	In Medium Sensitivity Area	N/A	Significant subsoil where a pylon is required**	N/A
Medium to Low Sensitivity	N/A	<50m from Low feature centre point	In Low Sensitivity Area	N/A	N/A	N/A
Low Sensitivity	N/A	No Heritage Sites	Not in a Sensitive Area	Not in a Designated Area	No Significant Subsoil	No Water

Note:

In all cases the distances are taken from the outer extremity of the pylon, which is 10m from the centre of the route line.

*It is assumed that if a GeoDirectory point is less than 60m from the outer extremity of the power line then the outer wall of the building will be less than 50m away.

** Significant subsoil where a pylon is required is either at a point where the route option changes direction, or crosses the subsoil for a continuous distance of >300m.

11.3 EVALUATION

Using the GIS data, the graph in Figure 11.1 was produced and was used to analyse the route options. On comparing this data, it is apparent that all of the route options evaluated could be viable as they have similar characteristics when classified. In balance however, Route Option 3A and Route Option 3B both appear to be the Emerging Preferred Route Options, as they have very similar merits.

These route options are about 53.5km long, which is significantly shorter than the other route options (see Figure 11.2, p.114). Route Option 1 is 63.03km long and Route Option 2 is 58.87km in length. This would mean that the impacts associated with the power lines would be spread over a shorter distance in Route Options 3A and 3B.

Route Options 3A and 3B have the shortest lengths of “Very High Sensitivity” classifications, less “High Sensitivity” than Route Option 2, and only slightly more “High Sensitivity” than Route Option 1. They also have significantly less “Medium Sensitivity” compared to the other route options, and they have the lowest overall impact when all of the factors are taken into account.

The classifications determined for each Route Option are detailed in Tables 11-2 to 11-4 overleaf. Each table contains the particular constraints causing the classifications assigned, the length of the route option affected and whether the route option can be modified easily to avoid the constraint. Note that the No. of Occurrences field is a count of the number times the of route line is affected by a constraint type, not the number of features that could be impacted. For example, if a route line passes close to a cluster of heritage points that are “High Sensitivity” then this would only count as 1 occurrence of heritage features causing “High Sensitivity”.

In all of the route options, the single biggest factor affecting the classifications of the lines is the presence of landscape visual impact areas. These are a combination of scenic views, scenic route corridors and vulnerable landscapes, and account for the majority of “High Sensitivity” sections as well as a significant amount of “Very High Sensitivity” classifications on all of the route options (see Volume II, Figure 11.2). Rivers and streams account for the “High Sensitivity” ratings for surface water crossings that contribute to the classifications of each route option significantly. Only one designated conservation area is crossed by each route option, which contributes to the “Very High Sensitivity” classifications. Only a few buildings are encountered by the route options, but upon closer inspection of these points it is apparent that all of these could be avoided by changing the route line slightly to move it further from buildings.

Table 11.2 Route Option 1 Classification Detail

Classification	Constraint	No. of Occurrences	Total Length of Route Affected (m)	No. Avoided by Slight Route Modification
Very High	Building	1	73	1
Very High	Designated Conservation Area	1	29	
Very High	Landscape Visual Impact	4	519	
High	Heritage Site	2	469	1
High	Landscape Visual Impact	9	7173	
High	Surface Water Crossing	31	2216	
Medium	Heritage Site	7	847	3
Medium	Significant Subsoil	7	2006	1
Medium	Landscape Visual Impact	3	3210	
Medium-Low	Landscape Visual Impact	8	4314	

Of the options studied, Route Option 1 is the least affected by landscape visual impact but has the greatest length of line affected by surface water crossings. It also crosses more significant subsoils, but has the least impact on the Designated Conservation Area as it crosses at a narrower point than the other route options. This route option has the highest total length affected by "High" and "Medium" heritage sites, however 4 of the 9 areas where this occurs can be avoided by modifying the route line slightly.

Table 11.3 Route Option 2 Classification Detail

Classification	Constraint	No. of Occurrences	Total Length of Route Affected (m)	No. Avoided by Slight Route Modification
Very High	Building	2	171	2
Very High	Designated Conservation Area	1	142	
Very High	Landscape Visual Impact	2	183	
High	Heritage Site	2	455	1
High	Landscape Visual Impact	15	9000	
High	Surface Water Crossing	38	1538	1
Medium	Heritage Site	4	461	2
Medium	Significant Subsoil	2	639	
Medium	Landscape Visual Impact	3	3636	
Medium-Low	Landscape Visual Impact	1	112	

Route Option 2 has the highest total of "Very High" and "High Sensitivity" landscape visual impacts and the most "Medium Sensitivity" for this constraint. It has the highest number of surface water crossings, but a shorter length of line is involved compared to Route Option 1. It has the highest equal length of line crossing the designated conservation area at the same point as Route Options 3A and 3B.

Table 11.4 Route Option 3A Classification Detail

Classification	Constraint	No. of Occurrences	Total Length of Route Affected (m)	No. Avoided by Slight Route Modification
Very High	Building	3	179	3
Very High	Designated Conservation Area	1	142	
Very High	Landscape Visual Impact	1	90	
High	Heritage Site	5	585	2
High	Landscape Visual Impact	10	8924	
High	Surface Water Crossing	28	1298	1
Medium	Heritage Site	5	606	1
Medium	Landscape Visual Impact	1	1270	
Medium-Low	Landscape Visual Impact	9	8476	

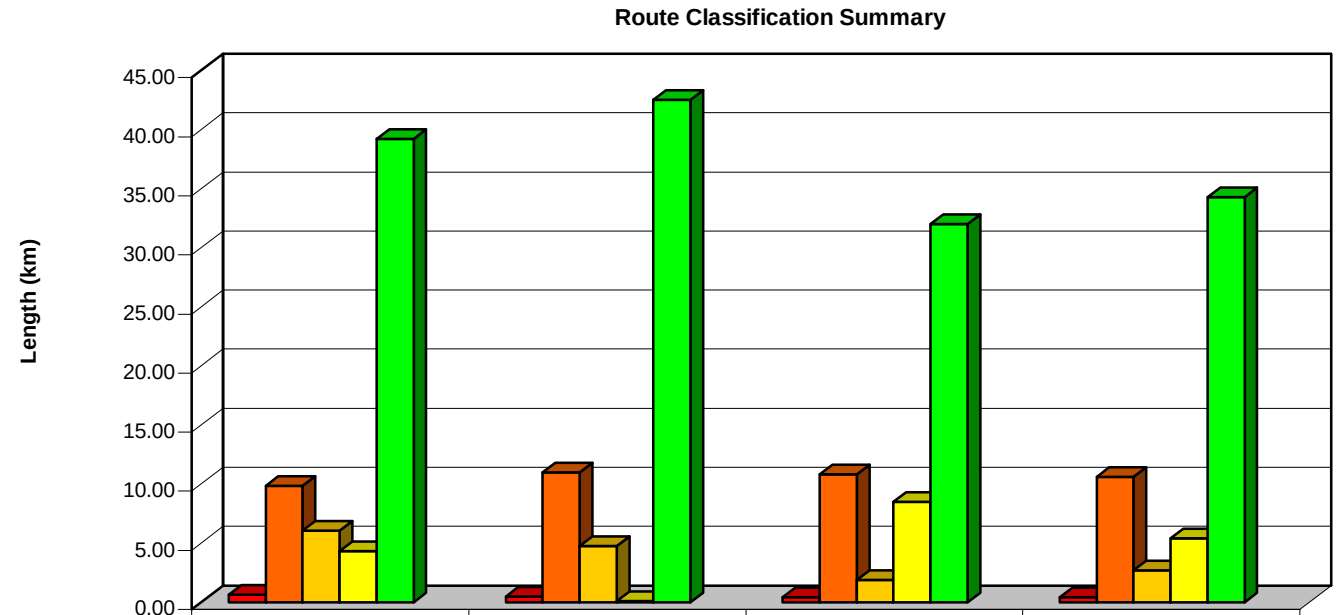
Table 11.5 Route Option 3B Classification Detail

Classification	Constraint	No. of Occurrences	Total Length of Route Affected (m)	No. Avoided by Slight Route Modification
Very High	Building	4	204	4
Very High	Designated Conservation Area	1	142	
Very High	Landscape Visual Impact	1	90	
High	Heritage Site	4	298	1
High	Landscape Visual Impact	10	8924	
High	Surface Water Crossing	32	1383	
Medium	Heritage Site	6	686	
Medium	Significant Subsoil	3	721	
Medium	Landscape Visual Impact	1	1270	
Medium-Low	Landscape Visual Impact	11	5407	

Route Options 3A and 3B follow the same path for the most part, and are similar in that they both have a lower overall length classified as “Very High Sensitivity” than the other two route options. They are also the shortest route options in total, and have the shortest length that is crossing surface water features.

The key differences are that Route Option 3A does not encounter any significant subsoil areas whereas Route Option 3B does, however it is slightly longer overall and is affected by a “High Sensitivity” heritage site that Route Option 3B avoids. Route Option 3B also crosses 4 more surface water features than Route Option 3A.

Figure 12.1 overleaf depicts the classifications assigned to each of the route options on a single graph to allow for direct comparisons. It quantifies the length of power line that falls into each of the classification categories, ranging from “Very High Sensitivity “ to “Low Sensitivity”.



Classification	Route 1 (km)	Route 2 (km)	Route 3A (km)	Route 3B (km)
Very High	0.62	0.50	0.41	0.44
High	9.86	10.99	10.81	10.60
Medium	6.06	4.74	1.88	2.68
Med-Low	4.31	0.11	8.48	5.41
Low	39.20	42.53	31.99	34.30
Total	63.03	58.87	53.56	53.42

Figure 11.1 Route Classification Summary

Figure 11.2 below details the lengths of each of the route options. It is apparent from this figure that Route Option 3B is the shortest route option at 53.42km, with Route Option 3A being very similar at 53.56km in length. Route Option 1 is the longest at 63.03km in length, although it should be noted that 2.97km of this follows an existing 400kV overhead power line near Woodland and existing pylons could be utilised for this section.

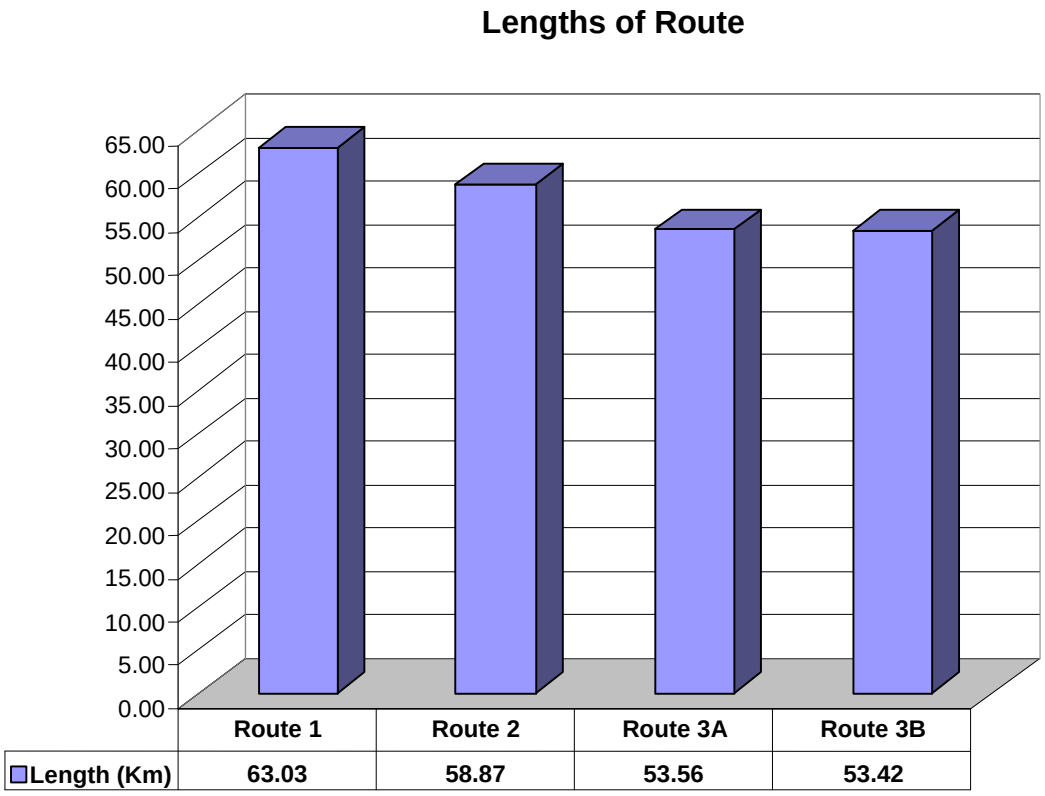


Figure 11.2 Lengths of Route Options

11.4 CONCLUSIONS

From the Desktop Constraints Study and the site visits a number of route options were analysed. The specialist information was collated and a systematic process was developed and applied to classify the route options based on the significant constraints (See Table 11.1 above). From comparing the classified routes, Route Options 3A and 3B were identified as the Emerging Preferred Route Options.

The next stage is to carry out further investigations on the Emerging Preferred Route Options by examining the aerial photography, refining the route option lines further, and then completing a detailed EIS.