



Consolidated Environmental Statement Addendum

Volume 1
Non-Technical Summary
June 2015



Tyrone Cavan
Interconnector

The current. The future.



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Background to the Project

1. SONI¹ is seeking consent from the Northern Ireland Department of the Environment, (DOE), for a new substation at Turleenan, Moy, County Tyrone and an overhead electricity transmission line from this new substation to a point on the border with the Republic of Ireland in County Armagh.
2. The electricity networks in Northern Ireland and the Republic of Ireland were initially independent of each other. However, they are both now joined together (or interconnected), and they operate today as a single all-island electricity network. Unfortunately, the existing interconnection arrangements severely limit the amount of electricity that is allowed to flow across the both jurisdictions, and this limitation is causing inefficiency and increased operating costs. These additional costs mean that all electricity customers on the island of Ireland are paying more for their electricity than would be the case if the limitations were removed.
3. The new transmission line being jointly proposed by SONI and EirGrid² will form a second independent interconnection link between Northern Ireland and the Republic of Ireland and will enable significantly increased power transfer capacity on the island of Ireland.
4. The additional power transfer capacity will be especially important for electricity customers in Northern Ireland. Improved access to the all-island electricity market will help to reduce electricity prices, and the improved transfer capacity will significantly improve the scope for use of renewable energy from wind generators and will also provide secure access to a larger number of power generation sources.
5. The submitted planning application seeks consent to construct the Northern Ireland element of the proposed interconnector. An extensive Environmental Impact Assessment (EIA) has been carried out, and an Environmental Statement (ES), which reports on the findings of this assessment, has been prepared and provided to the DOE in support of the planning application. The ES has been consolidated since its original submission in December 2009 to take account of additional reports (addenda) submitted in 2011. The Consolidated ES (as it is referred to) was published in May 2013. It updated the assessment of the Tyrone - Cavan Interconnector and assessed the likely significant environmental effects of a separate application for permission to carry out works associated with the construction of the substation and the overhead line.
6. In June 2015, an Addendum to the Consolidated ES has been published with further information on the proposed interconnector. The Addendum (and this Non-Technical Summary) should be read together with the previously submitted documents.

The Tyrone – Cavan Interconnector

7. SONI is seeking planning consent for:
 - The construction and operation of a new 275 / 400 kV substation at Turleenan townland, north east of Moy, County Tyrone;
 - The removal of an existing 275 kV suspension tower and the construction and operation of two new 275 kV terminal towers to enable connection of the Turleenan substation to the existing 275 kV overhead line;
 - The construction and operation of a single circuit 400 kV overhead transmission line supported by 102 towers for a distance of some 34km from the source substation (at Turleenan) to a border crossing between the townlands of “Doohat or Crossreagh”, County Armagh and Lemgare,

¹ Since 2013 there has been a change in the applicant for the project – from NIE to SONI. Further details are below.

² EirGrid is the company responsible for the planning of the electricity transmission system in the Republic of Ireland.

County Monaghan, where it will tie into the ESB³ network. Owing to geographic border definitions in the immediate area of the border crossing point, the overhead line will need to over-sail a portion of land within the Northern Ireland townland of Crossbane for a short distance; and,

- The formation of temporary access tracks, and other ancillary works associated with construction of the substation and the overhead line.
8. At the border with the Republic of Ireland, the proposed interconnector will continue further south, with EirGrid seeking consent for the section of the proposed interconnector in the Republic of Ireland. In total, the proposed interconnector will run for 138km from Turleenan in County Tyrone to Woodland County Meath.
9. The proposed interconnector is a development of long-term importance for Northern Ireland and will deliver benefits for electricity customers in three key areas:
- **Improving competition** and helping to reduce electricity prices – by reducing existing constraints that are restricting the efficient performance of the electricity market;
 - **Supporting the development of renewable power generation** – by enhancing the flexible exchange of power flows over a large area of the island. This will enable the integration of larger volumes of renewable power generation (especially wind powered generation) throughout the island; and,
 - **Improving security of supply** – by providing a dependable high capacity link between the transmission systems of Northern Ireland and the Republic of Ireland.

³ The Electricity Supply Board (ESB) is responsible for construction and ownership of the transmission system in the Republic of Ireland.

Nature of the Addendum

10. This Non-Technical Summary (NTS) document provides an overview of the published Consolidated ES Addendum in non-technical language. The NTS also provides information of the change of planning applicant (from NIE to SONI) and provides information on the section of the proposed interconnector in the Republic of Ireland. The Consolidated ES Addendum is therefore intended to be read together with the Consolidated ES as it provides additional information and also supersedes some of the information contained in the Consolidated ES. Similarly this NTS should be read together with the Consolidated ES NTS. To assist understanding of how the principal changes in the Addendum relate to the Consolidated ES, a table is provided to show how the documents relate to each other.

Consolidated ES (2013)	Consolidated ES Addendum (2015)
Chapter 1 Introduction	
Chapter 2 Need	Addendum Chapter 3 Need provides an update on Policy Need and supersedes the Technical Need assessment section of the Consolidated ES.
Chapter 3 Planning and Development	Addendum Chapter 4 Planning and Development provides supplemental information.
Chapter 4 Alternatives	Addendum Chapter 10 Technology Alternatives provides supplemental information.
Chapter 5 Proposed Development	Addendum Chapter 1 Introduction provides supplemental information.
Chapter 6 – Scoping and Consultation	Addendum Chapter 9 Air Quality and Climate provides supplemental information.
Chapter 7 – Electric and Magnetic Fields	Addendum Chapter 1 Introduction provides supplemental information.
Chapter 8 – Water Environment	
Chapter 9 – Geology, Soils and Groundwater	
Chapter 10 – Ecology	Addendum Chapter 8 Ecology provides supplemental information.
Chapter 11 – Noise	Addendum Chapter 11 provides supplemental information.
Chapter 12 – Cultural Heritage	
Chapter 13 – Landscape and Visual	Addendum Chapter 1 Introduction provides supplemental information.
Chapter 14 – Community Amenity and Land Use	
Chapter 15 – Socio- Economics	
Chapter 16 – Telecommunications and Aviation Assets	
Chapter 17 – Flood Risk Assessment	
Chapter 18 – Transport*	Addendum Chapter 7 Haulage Route Assessment provides supplemental information.
Chapter 19 – Cumulative and interrelationship of impacts	Addendum Chapter 5 Cumulative and Interrelationship of Impacts supersedes the cumulative chapter in the Consolidated ES. Addendum Chapter 2 Joint Environmental Report provides supplemental information.
Chapter 20 – Transboundary impacts	Addendum Chapter 6 Transboundary Impacts supersedes the transboundary chapter in the Consolidated ES. Addendum Chapter 2 Joint Environmental Report provides supplemental information.
Chapter 21 – Conclusion	

Change of Applicant in Northern Ireland

11. The planning of the portion of the proposed interconnector within Northern Ireland was originally undertaken by Northern Ireland Electricity (NIE). However, NIE was required by the European Commission to transfer its investment planning function (the “Planning Function”) to System Operator for Northern Ireland (SONI). The SONI transmission system operator licence (the “Licence”) was amended on 28th March 2014 to take account of the transfer of the Planning Function following a consultation process by the Northern Ireland Authority for Utility Regulation (NIAUR). The Licence amendments took effect on 30th April 2014. The responsibility for the preparation and submission of planning applications for proposed transmission infrastructure development has therefore been transferred from NIE to SONI (the ‘applicant’). As such, SONI is now the ‘applicant’ in respect of this proposed development and the Department of the Environment (DOE) was notified accordingly.
12. Subject to planning permission, NIE will continue, in accordance with its electricity transmission licence, to be responsible for the construction, ownership and maintenance of proposed development, and the wider transmission system in Northern Ireland.
13. In the context of the above, any reference to NIE in the plans and documents associated with the planning applications for the proposed Tyrone-Cavan interconnector should be understood as now referring to SONI in substitution for NIE. Some references to NIE may remain in the documents, and these are generally in reference to guidelines and installations and properties that will remain in the ownership of NIE (e.g. the Carn depot will remain as a NIE depot but will continue as the proposed construction depot for the Tyrone - Cavan Interconnector).

Relationship with Associated Development in the Republic of Ireland

14. As the project has developed over a number of years, the terminology used to describe the proposed interconnector has also developed. For clarity, the following terms have been used:
 - The **proposed interconnector**: The overall project from Turleenan to Woodland (i.e. both the SONI and EirGrid sections), including all proposed works;
 - The **Tyrone – Cavan Interconnector**: That portion of the proposed interconnector located in Northern Ireland being proposed by SONI; and,
 - The **North-South 400 kV Interconnection Development**: That portion of the proposed interconnector located in the Republic of Ireland being proposed by EirGrid.
15. The proposed interconnector extends for a total distance of some 138km from a proposed new substation at Turleenan, County Tyrone, to a point in the vicinity of Kingscourt, County Cavan, in the Republic of Ireland and onwards, to an existing 400 kV substation at Woodland, County Meath.
16. In June 2015, EirGrid submitted a planning application, accompanied by an Environmental Impact Statement (EIS), and Natura Impact Statement (NIS) in accordance with the Birds and Habitats Directives, for the portion of the proposed interconnector in the Republic of Ireland.
17. The publication of the location and route (including tower locations) of the proposed EirGrid section of the proposed interconnector, known as the ‘North-South 400 kV Interconnection Development’, has allowed SONI to update and complete the cumulative and transboundary assessment for the proposed Tyrone-Cavan Interconnector (summarised in this NTS). In addition, a joint SONI/EirGrid report for the proposed interconnector in line with recent European Commission guidance has been completed.

Consolidated ES Addendum

18. Since the publication of the Consolidated ES, there have been updates to guidelines and policy, as well as other developments. The Consolidated ES Addendum report has been prepared to capture these updates, and thereby provide additional information with regard to the Tyrone - Cavan Interconnector.
19. The Consolidated ES Addendum contains the following chapters:
- **Introduction** – an overview of the report and a description of the EirGrid section of the proposed interconnector (North-South 400 kV Interconnection Development) being concurrently proposed by EirGrid. An overview of updates surrounding the project are also included on the following topics: Do Nothing Scenario and Decommissioning, New Planning Applications in the area of the Tyrone - Cavan Interconnector, two alternative access tracks, and a minor design change to proposed Tower 102;
 - **Joint Environmental Report** – a joint SONI/EirGrid report for the proposed interconnector in line with recent European Commission guidance;
 - **Need** – an updated chapter on the established need for the Tyrone – Cavan Interconnector;
 - **Planning and Development Context** – an overview chapter on relevant planning and policy issues since the publication of the Consolidated ES;
 - **Cumulative Impact Assessment** – an updated chapter on the cumulative impacts (interaction of impacts and impacts with other developments) of the Tyrone – Cavan Interconnector;
 - **Transboundary Impact Assessment** – an updated chapter on the transboundary impacts of the Tyrone – Cavan Interconnector (impacts in the Republic of Ireland from the project within Northern Ireland);
 - **Haulage Route Assessment** – an assessment of the haulage route for the transformers required for the proposed Turleenan substation;
 - **Ecology** – an updated assessment on the ecological impacts of the Tyrone - Cavan Interconnector following updates to guidance and further ecological surveys undertaken in summer 2013;
 - **Air Quality and Climate** – an assessment of the air and climate impacts of the Tyrone – Cavan Interconnector;
 - **Technology Alternatives** – an assessment of the Technology Alternatives for the proposed interconnector and the technical potential for partial undergrounding of the proposed interconnector and, in response to a request from the Competent Authority for Projects of Common Interest (PCI) in the Republic of Ireland (An Bord Pleanála) to EirGrid, an assessment of the potential for partial undergrounding specifically to mitigate significant landscape impacts on landscapes/demesne landscapes; and,
 - **Noise Assessment** – since the publication of the Consolidated ES, two noise standards have been revised and this chapter updates the assessment in light of these changes;
 - **Erratum** – a chapter correcting typographical errors in the Consolidated ES.

Addendum Introduction

[Do Nothing Scenario](#)

20. The 'Do Nothing scenario' is the term used to describe conditions in the existing environment where the Tyrone – Cavan Interconnector is not constructed. Under the Do Nothing scenario, the land where the Tyrone – Cavan Interconnector would have been constructed would remain unchanged, unless developed for some separate purpose – such as agricultural land use changes or construction of houses or chicken sheds, etc. Such changes would not be affected by the presence or absence of the

Tyrone - Cavan Interconnector and any development would be subject to any normal planning controls.

21. Under the 'Do Nothing' alternative, the need for additional interconnection between the two electricity transmission systems on the island of Ireland would not be met. Doing nothing would fail to address the need to improve the efficiency of the electricity market, as required by existing European Directives, and would impede all-island government policies to increase renewable energy generation. Also, it would not deliver improvements in the security of electricity supply and would not prevent future shortfalls in electricity supply for Northern Ireland.
22. Given that the limited extent of the existing electricity interconnection between the transmission systems of Northern Ireland and the Republic of Ireland is insufficient to achieve the key objectives, the Do Nothing alternative is not acceptable, and SONI (along with EirGrid) has rejected it.

Decommissioning

23. SONI and NIE have no plans to decommission the Tyrone - Cavan Interconnector as it will be a key piece of strategic electrical infrastructure. The decommissioning of the Tyrone - Cavan Interconnector, if ever required, would involve the removal of the above ground works and restoring the land to its former use (mostly agricultural). In the unlikely event this would be undertaken, it was considered that the likely significant effects will be similar to and no greater than the construction phase impacts that have been assessed as part of the Tyrone - Cavan Interconnector. Similar mitigation measures as described for the construction stage in the Consolidated ES should be again implemented to ensure the minimisation or elimination of any environmental impacts.

New Planning Applications/Permissions in the area of the Tyrone-Cavan Interconnector

24. Since the publication of the Consolidated ES, additional planning applications have been submitted and/or consented to as part of the normal development of the area. The DOE has been liaised with to obtain accurate and up to date information on planning applications, which is subject to further change while the planning applications for the Tyrone – Cavan Interconnector are being determined.
25. Since the Consolidated ES was published, a number of residential dwelling planning applications have been consented. These dwellings represent additional visual receptors. Specifically, eight additional dwellings have been assessed as consented or new build dwellings as of March 2015 within the study area, 500m either side of the line route. Five new residential receptors have been assessed as having residual Moderate or Major adverse effects arising from the Tyrone – Cavan Interconnector.
26. The following two planning permissions O/2011/0184/F and O/2010/0824/O are highlighted in particular in the text below due to their proximity to the line route.
27. The DOE has approved planning permission for a house near to Tower 47 on the Bracknagh Road (O/2011/0184/F). If built as approved, this house would become the closest dwelling to the centreline of the overhead line at 49m. Previously, the Consolidated ES had identified that, at the time of its writing, the closest dwelling was 54m. Moreover, this permitted dwelling would be 80m from the base of Tower 47, which will be the closest dwelling to a proposed tower base. The Consolidated ES had identified that, at the time of its writing, the closest dwelling from a tower base was located 85m away.
28. The permitted dwelling has been assessed in terms of EMF, visual and noise impacts. It was found that there would be no significant impacts in terms of noise during construction or operation. EMF levels from the overhead line will be fully compliant with government guidelines, such that there will be no impact on the permitted dwelling. It has been assessed that there would be major adverse visual impact during construction and operation of the proposed overhead line on the permitted dwelling, if constructed.
29. The construction of the house would mean that an alternative access to Tower 47 would be required. An alternative track (AT47A) has been proposed. It will run from Tower 46 to Tower 47 and would be within the submitted planning application boundary ('red line'). It would impact grassland and two species-poor hedgerows. It has been assessed that there will be no significant impact from the new proposed alternative access track or its use.

30. Another planning permission granted for a house (O/2010/0824/O) is located in the area of Tower 71 and 72. If built as approved, the permission would require that an alternative access to a stringing location would be considered. It is proposed to use an alternative access track from Tower 71 to the stringing location. The proposed alternative access track (AT71SL2A) would be within the submitted planning application boundary ('red line') and would impact the Linwoods willow bio-remediation area, a species-poor hedgerow and grassland. The area of willow bio-remediation affected by the new proposed alternative access track has been included in the assessment within the Consolidated ES and so there is no change in the previous assessment. It has been assessed that there will be no significant impact from the new proposed alternative access track or its use.
31. The permitted house is located 130m from the overhead line and 160m from the nearest tower base. There are no significant impacts in terms of EMF and noise impacts. It has been assessed that the dwelling, if constructed, would be subject to a moderate adverse visual impact during construction and minor adverse during operation.

Tower 102

32. Since the publication of the Consolidated ES, a review of the overhead line design found that tower 102 was classified as a 30 degree angle tower, where in fact a 60 degree angle tower is required. The result is that the foundation for that tower will change by approximately 1 m – the maximum foundation size will be now be 19.51 x 19.51 m instead of 18.71 x 18.71 m, an increase of 0.8 m in length and breadth and so an increase of 30.6m². There will be no significant change to the overall appearance of the tower and no changes to the planning application boundary. There will be no change in the original assessment in the Consolidated ES. While there will be a small increase in traffic as result of the foundation change, it has been determined that there will be no significant change to the original assessment.
33. Overall - the design change only affects the foundations of the tower and does not affect the overall tower dimensions and so has no significant change to the overall assessment of the tower as described in the Consolidated ES.

Joint Environmental Report

34. New European guidance was published on Transboundary Effects in 2013 in a document entitled '*Guidance on the Application of the Environmental Impact Assessment Procedure for Large-scale Transboundary Projects*⁴'. This guidance suggested that a single report be prepared for projects that cross international borders. Consequently, a Joint Environmental Report has been prepared in respect of the overall proposed interconnector.
35. The proposed interconnector will comprise approximately 138km of overhead line between substations in Turleenan, County Tyrone and Woodland, County Meath and can be summarised as follows:
- Turleenan Substation: the construction and operation of a new 275 kV / 400 kV substation at Turleenan townland, north-east of Moy, County Tyrone;
 - The 275 kV Towers: the removal of an existing 275 kV suspension tower and the construction and operation of two new 275 kV terminal towers, including the temporary diversion of the 275 kV line, to provide for connection of the Turleenan substation to the existing network;
 - The 400 kV Towers and Overhead Line: The construction and operation of a single circuit 400 kV overhead transmission line supported by 401 new towers for a distance of approximately 135km from the substation (at Turleenan) to an existing double circuit tower (Tower 402) in the townland of Bogganstown, County Meath. The overhead line

⁴ [http://ec.europa.eu/environment/eia/pdf/Transboundary EIA Guide.pdf](http://ec.europa.eu/environment/eia/pdf/Transboundary_EIA_Guide.pdf)

(conductors) will be positioned at a minimum of 9.0m above ground level. The new transmission line will require modifications to 3 No. existing 110 kV overhead transmission lines;

- Use of existing 400 kV Double Circuit Towers: It also includes the addition of a new 400 kV circuit for approximately 3km along the currently unused (northern) side of the existing double circuit 400 kV overhead transmission line (the Oldstreet to Woodland 400 kV transmission line) extending eastwards from Tower 402 in the townland of Bogganstown, County Meath to Tower 410 and the Woodland Substation in the townland of Woodland, County Meath;
- Works to Woodland Substation: Associated works within and immediately adjacent to the existing ESB Woodland 400 kV Substation; and
- Associated Works: Works to include, where appropriate, site levelling, site preparation works, modifying existing access points, construction of new access points, construction of new access lanes, construction of working areas, stringing areas, guarding, site boundary fencing, related mitigation works, access tracks and other associated works at the substation and at the tower locations.

36. The proposed interconnector is illustrated in NTS Figure I.
37. The proposed 138km overhead line will comprise towers and support structures (including temporary support structures) ranging in overall height from 26m – 61m over ground level (52-61m towers are existing double circuit towers with the exception of the two proposed 275 kV towers which are 46 and 54m). The footprint of the towers will vary based on ground conditions and the design of the towers. The maximum foundation size is 6m deep and 25m in length x 25m in width (proposed 275 kV tower at Turleenan substation). The majority of towers will be smaller than this size.
38. The construction period for the proposed interconnector has been estimated as three years from the start of the site works, but the construction period at any particular location along the overhead line route would be in the order of four to six months. The construction of Turleenan Substation will take up to three years, and will be undertaken in parallel with the overhead line construction activity. Turleenan Substation will be constructed in several stages including site entrance, access roads, site clearance, installation of drainage, construction of roads, installation of equipment/construction of building and completion of access roads.
39. There will be two construction depots for the proposed interconnector: NIE's existing depot at Carn Industrial Estate, Craigavon, County Armagh; and a proposed site to the south east of Carrickmacross, County Monaghan. The depots will be used to store construction vehicles and equipment. Materials for the construction phase (overhead line and towers) will also be stored at the depots.
40. During the construction phase, temporary access tracks and other ancillary works will be required at the Turleenan substation site and at each of the tower locations. Temporary access routes capable of taking construction plant, construction materials and personnel are required for the construction of the proposed interconnector. Temporary access routes include access tracks, access to stringing locations, access to guarding locations and access to low voltage crossing locations.
41. The proposed works at the Woodland Substation include a western extension of the existing compound; modifications to the existing fence and the addition of electrical equipment/apparatus.
42. Associated works for the proposed interconnector include environmental mitigation measures, stringing of the line, guarding locations over road and some rivers, service diversions and other measures that are necessary to minimise the construction phase impacts. The Planning Policy Statement 15 (Revised) Planning and Flood Risk contains guidance which will be adhered to.

Technological Alternatives

43. The key conclusions confirming the selection of an overhead line for the proposed interconnector are as follows:
- Undersea technology was rejected because of risk, environmental impact and cost;
 - High voltage direct current (HVDC) offers no significant technical or environmental advantages, but has considerable additional significant technical complexity, cost and risk in comparison with HVAC technology;
 - Worldwide, HVAC overhead lines for transmission applications are chosen over HVAC underground cables. Also, there are no examples in the world of an underground HVAC cable of the same length and designed voltage as the proposed interconnector;
 - Underground high voltage cables have increased construction impacts, significant additional lifetime cost; and,
 - HVAC overhead line technology has superior reliability and performance.
44. The overall conclusion drawn in relation to both the EirGrid and SONI proposals is that the assessment of the transmission alternatives fully supports their proposals to construct the proposed interconnector by means of a 400 kV AC single circuit overhead transmission line.
45. The process also included the assessment of the “Do Nothing” or “No Action” alternative (i.e. the circumstance where the proposed interconnector is not constructed). Under the Do Nothing alternative, the requirement for additional interconnection between the two electricity transmission systems on the island of Ireland would not be addressed and so EirGrid and SONI have both rejected it.

Location and Routeing Alternatives

46. The EirGrid and SONI proposals have undertaken a process to evaluate alternative locations for transmission system connection, viable route corridors for an overhead transmission line between the selected connection points and the two transmission systems on the island of Ireland, as well as detailed overhead line route selection. The process has been undertaken in accordance with the objective to minimise the environmental impact of the proposed interconnector in accordance with published Guidelines and best practice.
47. Numerous alternatives have been considered for the connection, design, location and routeing of the proposed interconnector:
- Alternative system connection options. The identification of five possible and technically feasible solutions. Of these five, two (the Western Option and the Multiple 110kV Option) were rejected at a relatively early stage since they were considered to present poor power transfer capabilities in comparison with other feasible options;
 - Alternative study areas were identified in association with the remaining three connection options, two alternative “Mid-Country” connection options (including the eventually selected option of a connection between Drumkee, County Tyrone and Kingscourt, County Cavan) and an Eastern connection option that would have duplicated the existing interconnector connection between Tandragee and Louth;
 - Identification and assessment, having regard to the likely significant environmental impacts, of alternative route corridor options within the Mid-Country and Eastern study areas, leading to the choice of a preferred route corridor between Drumkee and Kingscourt;
 - Assessment of alternative tower designs to determine the best available option;
 - The identification and evaluation of alternatives to the detailed overhead line routeing within the preferred route corridor, and the application of established overhead line routeing principles (including land owner consultation and a combination of environmental and practical considerations) to the identification of a finalised route for the proposed overhead line;

- The identification and evaluation of three alternative substation locations in the vicinity of the chosen transmission system connection point, leading to the choice of Turleenan near Moy, County Tyrone (rather than the initial location near Drumkee); and,
- The evaluation of alternatives for the Turleenan substation design and layout, and the final choice of technology used in order to reduce the overall footprint and environmental impact of the proposed substation.

48. The proposed interconnector has been subject to an extensive examination of alternatives. The mitigation of environmental impacts by design has been a fundamental aspect of EirGrid and SONI's development process. This has also been the approach for the selection of the location of the proposed Turleenan substation. The routeing and site location selection are considered to represent the best overall options amongst the many alternatives considered throughout the development process.

JER Appraisal of the Proposed Interconnector

Population – Socio-economics

49. The likely impacts during both the construction and operational phases have been evaluated. The construction phase will result in a significant capital spend that it is likely to benefit the assessed area and the wider area in terms of equipment purchased, employment and indirect impacts (e.g. accommodation for construction workers and spending in the hospitality industries).

50. The routeing of the proposed overhead line and location of the proposed substation is considered to present the best overall option amongst the many alternatives considered throughout the development process. In terms of minimising the potential for impacts on the amenities of existing and future populations, the principal mitigation measure has been incorporated into the design stage by maximising the distance between the proposed interconnector and larger urban settlements, local villages, clustered settlements, individual one-off dwellings, schools, churches and community facilities. Therefore it is considered that the proposed interconnector will not result in any significant negative socio-economic effects.

51. There will be wider economic benefits arising from these improvements to the electricity grid on the island of Ireland.

Population – Tourism

52. Impacts to tourism will not be direct as no tourist sites will be physically impacted by the proposed interconnector. Negative impacts are anticipated to be limited to construction impacts of noise and traffic, setting impacts at cultural heritage sites, and landscape and visual impacts. Tourism impacts arising as a result of visual and cultural impacts at key tourism sites including the Argory, Navan Fort, Benburb, the Monaghan Way, Bective Abbey and the Boyne Valley Driving Route will not be significant.

Population – Land Use

53. The construction activity will affect individual farms along the proposed interconnector at different times for a period of approximately 4 – 6 months. The disturbance impacts on farm enterprises from construction activity will generally be temporary and therefore will not give rise to residual effects. The construction activity will cause short to medium term residual effects on approximately 124 hectares (ha) of land where damage to soil is predicted and long term damage to soil on the 1.4 ha Carrickmacross construction materials storage yard. An area of 22.2 ha will be required for the Turleenan substation and associated works. Most of the 22.2 ha can return to agricultural use following the construction phase, however there will be a residual impact to the affected land. There will be residual effects due to the restriction of land utilisation at the base of the towers (10.5 ha) and the towers will be an obstacle to machinery operations. Approximately 14.8 ha of commercial forestry will be cleared under and adjoining the proposed overhead line. The presence of the overhead line will be an additional safety risk on farms and may restrict the construction of some agricultural buildings.

54. The residual impacts are either Negligible or Slight Adverse on 95% of the land parcels along the proposed interconnector. Twenty six Moderate Adverse impacts (4.5%) are predicted. Three Major

Adverse impacts (0.5% of total) are predicted and one Major / Profound Adverse impact (0.1% of total) will arise at the site of the substation in Turleenan, Co Tyrone.

55. In the context of the relatively small area where direct land take impacts, land restriction impacts (at the base of the towers) and soil damage impacts occur, the short term nature of construction impacts and the prediction that land utilisation will not change significantly under and adjoining the overhead lines, overall, the impact is Negligible.

Material Assets

56. Extensive consultation took place with the authorities responsible for transmissions associated with radio (domestic and commercial), television, aviation and the emergency services that have telecommunications assets.
57. No objections or potential impacts were highlighted by the telecommunication or aviation consultees. It is concluded that there will be no significant impacts to telecommunications or aviation assets as a result of the proposed interconnector.
58. The proposed interconnector will meet all electromagnetic compatibility requirements as set out by legislation.
59. Mitigation measures will be implemented at the construction and operational phase to minimise and/or eliminate impacts on material assets in the receiving environment. The mitigation measures included in the outline CEMP will be implemented as part of the construction management. Adherence to the mitigation measures will ensure there are no residual impacts associated with the proposed interconnector.
60. It is considered that the operation of the proposed interconnector will have no significant impacts on material assets. The proposed interconnector will not provide an obstacle for aircraft, particularly those operating at Trim Airfield. The Irish Aviation Authority (IAA) confirmed that the proposed interconnector will be below the obstacle limitation surface for Trim Airfield.

Electric and Magnetic Fields (EMF)

61. The proposed transmission lines (Single Circuit) operating at 400 kV will produce, for the majority of their length including all of the length within Northern Ireland, a maximum 50 Hz electric field of approximately 7.9 kV/m and a maximum magnetic field of approximately 47.9 μ T beneath the transmission line. For the short section (between towers 118 to 121 in Ireland) carried on transposition towers⁵, the maximum fields will be approximately 8.0 kV/m and 48.5 μ T. For the short section (between towers 402 to 410) carried on the existing double circuit towers⁶, the maximum fields will be approximately 7.1 kV/m and 41.6 μ T.
62. In more than 30 years of study researchers in various scientific disciplines have conducted studies to investigate potential health effects of EMF exposure. Authoritative health and scientific agencies have not concluded that exposures to Extremely Low Frequency (ELF) EMFs at levels encountered in our daily life are a health hazard.
63. Guidelines developed by International Commission on Non-Ionizing Radiation Protection (ICNIRP) form the basis for the European Union's (EU) Recommendation (1999/519/EC) which sets out guidelines for member states on limiting the exposure of the public to EMFs in locations where people spend significant time. The EU Recommendation is the guideline applicable in both Northern Ireland and Ireland and has been taken into account for the proposed interconnector.
64. The calculated levels of EMFs provided above demonstrate that even the maximum field levels produced by the proposed 400 kV line, which would be produced only rarely if ever in practice, are

⁵ These types of towers are required to ensure the efficient operation of the circuit.

⁶ For the final 2.8km run into Woodland Substation, the proposed interconnector is carried on existing double circuit towers. The existing Oldstreet-Woodland overhead line is installed on the southern side of these towers. The northern side is currently unused and therefore available for use by the proposed interconnector.

below the EU (1999) exposure limits (basic restrictions - for an electric field is 5kV/m and magnetic field is 100 μ T. paragraph).

65. In summary, even the maximum EMF levels from the proposed 400 kV line are still below EMF guidelines of both Ireland and Northern Ireland, and also the EU. Authoritative reviews of scientific research on topics relating EMFs to health of humans and other species do not show that EMFs at these levels would have adverse effects on these populations.

Traffic

66. The operational stage of the proposed interconnector will generate minimal volumes of traffic. The construction stage of the proposed interconnector will generate more traffic, albeit temporary, because the primary means of transporting materials and labour to / from site will be via the existing public road network.
67. Due to the nature of the proposed interconnector, the construction phase will consist of multiple separate construction sites. Access to the individual sites will generally be achieved via existing field accesses and existing internal tracks where available. A total of 362 temporary accesses are required from the public road network to construct the proposed interconnector.
68. Despite the scale of the proposed interconnector, the volumes of vehicles required to attend each individual construction location along the length of the linear development will be relatively low and this traffic will be spread out over several weeks (the duration it will take to construct individual towers). Due to the length of the proposed line, traffic will be dispersed over a large area during the construction phase; also construction will occur in any one location for a relatively short duration.
69. The construction of the proposed substation in Turleenan, County Tyrone, the extension of the existing substation in Woodland, County Meath and the operations at the proposed construction material storage yards, located at Carn Industrial Estate, Craigavon and also to the south east of Carrickmacross, County Monaghan will result in higher volumes of traffic over longer periods however these traffic flows will not result in congestion on the road network.
70. Heavy Goods Vehicles (HGVs) will be used to construct the transmission line. Local and minor roads are particularly sensitive to the increase in heavy vehicles as these roads are typically not designed to accommodate large numbers of these types of vehicles. With the proposed mitigation measures, the residual impacts in terms of disturbance caused to the local community in relation to noise, vibration, dust and air quality impacts will be minimised or eliminated.
71. A Construction Traffic Management Plan shall be prepared prior to the commencement of construction operations. The objective of this plan will be to minimise the impact caused by the construction stage of the proposed interconnector.
72. An assessment of the transportation of the three transformers to the proposed Turleenan substation has been undertaken. This transportation will require three trips of a 20-axle transporter to transport the 222 tonne transformers from Warrenpoint port to Moy. This transportation will take up to seven hours per trip and will result in local traffic disruption because of temporary road closures and the slow moving traffic.
73. Because of a sharp turn in Moy village, it will be necessary to transfer the transformer by crane from the 20-axle transporter to a smaller self-propelled trailer. This will result in the closure of the B106 in the centre of Moy square and diversion system will be in operation at the northern and southern end of the square. This will result in local disruption to the traffic, as well as temporary visual and noise impacts and will disrupt the normal use of Moy village. This transfer will require two days per trip; six days in total. The three required trips will be spaced apart to minimise disruption.
74. Mitigation measures and publicity of the transformers transportation will inform and help to minimise the disruption. The mitigation measures will include police escorts, appropriate signage of alternative routes and diversions, and undertaking works in daylight only. There is likely to be short-term moderate adverse impacts to road users with no long-term impacts on the completion of the transport.

Noise

75. Extensive noise surveys have been conducted around the area of the proposed interconnector to establish the existing noise levels. The area is predominantly rural and the noise levels which reflect this are generally low.
76. Potential noise levels from the construction and operation of the proposed interconnector have been evaluated.
77. It is predicted that the highest noise levels from the proposed interconnector will be from the construction noise of the substation and the overhead line. However, this impact will be short term and of a limited nature. Mitigation measures have been provided to reduce the potential 'worst case' impact from construction noise and the contractor will be required to liaise with the Local Authority and residents throughout the construction period. The impact of construction noise and vibration with mitigation measures will not be significant.
78. The overhead line will be subject to an annual survey by helicopter patrol. Helicopter inspections will be announced in advance in local newspapers and through landowner consultations. This is not expected to cause any significant noise impact, will be short term in nature and advance notice will be given to landowners.
79. Once complete the operational noise impact of the proposed overhead line route, towers, and substation will be limited to occasional corona noise⁷ and continuous plant noise at the substation. There will be no operational vibration impacts to sensitive receptors for the proposed interconnector.
80. The overhead line and substation noise emissions during operation will be below the recommended levels and targets set by the World Health Organisation (WHO) and are within acceptable limits.
81. The proposed interconnector will not result in any significant noise and vibration effects.

Ecology

82. The proposed interconnector will not adversely impact upon European and/or Nationally protected sites; however it does have potential to impact upon local populations of protected fauna.
83. Mitigation measures will be implemented at the construction and operation phase to minimise and/or eliminate identified impacts.
84. The level of impacts were assessed from an entire project perspective with the highest impact being minor negative to hedgerows / treelines, Wintering birds (Whooper Swans) and Breeding birds (Lapwing). All other impacts are considered negligible. The term "minor negative" in this context means a change in the ecology of the effected site which has noticeable consequences outside the development boundary, but these consequences are not considered to significantly affect the distribution or abundance of species or habitats of conservation importance.

Soils, Geology and Hydrogeology

85. Mitigation measures will be implemented at the construction phase to minimise and/or eliminate impacts.
86. The construction phase of the proposed interconnector will impact on the ground and geological conditions through the use of temporary access routes and excavations required for the tower bases and the excavations required for the Turleenan substation.
87. The tower locations have been selected to avoid known areas of intact peat and cutover peat where possible. Intact peat was not identified at any tower location along the line route. Accordingly, it is considered that the excavations required for the proposed interconnector will have no adverse impacts on the more sensitive peat ecosystem.

⁷ Corona noise comprises two sound components: one is irregular (random crackling noise) sound, and the other is the pure sound (corona hum noise) of buzzing.

88. It is considered no significant impacts will occur on the geology and groundwater conditions; accordingly, it is concluded that the proposed interconnector will have no significant transboundary impacts on soils, geology and hydrogeology. With regard to the operational phase of the development, no significant impacts on groundwater are predicted. Any predicted impact on the soils and geology is considered to be Negligible.

Water

89. The construction phase of the proposed interconnector will impact on the water conditions through the use of temporary access routes and excavations required for the tower bases.
90. During construction, mitigation measures will be put into place to prevent impacts to the water environment.
91. The tower locations have been selected to avoid known areas of flood plains and river banks where possible. No significant adverse effects are predicted on the water environment as a result of the construction phase of the proposed overhead line.
92. With regard to the operational phase of the development, no significant impacts on the local water environment are predicted with the proposed mitigation measures. The predicted impact on the water environment is considered to be long term and Negligible.

Air and Climatic Factors

93. The proposed interconnector will have positive long term residual impacts on greenhouse gas emissions as it will facilitate further development and connection of renewable energy sources thereby reducing the dependence on fossil fuels with consequent reduction in greenhouse emissions.
94. In terms of dust, no significant impacts are predicted following the implementation of good construction practice and implementing appropriate mitigation measures.
95. Traffic emissions themselves will not give rise to significant air quality effects from vehicular emissions.
96. With the implementation of mitigation measures no significant local air quality effects are predicted.

Cultural Heritage

97. Mitigation measures will be implemented at the construction phase to minimise and/or eliminate impacts to previously recorded features and to resolve any unknown features discovered during construction.
98. While the proposed interconnector will not have a direct physical impact on the upstanding remains of any known archaeological sites or architectural features, it will have such an effect on a number of demesne landscapes⁸. The impact on one of the demesnes landscapes, Brittas (County Meath) was found to be significant. A further four demesne sites will experience a moderate negative impact in terms of setting.
99. There will be likely significant effects to the setting of a number of features. In summary there will be 24 moderate negative, seven moderate to significant negative and six significant negative impacts to archaeological sites. In addition, there will be three moderate negative and one moderate to significant negative impacts to architectural sites.
100. All other sites in the receiving environment will not be affected by the proposed interconnector or have a slight negative impact.

Landscape

101. Considerable efforts have been made in the routeing and design processes to avoid or minimise landscape and visual impacts as much as possible. Detailed routeing of the line has sought to achieve the best fit with the landscape using landform and vegetation whilst recognising the technical constraints of the construction and operation of an overhead line.

⁸ Areas associated with manor estates.

102. The proposed overhead line and substation will be located within an area that is primarily agricultural, consisting of low rolling hills, shallow valleys and structured fields, which often have overgrown hedgerows and many mature trees.
103. After construction, the towers and overhead lines would remain as significant visual elements in the landscape.
104. Over time, any vegetation cut back during construction will re-grow and any new replacement planting will become established. Clearance of vegetation that could fall on the overhead line, inspections and repairs are activities in the landscape that will be undertaken on occasions, however, the level of activity in the landscape would be greatly reduced following construction.
105. Mitigation measures will reduce visual impacts of the proposed Turleenan substation and would see the earthworks and entrance road heavily planted with woodland. Over time, as the mitigation landscape matures, views of the substation would be reduced.
106. There will be significant impacts on the landscape of some parts of the assessed area. There would also be significant visual effects from many locations from within the immediate area of the overhead line route. However, it is considered that the landscape and visual resource of the wider assessed area along the proposed interconnector would not be impacted to a significant degree and the overall landscape and visual impact in general will be limited to those receptors/areas within close proximity to the towers and overhead line.

Cumulative Impacts and Interactions

107. During the assessment process, coordination took place between assessment specialists to ensure that interacting impacts arising from the proposed interconnector were identified, assessed and, where appropriate, mitigated.
108. The assessment of cumulative impacts between the proposed interconnector and other developments has included identification of the other planned developments which have not yet been constructed. This has led to the identification of other overhead line projects. Other developments also include proposed chicken sheds and wind turbines.
109. The cumulative effects are generally predicted to be Not Significant. However there will be separate significant landscape and visual cumulative impacts with the proposed interconnector and the proposed wind turbines at Teevurcher, Raragh, Old Mill Wind Farm (Lisduff), Emlagh Wind Farm and the future Kingscourt substation.

Need for the Project

110. The proposed interconnector is a development of long-term importance for Northern Ireland and will deliver benefits for electricity customers in three key areas:
- **Improving competition and helping to reduce electricity prices** – by reducing existing constraints that are restricting the efficient performance of the electricity market;
 - **Facilitating the development of renewable power generation** – by enhancing the flexible exchange of power flows over a large area of the island. This will enable the integration of larger volumes of renewable power generation (especially wind powered generation) throughout the island; and
 - **Improving security of supply** – by providing a dependable high capacity link between the transmission systems of Northern Ireland and the Republic of Ireland.
111. The proposed interconnector complies with European Union Directives that require enhanced electricity interconnection between EU member states and improved conditions for energy competition throughout Europe. The development of the Tyrone – Cavan Interconnector has been part funded by the EU Trans European Networks (TEN-E) programme. Also it has been designated a project of common

interest (PCI)⁹. The proposal is jointly supported by the Governments of both the UK and the Republic of Ireland and is fully compliant with Northern Ireland energy policy, having received specific support from the Department of Enterprise, Trade and Investment (DETI). The project is also supported by the Northern Ireland Utility Regulator.

112. The following are key elements of the “case of need” for the proposed Interconnector. The demonstration of Need, which is summarised below and more fully set out within the ES Addendum, is required by Policies PSU2 and PSU8 of the Planning Strategy for Rural Northern Ireland¹⁰.

Electricity Prices

113. For Northern Ireland to remain competitive and to generate growth, it will be important for energy prices, including electricity prices, to be competitive. The primary mechanism for achieving this objective is to facilitate and encourage competition through market forces. Market liberalisation and competition are therefore important factors driving change across the electricity sector.
114. Competition has been the major driver behind the development and implementation (in November 2007) of the Single Electricity Market (SEM) on the island of Ireland. The SEM was introduced to enable generators and electricity suppliers to compete freely across the island. It aims to keep prices at the lowest possible level by operating a competitive system that chooses the lowest priced sources of power generation at any point in time. However, since the present interconnection arrangements do not provide sufficient capacity (see “Limitations of the Existing Interconnector” below), this results in constraints that limit the benefits that would otherwise be available.
115. By reducing the existing infrastructure constraint between both jurisdictions, the second interconnector would remove this constraint and would allow the all-island single electricity market to operate more efficiently, in line with its design objectives¹¹. Studies have calculated annualised benefits to the market from the delivery of the second North South interconnector of the order of €20m¹² per annum in 2020 rising to a range of between €40m and €60m¹³ by 2030¹⁴.
116. The energy regulators and government departments in both Northern Ireland and the Republic of Ireland have explicitly identified the need for improved electricity infrastructure, and especially a second North-South interconnector, as a “key enabler” for the future success of the SEM.
117. In December 2014, Arlene Foster MLA, the DETI Minister at that time, observed that:
*“The constraint costs arising from the absence of the North-South electricity interconnector are estimated by the Transmission System Operators to be €20 million per annum in 2020, rising to €40 million per annum in 2030. I am advised that delivery of the Interconnector would eliminate such charges”*¹⁵

⁹ The proposed interconnector has been designated a PCI for the purposes of EU Regulation 347/2013. A key aim of this regulation is to ensure that strategic priority energy networks in Europe are completed by 2020.

¹⁰ (DOE, 1993)

¹¹ The key SEM Objectives are set out at <http://www.allislandproject.org/GetAttachment.aspx?id=5d50b98a-5aef-47e1-a3f7-904cc7aeac9e>.

¹² Based on the exchange rate in March 2015: £14.5m

¹³ Based on the exchange rate in March 2015: £29m - £43.5m

¹⁴ See *The Need for a Second North South Electricity Interconnector*, Appendix 3.1 of Consolidated ES Addendum. That paper describes the detailed calculation of associated benefits for the project.

¹⁵ In response to NI Assembly question AQW 39715/11-15 on 15th December 2014.

Renewable Energy

118. Northern Ireland and the Republic of Ireland are both particularly well suited to the development of substantial wind energy generation. The wider use of wind energy would bring significant benefits to both economies, whilst improving the overall diversity of supply and reducing dependence on imported energy. The development of further renewable generation is encouraged by both Governments.
119. In September 2010 DETI published the Strategic Energy Framework (SEF). In this document DETI Minister Arlene Foster MLA set a target for 40% of electricity consumption within Northern Ireland to be generated from renewable sources by 2020. The SEF was unequivocal in demonstrating strong support for the proposed Interconnector as a key enabler for the delivery of this target.
120. Wind powered generation on this scale would deliver a significant benefit to the Northern Ireland economy. However, a key constraint to the full development of wind powered generation is the ability of the existing electricity network to absorb and manage this form of power generation. The proposed Interconnector will be a significant step towards addressing this issue by allowing power sourced from renewable generation to access demand and other interconnectors on both parts of the all island network.
121. In Northern Ireland DETI is giving consideration to arrangements that will apply after the cessation of the present Northern Ireland Renewables Obligations arrangements which could have an impact on the level of renewables that will come forward in Northern Ireland. However, there is certainty that there will be a substantial amount of renewable generation connected in Northern Ireland before 2017 and in combination with the other significant drivers for the second North-South interconnector including enhanced security of supply and greater efficiency in the all island electricity market, the case of need for the proposed interconnector remains strong.

Energy Security

122. Northern Ireland has a relatively small electricity network with a limited number of power stations. It is therefore exposed to a greater risk of loss of supply than would be the case in a large and highly interconnected system with a large number of power stations that can depend upon each other for support in the event of unforeseen disturbances.
123. Due to the restrictions in the available transfer capacity of the existing interconnector, the level of security of supply support that can be provided by each system to the other is significantly limited. Previous Generation Capacity Statements¹⁶ published jointly by EirGrid and SONI have highlighted how, for Northern Ireland, with this limited support, the availability of generation to meet forecast demand would be subject to significant risk from 2016.
124. SONI has taken action to address the risk to Northern Ireland security of supply for a limited period, post 2016. Following a competitive procurement process, a contract has been signed between SONI and AES Ballylumford for the provision of 250 MW of local reserve services for a three-year time period commencing 1st January 2016, with an option to extend for a further 2 years. This contract has secured the operation of two of the steam units at Ballylumford at a slightly reduced capacity until 2018.
125. With the addition of this local reserve services contract in 2016 and the restoration of the Moyle Interconnector to full capacity in 2018¹⁷, the capacity situation in Northern Ireland is adequate up to the end of 2020. Emissions restrictions on the generating station at Kilroot will however have a severe impact of system adequacy from 2021 onwards, resulting in significant risk to the security of supply in Northern Ireland if the second north south interconnector is not in place.

¹⁶ <http://www.eirgrid.com/media/Generation%20Capacity%20Statement%202014.pdf>

¹⁷The Moyle Interconnector is currently limited to a capacity of 250MW due to a cable fault. Repairs are currently being carried out to return the Interconnector to full capacity.

126. Shortfalls in available sources of electricity supply would require the introduction of arrangements to prevent power system failure by switching off the electricity supply (using a rota system for selected areas) during times of peak electricity demand. This outcome is highly undesirable, and underlines the increasingly critical nature of the need for additional interconnection as a matter of urgency.
127. The risk of loss of supply is highly relevant in the context of industrial or commercial investment decisions, and a secure energy environment will ensure the best possible economic advantage for everyone in Northern Ireland.

Legal and Regulatory Context

128. DETI is the Government department responsible for energy affairs in Northern Ireland. It also has a role in ensuring the provision of the infrastructure that is needed for Northern Ireland's economy.
129. The Electricity (Northern Ireland) Order 1992 sets out the basic licensing regime for carrying out electricity related business activities in Northern Ireland. It places a statutory duty on SONI as a licence holder to develop and maintain an efficient, co-ordinated and economical system of electricity transmission which has the long-term ability to meet reasonable demands for the transmission of electricity.
130. SONI's licence requires it to develop a mechanism for the transmission of electricity in Northern Ireland that takes account of the benefits of efficient, co-ordinated and economical systems for the transmission of electricity on the island of Ireland as a whole. It also requires the company to contribute to security of supply through adequate transmission capacity and system reliability, and to facilitate competition in the supply and generation of electricity.
131. The Utility Regulator is responsible to Government for regulating the ongoing operation of SONI and for protecting the long term interests of customers. The Utility Regulator is, amongst other things, specifically required to promote effective competition between persons engaged in the sale or purchase of electricity through the SEM.
132. The proposed Interconnector is consistent with the legal and regulatory obligations required of SONI by DETI and by the Utility Regulator.

Limitations of the Existing Interconnection

133. The existing 275 kV overhead line interconnector to the Republic of Ireland is a double circuit line that is theoretically capable of a maximum power transfer of 1,500MW (Mega Watts). However, since its electrical circuits are carried, both together, on a single series of steel towers, they are exposed to the possibility of a single event (such as an electrical fault or damage) resulting in failure of both circuits at the same time and therefore causing the loss of the entire Interconnector. In order to avoid such a failure causing widespread loss of electricity supplies, the transmission system operators currently have to restrict the interconnector capacity to a maximum level of 450MW¹⁸.
134. The 450MW restriction creates distortion in the electricity market between electricity generators and electricity suppliers, because it places an upper limit on the amount of electricity that can be traded between the two jurisdictions. It also places a serious constraint on the maximum volume of wind powered generation that can be accommodated by the overall electricity network, in turn creating a serious obstacle to the future development of renewable energy.

¹⁸ Furthermore, the capacity available for economic power flows is less than this, as some capacity must be maintained for emergency response between the two systems. In addition, there may at times be other bottlenecks (e.g. during transmission maintenance outages) in the networks that will also limit flows in either jurisdiction.

Key Requirements for Additional Interconnection

135. In order to remove the limitations described above, the proposed Interconnector must be designed to match the maximum power transfer capacity of the existing interconnector, and must therefore provide for a power transfer capacity of 1,500MW.
136. The proposed Interconnector also needs to present a high level of interconnection security. In order to achieve this, it needs to be physically separated from the existing interconnector, so that the risk of simultaneous failure due to common events will be low.

The proposed Interconnector is required to form part of an integrated all-island electricity network. In order to work properly, the proposed Interconnector must therefore be able to operate efficiently and reliably in this mode.

Planning and Development Context

137. New planning legislation came into operation on the 1st April 2015, which introduced the plan led system. The assessment of the proposal in the Consolidated ES has had full regard to the relevant development plans for the area, and the proposal does not conflict with any policies contained therein. New operational policy for Northern Ireland was published in July 2013 for Planning Policy Statement (PPS) 2 Natural Heritage and in September 2014 for Revised PPS 15 Planning and Flood Risk. Both of these PPS's introduce new policies similar to those contained in their predecessors. PPS 16 Tourism (June 2013) has also been published. It reflects the earlier draft PPS 16 which was assessed in the Consolidated ES (May 2013). A Noise Policy Statement for Northern Ireland was published by the Department in 2014. This contains broad noise related aims and does not superseded specific guidance including British Standards which the proposal continues to comply with. All the issues these new policies identify have been addressed and the Tyrone - Cavan Interconnector still continues to comply with planning policy.

Cumulative and Interrelationship of Impacts

NB This text has been updated and also includes the assessment of the published North-South 400kV Interconnection Development (June 2015) and a number of newly approved projects.

138. The likely significant cumulative effects of the Tyrone - Cavan Interconnector must be assessed. This takes two forms:
- The interaction of impacts between topic areas (e.g. between landscape and ecology); and,
 - The cumulative (or additional) impacts of the Tyrone - Cavan Interconnector with other developments.¹⁹

Interactions

139. The assessment has included a consideration of the interrelationship or interactions between impacts. The likely significance of these combined and interrelated impacts has been assessed within the individual assessment topics.

¹⁹ The Tyrone – Cavan Interconnector has been submitted as two planning applications. The two applications are intrinsically linked and have been considered as one project in terms of EIA. The cumulative assessment of the two applications has been undertaken in the assessment chapters of the Consolidated ES and its Addendum. Similarly the cumulative assessment between the proposed Turleenan substation, overhead line and associated works are all cumulatively assessed where appropriate.

140. The assessment of EMF is interrelated to the various assessments of impacts on population, including noise, landscape and visual, community amenity and socio-economics.
141. The assessment of effects on the water environment is closely linked to the ecology and geology and soils assessments. Potential impacts on the water environment such as impacts on water quality could lead to secondary effects on ecological interests, including fisheries interests and aquatic habitats, as well as indirect effects on hydrogeology and groundwater resources.
142. The geology of the landscape, its surface deposits and the agricultural regimes that utilise soils all have an impact on the nature conservation value and potential of the proposed line route.
143. Geology is a major component of landscape, and land use can result from the quality of the landscape, as assessed in the landscape and visual assessment. Since geology largely determines the underlying shape of the landscape, it has also influenced use of the landscape in the historical and archaeological past, and man-made features described in the cultural heritage assessment may have been located on sites determined by the attributes of local geology and soils.
144. Geology has an important impact on the water environment as a determinant of water chemistry, river flow regimes, water storage capacity and watercourse location, and has an impact on water quality through the ability of bedrock and surface deposits to filter pollutants.
145. Good ecological practice has been incorporated within any mitigation or compensatory measures devised to reduce impacts. In particular, measures designed to mitigate impacts on the local landscape, where these involve new plantings or habitat creation, have taken into account existing semi-natural habitats, and will only use species that are locally appropriate.
146. Noise impacts deriving from vehicle movements are inherently related to transport impacts.
147. Cultural heritage impacts to the setting of cultural heritage sites are interrelated to landscape and visual impacts. Impacts to (unknown) cultural heritage sites arising from onsite excavation arise in tandem with other potential impacts from onsite excavation such as impacts to water quality, soils, habitats, and the water environment. Impacts to ecology, cultural heritage and community amenity are interrelated with landscape and visual impacts.
148. Impacts to community amenity are inherently interrelated by social, cultural, economic and environmental factors; all likely significant impacts have been considered in relation specifically to community amenity. In terms of community amenity, impacts arising from landscape and visual impacts, air, transport and noise are interrelated.
149. The significance of these impacts has all been assessed within the individual assessments.

Cumulative Impacts from other developments

150. The cumulative assessment is also based on potential impacts resulting from the Tyrone - Cavan Interconnector and other developments which are approved but not yet constructed. The assessment has included the proposed Omagh-Tamnamore 50km 110kV overhead electricity line and substation, which is 1.6km from the Tyrone - Cavan Interconnector at the closest point. It has also included an assessment of other developments with the potential for cumulative impacts, including wind turbines and chicken sheds. Cumulative impacts between these projects and the Tyrone- Cavan Interconnector are predicted to be Not Significant apart from the specific Landscape and Visual impacts set out below:
- Impacts between Tyrone - Cavan Interconnector and Tamnamore to Omagh 110kV project on Landscape Character Area (LCA) 47: Loughgall Orchard Belt;
 - Impacts between Tyrone - Cavan Interconnector and O/2013/0464/F Wind turbine on residential receptor E20; and,
 - Impacts between Tyrone - Cavan Interconnector and O/2013/0157/F Wind turbine on residential receptors J14, J16, J22 and J18.
151. A planning application was submitted by EirGrid in June 2015 for the portion of the proposed interconnector within the Republic of Ireland. The impacts of the Tyrone-Cavan Interconnector and North-South 400 kV Interconnection Development have been cumulatively assessed and there will be

significant adverse cumulative effects (moderate or major) in terms of landscape and visual impacts as follows:

- Impacts between Tyrone - Cavan Interconnector and North-South 400 kV Interconnection Development overhead line on LCA 66: Armagh Drumlins, LCA 6: Mullyash Uplands, Viewpoint 30, Viewpoint 34; and,
- Impacts between Tyrone - Cavan Interconnector and North-South 400 kV Interconnection Development overhead line on Individual Dwellings J48, J51, J51+, J59, J60 and J61.

152. There will be a minor adverse cumulative Community Amenity and Land Use impact to one farm (located within the vicinity of Tower Number 102, 10m south west of the overhead line) located at the border between the Tyrone – Cavan Interconnector and the North-South 400 kV Interconnection Development.
153. In terms of economic impacts, studies by EirGrid have shown the proposed interconnector will help customers on the island of Ireland to save approximately €20m²⁰ in 2020 and between €40m and €60m²¹ by 2030²². This is considered to be a major positive cumulative impact. In terms of socio-economics impacts, the proposed interconnector has been assessed to result in benefits in terms of employment.
154. There are no further significant cumulative impacts between all the assessed projects and developments and the Tyrone – Cavan Interconnector.

Transboundary Impacts

NB This text has been updated and also includes the assessment of the published EirGrid EIS June 2015).

155. The EIA Regulations require an assessment of likely significant environmental effects on other member states (more commonly called “transboundary impacts”), and this has been carried out as part of the assessment since the Northern Ireland portion of the proposed interconnector is likely to have effects within the Republic of Ireland in the border area of County Monaghan.
156. It should be noted that impacts arising within Northern Ireland from EirGrid’s proposals in the Republic of Ireland have been reported separately through an Environmental Impact Statement.
157. The proposed overhead line route, as it approaches the border between Northern Ireland and the Republic of Ireland, can be viewed within the Republic of Ireland. This includes the Mullyash Uplands looking north towards Northern Ireland and views from locations within the immediate area along the overhead line route.
158. Based on the assessment of the environmental topics within the scope of the assessment, the majority of transboundary impacts are predicted to be not significant. However, there will be a moderate adverse landscape and visual impacts on the Mullyash Uplands in the Republic of Ireland because of the landscape and visual impacts of the Tyrone – Cavan Interconnector.

²⁰ Based on the exchange rate in March 2015: £14.5m

²¹ Based on the exchange rate in March 2015: £29m - £43.5m

²² EirGrid/SONI (2015). *The Need for a Second North South Electricity Interconnector*. This paper describes the detailed calculation of associated benefits for the project. It is included as Appendix 3.1 of the Consolidated ES Addendum.

Haulage Route Assessment

159. The Consolidated ES considered that the construction of the Tyrone - Cavan Interconnector would result in a temporary increase in traffic levels on a number of roads within the study area during the construction period. These increases are considered to be minor and as such not significant.
160. Since the publication of the Consolidated ES, an additional assessment of the transportation of the transformers to the proposed Turleenan substation has been undertaken. This transportation will require three trips by a 20-axle transporter to transport each of the three 222 tonne transformers from Warrenpoint port to Moy. This transportation will take up to seven hours per trip and will result in local traffic disruption because of temporary road closures and the slow moving traffic.
161. Because of a sharp turn in Moy village, it will be necessary to transfer the transformers by crane from the 20-axle transporter to a smaller self-propelled trailer. This will result in the closure of the B106 in the centre of Moy square and diversion system will be in operation at the northern and southern end of the square. This will result in local disruption to the traffic, as well as temporary visual and noise impacts and will disrupt the normal daily activity of Moy village. This transfer will require two days per trip; six days in total. The three required trips will be spaced apart to minimise disruption.
162. Mitigation measures and publicity of the transformer transportation will inform and help to minimise the disruption. The mitigation measures will include police escorts, appropriate signage of alternative routes and diversions, and undertaking works in daylight only. There is likely to be short-term moderate adverse impacts to road users with no long-term impacts on the completion of the transport.

Ecology

163. In 2013, additional ecological surveys were undertaken. An assessment and survey for smooth newts did not find any and there is unlikely to be a significant effect to this species. Additional surveys for bats confirmed that there are three bat roosts that would be affected by the Tyrone - Cavan Interconnector (in two trees and an agricultural shed). These roosts are likely to be only occasionally used by small numbers of bats; however they will be removed in consultation with NIEA in line with its requirements at construction. Overall there is no change to the assessment of impacts to bats (minor negative) as shown in the Consolidated ES.
164. The first stage of the Habitats Regulations Assessment (HRA) (Stage 1 Screening Stage) was submitted as a draft with the Consolidated ES (May 2013). The screening stage assessed that there would be no likely significant effect on any European sites or their qualifying features arising from the Tyrone - Cavan Interconnector.
165. A review of the draft/shadow Stage 1 Habitats Regulations Assessment screening report (Appendix 10H of the Consolidated ES) was undertaken as part of the preparation of the Consolidated ES Addendum. This review identified the need to update the information required to inform the Habitats Regulations Assessment for the following reasons:
- The draft/shadow Stage 1 Habitats Regulations Assessment was prepared at a time when information on the design of the associated Proposed Development in Rol was not complete
 - The incorporated mitigation has been modified to include additional bird diverters between Towers 1 and 13; and,
 - The inclusion of more remote SPA sites (greater than 30km) for which whooper swan is a qualifying interest species to allow for screening of potential interactions during migratory periods (Autumn and Spring) as birds move between staging sites and onward journeys to wintering and breeding grounds (spring).
166. The revised report upholds the conclusions of no likely significant effects on the conservation objectives of any European Site in the construction or operational phase of the proposed Tyrone Cavan Interconnector and is thus considered compliant with PPS 2 policy NH1. Additional information is presented that will allow the Competent Authority to undertake a Habitats Regulations Assessment.

Air Quality and Climate

167. During construction, the greatest potential dust impacts were predicted to be Medium Adverse due to earthworks and construction activity at the Turleenan substation site. The potential dust-generating impacts due to construction of the overhead line towers were predicted to be low or negligible due to the distance from receptors and small size of the individual working areas.
168. Appropriate construction dust mitigation controls will be put in place and the overall effect will be 'not significant'. Greenhouse gases will be emitted during the construction phase, although these emissions are unlikely to be significant compared with the facilitated emissions reductions expected once operational. During the operational phase the Tyrone - Cavan Interconnector will facilitate the uptake of renewable energy sources, such as wind, by improving access to the end market. This will have long-term beneficial greenhouse gas and climate change effects. This will support government objectives and climate change reduction commitments.

Technology Alternatives

169. The consideration of the main transmission and technology alternatives in respect of the proposed interconnector was undertaken jointly by EirGrid and SONI (at the time NIE) and was informed by a number of studies and reports which evaluated potential transmission alternatives specifically for the proposed interconnector.
170. The project objectives and / or design criteria for the proposed development, regardless of the particular technological alternative that is actually employed, are to:
- a) Comply with all relevant safety standards;
 - b) Comply with all system reliability and security standards;
 - c) Provide an environmentally acceptable and cost effective solution;
 - d) Have a power carrying capacity in the region of 1,500 megawatts (MW), and connect between appropriately robust points on the transmission networks north and south of the border;
 - e) Facilitate future reinforcement of the local transmission network in the north-east area of the Republic of Ireland;
 - f) Facilitate future grid connections and reinforcements; and
 - g) Comply with good utility practice or 'best international practice'.
171. There are several technological alternatives by which a transmission circuit of the capacity required for the proposed development could, in theory, be implemented. Some of these alternatives utilise AC technology while others utilise DC technology.
172. Until relatively recently, DC technology was only used for high capacity electricity transmission in circumstances where it was the only technically feasible or cost effective option. In recent times, however, during consultations associated with transmission projects (including in the case of this proposed development) stakeholders have suggested that DC technology should be used not because of any technical, operational or cost advantage that might accrue but rather because it is seen as a way

of facilitating the undergrounding of the proposed development.

High Voltage Direct Current (HVDC) and High Voltage Alternating Current (HVAC) Technology

173. The existing electricity transmission system on the island of Ireland is a High Voltage Alternating Current (HVAC or AC) system. Any new transmission project that utilises HVAC would therefore be an extension of the existing technology, and would fit seamlessly into the existing meshed transmission network on the island of Ireland.
174. High Voltage Direct Current (HVDC or DC) is an alternative method of transmitting electricity. HVDC technology is mostly used to transmit bulk power from one point to another over long distances where HVAC is not technically or environmentally acceptable (e.g. a long (> 50 km) high capacity submarine cable, as used for the East–West Interconnector between Deeside in north Wales and Woodland, County Meath in the Republic of Ireland or the Moyle Interconnector between Scotland and Northern Ireland).
175. Inserting a HVDC circuit between any two points in a HVAC network would require the HVAC electricity to be converted into HVDC electricity at one end, transmitted through cable or overhead line to the other end, where it is converted back from DC to AC, and then transmitted back into the HVAC network. This is inefficient (unless the HVDC circuit is very long) and costly (in terms of the requirement for converter stations) but it is technically feasible.
176. In their joint comparative assessment of HVDC as an alternative to HVAC, EirGrid and SONI (at the time NIE) have concluded that any option using DC technology is not an appropriate option for the intended nature and purpose of the proposed interconnector. Specifically, it would not facilitate the future development of the transmission network as well as any AC option; furthermore, the requirement to introduce complex and bespoke control systems into a strategically important part of the all-island transmission network brings with it considerable risk for system security and stability. In addition to these significant technical constraints, all DC options (underground cable and overhead line) would be significantly more expensive. For these reasons, the proposed interconnector, including SONI's proposed development is a standard AC solution.

AC Overhead Line and Underground Cable

177. At 400 kV, overhead line technology conventionally utilises steel lattice towers to support the high voltage electricity conductors. Equivalent underground cable technology involves installation of specialised insulated cables.
178. An overhead line has a high level of reliability, with most faults being located easily and quickly repaired; it is a flexible technology which can adapt to a variety of topographies; it has a relatively low physical impact on the land it crosses (limited to the tower locations and land within the overhead line corridor); and is considered very cost effective compared with an underground system which has a more complicated construction and design. Overhead line technology for 400 kV AC transmission networks reflects current international practice for such nature, extent and purpose of transmission infrastructure development as is proposed in this instance, and is the technology around which the transmission network in the UK, the Republic of Ireland, and indeed in Europe and internationally, has been developed to date.
179. Comparatively, international experience confirms that reliability is an issue with underground cables. In the short-term, there is potential for prolonged unplanned circuit outages with underground cables. In the long-term, the expectation is that as an underground cable gets older, it becomes less reliable. In addition, in the use of underground cable for HVAC transmission, the high capacitance of the cable – meaning that it is able to collect and hold a charge of electricity - presents design and operational difficulties. As a consequence, it is the case that there are no 400 kV HVAC underground cables in the world that are in any way near the length required for the proposed development.
180. One of the main advantages of installing underground cables is a reduction in visual impacts associated with the overhead line option. However, installing buried cables introduces other

environmental issues specific to that technology, e.g. potential impact on archaeology as a result of excavation works and permanent loss of habitat due to removal of hedgerows. Furthermore, buried cables occupy a significant amount of land and introduce restrictions on the building of any structures over the cable route (due to the risk of damage during construction and preventing cable access if required).

181. Indeed, because of their higher cost and lower service availability, underground cable is generally only used in congested and/or built-up urban areas or wherever a constraint has been identified such that no alternative exists other than to use an underground cable.
182. Having regard to the above, in its careful and detailed consideration of alternative technology solutions for the proposed development, EirGrid and SONI have concluded:
- A 400 kV AC overhead line is the best technical solution for the proposed development;
 - An entirely undergrounded AC option is not an acceptable solution for the nature, purpose, and extent of this project for technical reasons. The use of long 400 kV AC underground cables on the island of Ireland transmission system is not feasible within the constraints of EirGrid's and SONI's statutory obligations to ensure a secure and reliable grid;
 - At 400 kV, an overhead line would be significantly less costly than any underground cable alternative; and
 - The use of short lengths of underground cable should only be considered in the event that an overhead line solution cannot be found and where it can be confirmed that the use of underground cable does not exceed the system's capacity to absorb such cables.

Partial Undergrounding

183. Partial undergrounding is the term used to describe the undergrounding of a short section, or short sections, of a long transmission circuit that is primarily comprised of an overhead line. Partial undergrounding of lower-voltage 110 kV transmission circuits is at this stage common practice on the island of Ireland and internationally. There are no examples of partial undergrounding at the 400 kV level in the Republic of Ireland; however there are numerous examples elsewhere in Europe. Partial undergrounding of 400 kV AC circuits is therefore technically feasible.

Consideration of Partial Undergrounding for this Development

184. When considering partial undergrounding for a 400 kV project, it is essential to understand the environmental, technical and cost implications of such. These implications of partial undergrounding are considered below.
185. **Environmental Issues:** The size of the AC underground cables required for the proposed development would be such that they could not be installed under public roads or under disused railway lines, as these roads and railways are not sufficiently wide. The only practical option would be to install the cables directly across farmland. This would among other things: result in much greater disruption to farming and other activities during the construction phase; it would require the cutting of a swathe through every hedgerow in its path (leaving a permanent gap); it would restrict development potential (as no buildings could be permitted to be constructed within a underground cable reserve); and it would also be necessary to have a substation at every location where the 400 kV circuit changes from overhead line to underground cable (known as a 'transition station'), thereby requiring an additional land take of about one half of a hectare per transition station. Any partial undergrounding of the circuit would require two transition stations – one at either end of the underground portion unless one end is in a main terminal substation. These transition stations are themselves relatively large, and therefore visually prominent above-ground features.
186. **Technical Considerations:** Inserting a section of underground cable into an overhead line circuit will have a negative effect on the reliability performance of the overall circuit. In addition, some transmission system operators in other countries have set down the maximum permissible length of underground cable that can be safely installed on their transmission system; for example, in the

Netherlands the maximum permissible length of a single 400 kV underground cable is 20km; the longest 400 kV underground cable in Europe is a 20km cable installed in an air conditioned tunnel in London. The transmission system on the island of Ireland is much smaller and more isolated than that of Great Britain or indeed mainland Europe and, consequently, can only accommodate much shorter lengths of 400 kV underground cables than is the case in other larger countries. Having carefully considered the issue of partial undergrounding, and based on the present extent and configuration of the island of Ireland network, EirGrid and SONI consider that the maximum length of 400 kV underground cable which it would be technically feasible to install as part of the proposed overhead line development (inclusive of that part of the interconnector located in Northern Ireland) is approximately 10km, whether installed in one continuous length or in an accumulation of shorter lengths.

187. **Cost Issues:** 400 kV AC underground cable would cost on average €5.4²³ million euro per km more to install than the proposed AC overhead line. In addition, given that at least one, and potentially two, transition stations would be required for each section of the circuit that is undergrounded, depending upon the length of an underground section (and therefore the facilities required at each end), the required transition stations could add an additional approximately €5 - €15²⁴ million per installation.
188. Overall, EirGrid and SONI have concluded that partial undergrounding is feasible, if:
- The length to be undergrounded is restricted, for technical and operational reasons, to less than approximately 10km over the entire length of the circuit in Northern Ireland and Republic of Ireland, either in one continuous length or an accumulation of shorter lengths; and
 - The cost of using the short length(s) of underground cable can be proven to be an environmentally advantageous and cost-effective way of overcoming an otherwise unavoidable environmental or technical constraint to the preferred overhead line.
189. In this regard, neither of the respective applicants has identified any section of the route of the proposed interconnector where the environmental and / or technical impact of the preferred overhead line is of such significance that partial undergrounding is considered to be a preferable alternative. On the basis of this consideration of alternatives, the respective applicants are therefore proposing that the entire 400 kV circuit be implemented using 400 kV AC overhead line.

[Partial Undergrounding as a Landscape Mitigation Measure](#)

190. In 2014, as part of the formal pre-application process for Projects of Common Interest (PCI) in the Republic of Ireland, the Competent Authority (An Bord Pleanála) examined EirGrid's Draft Application File, which included a draft Environmental Impact Statement (EIS). An Bord Pleanála requested missing information including the following request relating to partial undergrounding:
- “Where significant impacts on landscapes/demesne landscapes are identified, the EIS should address the potential for partial undergrounding of the line to mitigate those impacts”.*
191. In other words, An Bord Pleanála requested consideration of partial undergrounding of the circuit, not as a technical alternative in itself, but as a potential mitigation measure in respect of the most sensitive visual receptors. To address this specific request, and also to ensure completeness and consistency, EirGrid and SONI undertook an assessment of the potential for partial undergrounding as a landscape mitigation measure for the entire proposed interconnector.
192. Partial undergrounding would involve constructing a starting transition station and a finishing transition station. Between these stations the proposed interconnector would be buried as a cable and so towers would not be required along these sections. As noted above, a constraint to the use of partial

²³ Based on the exchange rate in March 2015: £4 million.

²⁴ Based on the exchange rate in March 2015: £4 – 11 million.

undergrounding, is that the length of undergrounding which is technically feasible for the entire proposed interconnector, both in the Republic of Ireland and Northern Ireland, is approximately 10km.

193. For this reason the Partial Undergrounding consideration considered Northern Ireland and the Republic of Ireland, despite the original request coming from the Competent Authority for PCI in the Republic of Ireland only, and not those in Northern Ireland.
194. The methodology for the consideration sought to identify the locations where undergrounding might have the most effective mitigating effect on identified significant and sensitive landscapes impact. The use of this approximate 10km length might be in one location, or the use of shorter lengths of partial undergrounding might be considered in more than one location, while bearing in mind the absolute need for, and consequent potential impact of, the above-ground transition stations required at each end of that partially undergrounded portion of the alignment.
195. The process starts with a listing of locations where significant landscape and visual impact has been identified. Following this, the impacts that can feasibly be mitigated by partial undergrounding are identified. Some impacts are so dispersed that partial undergrounding of 10km can be excluded as having no potential to mitigate landscape impacts due to the amount of transition stations required.
196. One of the areas considered for partial undergrounding was within Northern Ireland - the Benburb Area. Receptors in the area include:
- Tullydowey House Gate Lodge;
 - River Blackwater, Counties Tyrone and Armagh;
 - Tullydowey House;
 - National Cycle Route 11 and River Blackwater Canoe Trail; and,
 - Benburb as a settlement and constraints within (e.g. Benburb Priory and Benburb Castle).
197. Consideration was made of a number of environmental topics within each area under consideration in both Northern Ireland and Ireland. These topics included Agronomy, Ecology, Soils, Geology, Hydrogeology, Water, Cultural Heritage, Traffic and Landscape effects. It was acknowledged that the partial undergrounding would have reduced impacts in terms of landscape and cultural heritage. However it was considered there was no justification for, or greater benefit of, partial undergrounding at this location in the Benburb Area over the proposed overhead line for this location at Benburb. The partial undergrounding option at Benburb would create greater adverse impacts (agronomy, ecology, soils, geology, hydrogeology and traffic) than the overhead line.
198. This consideration of the potential for partial undergrounding of the proposed circuit in for the Benburb Area reflected the consideration in respect of sites in the Republic of Ireland. For each of the locations identified and evaluated in the Republic of Ireland, it was concluded that there is no overriding justification for, or benefit of the provision of partial undergrounding when compared to the proposed interconnector, i.e. the overhead line design.

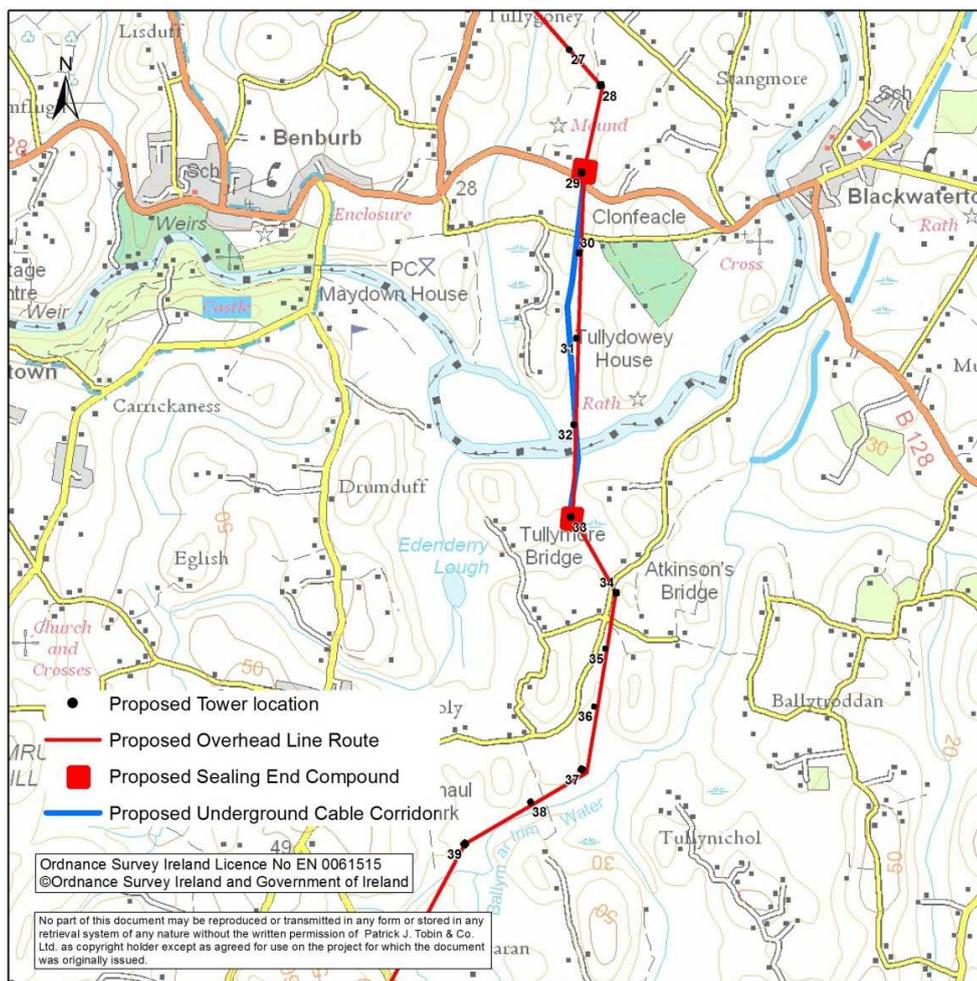


Plate 2: Partial Undergrounding Proposed Option within Northern Ireland: Benburb Area (Towers 29 – 33)

Noise Assessment

199. Two of the main British Standards dealing with the assessment of noise or providing guidance on acceptable noise limits in buildings have been revised since the publication of the Consolidated ES. They are BS4142 Methods for rating and assessing industrial and commercial sound (2014) and BS8233 Guidance on sound insulation and noise reduction for buildings (2014). The noise assessment in the Consolidated ES was prepared in advance of the publication of the revised Standards. However, it is considered that the assessment is in line with the revised standards. While the background noise levels are low in the study area, a precautionary approach has been taken to the assessment. The noise assessment remains that the noise impacts of the proposed Tyrone – Cavan Interconnector will be below the recommended levels and targets set by the WHO and the British Standards BS8233 and BS4142 and are thus within acceptable limits in Northern Ireland. Therefore there will be no significant noise effects.

Copies and Comments

200. If you have comments on this NTS or Addendum, they can be made to:
Strategic Planning Division, DOE, Causeway Exchange, 1-7 Bedford Street, Belfast, BT2 7EG
Tel: 0300 200 7830 (NI Only) Fax: 028 9041 6802 Email: planning@doeni.gov.uk
201. The EIA documents, including this NTS and the Addendum, are available to download at www.soni.ltd.uk. An electronic copy of these documents on DVD and a hard copy of the NTS are also available free of charge, and may be obtained by contacting SONI at:
GRID DEVELOPMENT N.I. PROJECTS, SONI, 12 Manse Road, Belfast, BT6 9RT
Website: www.soni.ltd.uk Tel: 028 90 794336
202. Printed and bound copies of the Addendum and EIA documents are available for £80. Should you wish to purchase a copy you can either:
- Write to SONI at the address above enclosing a cheque, made payable to SONI, for the appropriate amount. On receipt of this payment, the documents will be immediately dispatched, or
 - Purchase the document directly at the Post Office in Armagh, County Armagh, at the address given below. Payment at the Post Office can be made by either cash or cheque:
Armagh Post Office, Emersons Supermarket, 55-57 Scotch Street, Armagh, Co Armagh BT61 7DF
203. All of the EIA documents and planning applications can be viewed at the Strategic Planning Division (address given above) or at any of the locations listed below:
- Armagh, Banbridge and Craigavon District Council, Council Offices, The Palace Demesne, Armagh, BT60 4EL Tel: 028 3752 9600;
 - Armagh Branch Library, Market St, Armagh, County Armagh, BT61 7BU Tel: 028 3752 4072;
 - Portadown Library, Church Street, Portadown, County Armagh, BT62 3LQ Tel No 028 3833 6122;
 - Dungannon Library, Market Square, Dungannon, County Tyrone, BT70 1JB Tel: 028 8772 2952; and,
 - Mid Ulster Council, Council Offices, Circular Rd, Dungannon, County Tyrone, BT71 6DT Tel: 028 8772 0300.
204. In addition, a **project information office** will be available at the Armagh City Hotel (2 Friary Road, Armagh, County Armagh, BT60 4FR) to view or purchase a copy of the EIA documents and planning applications and to meet a member of the project team between 12 noon and 7pm during the following periods:
- Every day from Monday 15th to Friday 19th June 2015;
 - Every Tuesday and Thursday from 23rd June to Thursday 30th July 2015; and,
 - Every day from Monday 3rd to Friday 7th August 2015.

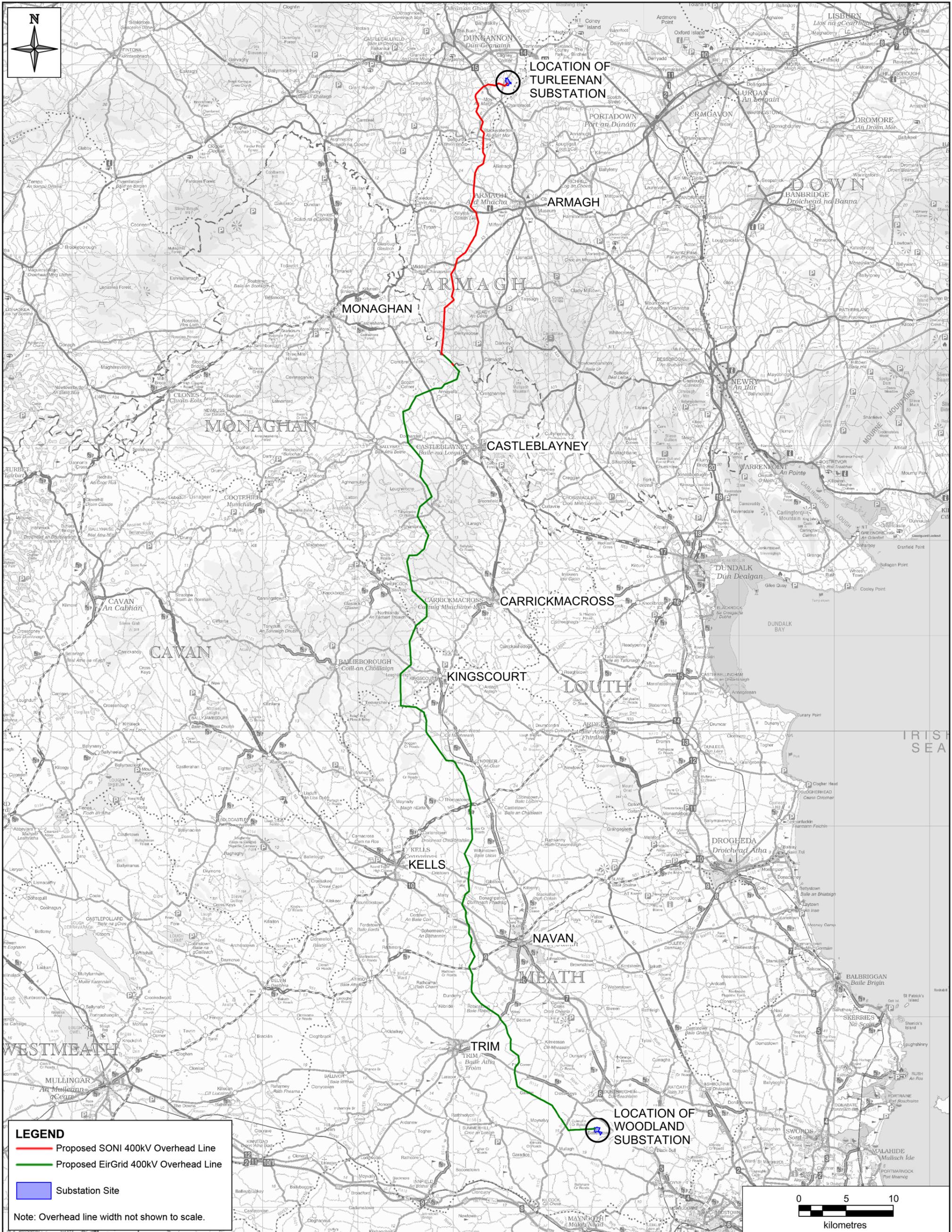
Volume 1 Non-Technical Summary Figures:

NTS Figure I Proposed Interconnector

NTS Figure II Alternative Access Track to T47

NTS Figure III Alternative Access Track to T71

NTS Figure IV Revised Tower Foundation T102



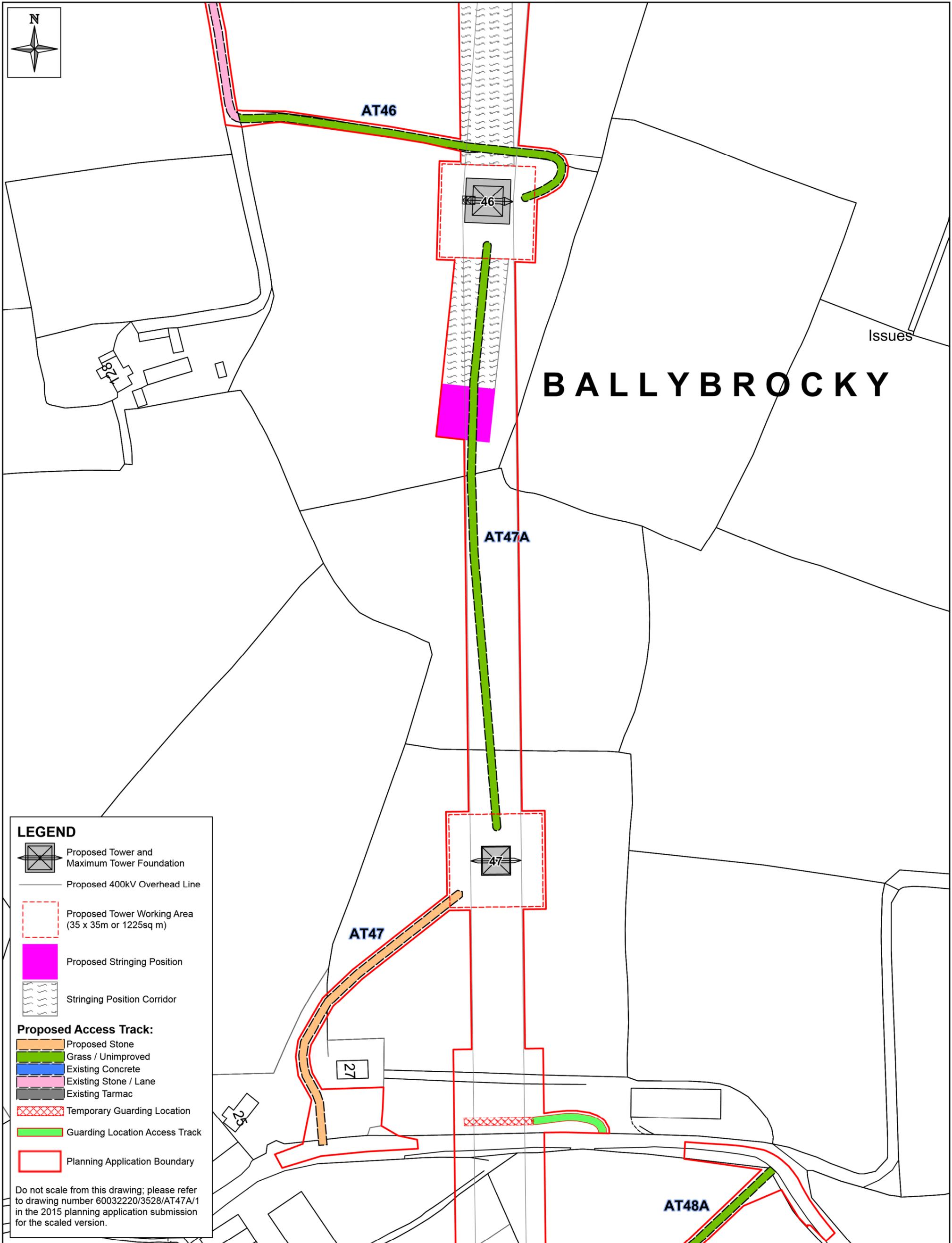
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Client:	 
Project:	TYRONE TO CAVAN INTERCONNECTOR CONSOLIDATED ES ADDENDUM

Title:	NON-TECHNICAL SUMMARY FIGURE I: PROPOSED INTERCONNECTOR OVERALL SCHEME LOCATION PLAN
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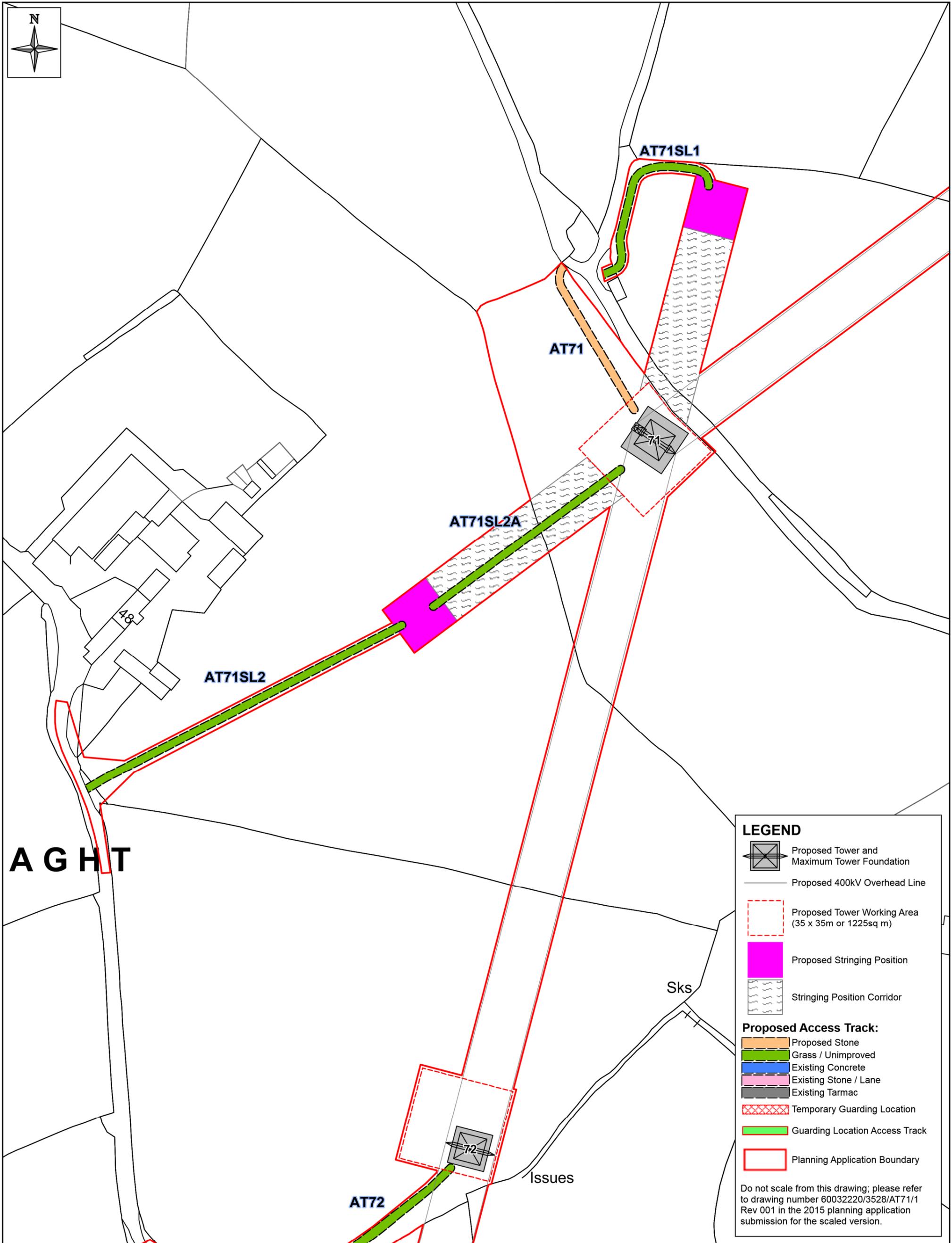
	
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Design: ESB/GNFE	Drawn: GB
Chk'd: JM	App'd: FL
Date: 27/05/2015	Scale: NOT TO SCALE
No: 60032220/3528/CESA/NTS/FIGI	



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<p>Client:</p> 	<p>Title:</p> <p>NON-TECHNICAL SUMMARY FIGURE II: ALTERNATIVE ACCESS TRACK AT47A TO TOWER 47</p>		<p>Design: GB</p> <p>Chk'd: JM</p> <p>Date: 20/05/2015</p>	<p>Drawn: GB</p> <p>App'd: FL</p> <p>Scale: NOT TO SCALE</p>
<p>Project:</p> <p>TYRONE TO CAVAN INTERCONNECTOR CONSOLIDATED ES ADDENDUM</p>	<p>9th Floor The Clarence West Building 2 Clarence Street West BELFAST, BT2 7GP</p>	<p>Tel: +44 (0) 28 9060 7200 Fax: +44 (0) 28 9060 7399 www.aecom.com</p>	<p>No: 60032220/3528/CESA/NTS/FIGII</p>	



LEGEND

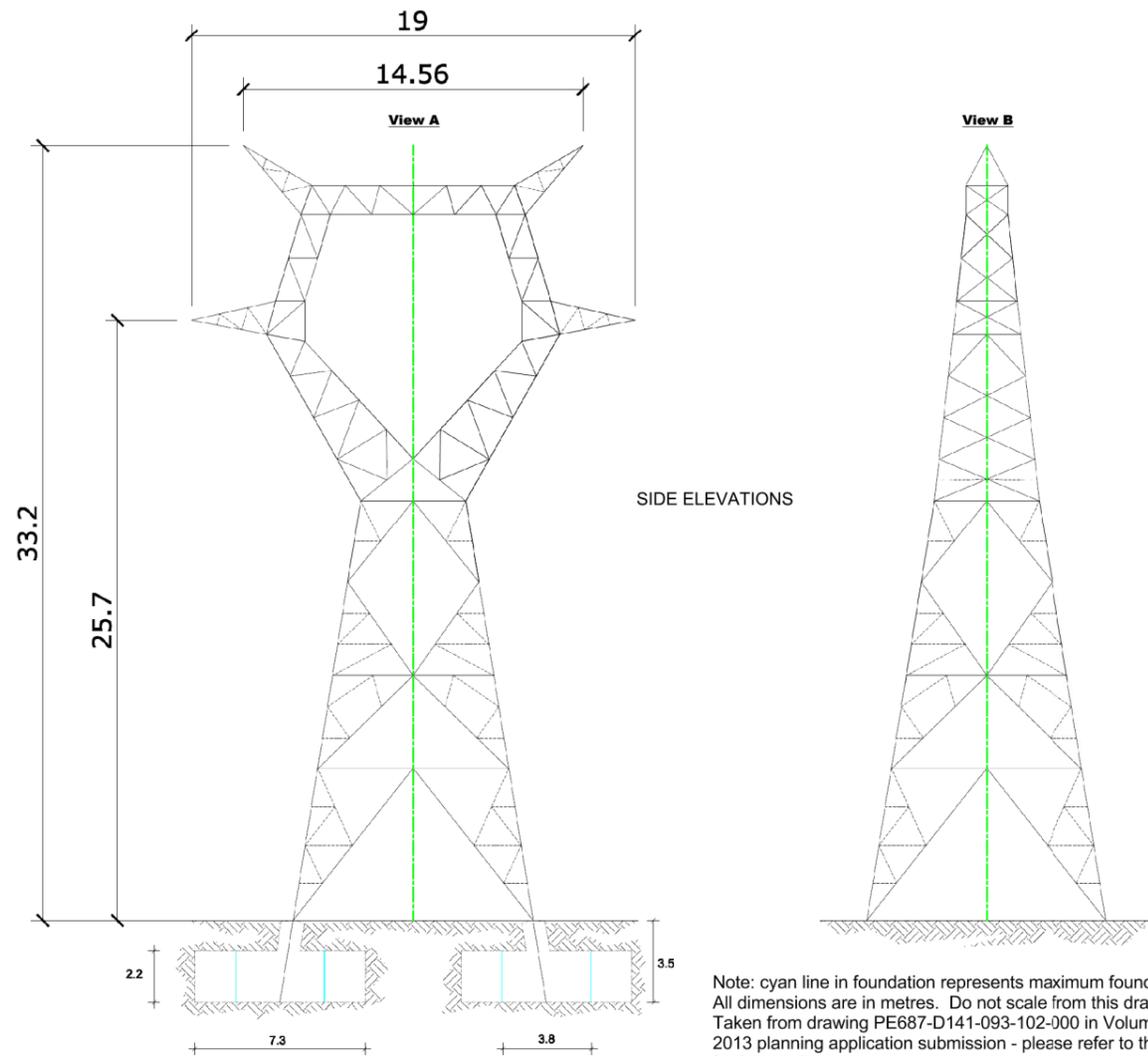
- Proposed Tower and Maximum Tower Foundation
- Proposed 400kV Overhead Line
- Proposed Tower Working Area (35 x 35m or 1225sq m)
- Proposed Stringing Position
- Stringing Position Corridor

Proposed Access Track:

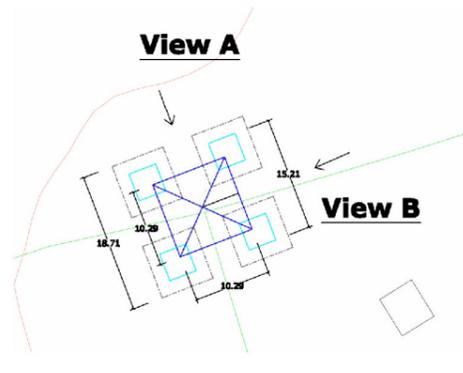
- Proposed Stone
- Grass / Unimproved
- Existing Concrete
- Existing Stone / Lane
- Existing Tarmac
- Temporary Guarding Location
- Guarding Location Access Track
- Planning Application Boundary

Do not scale from this drawing; please refer to drawing number 60032220/3528/AT71/1 Rev 001 in the 2015 planning application submission for the scaled version.

2013 PLANNING SUBMISSION TYPE "C-IVI" TENSION TOWER - 30° LINE ANGLE

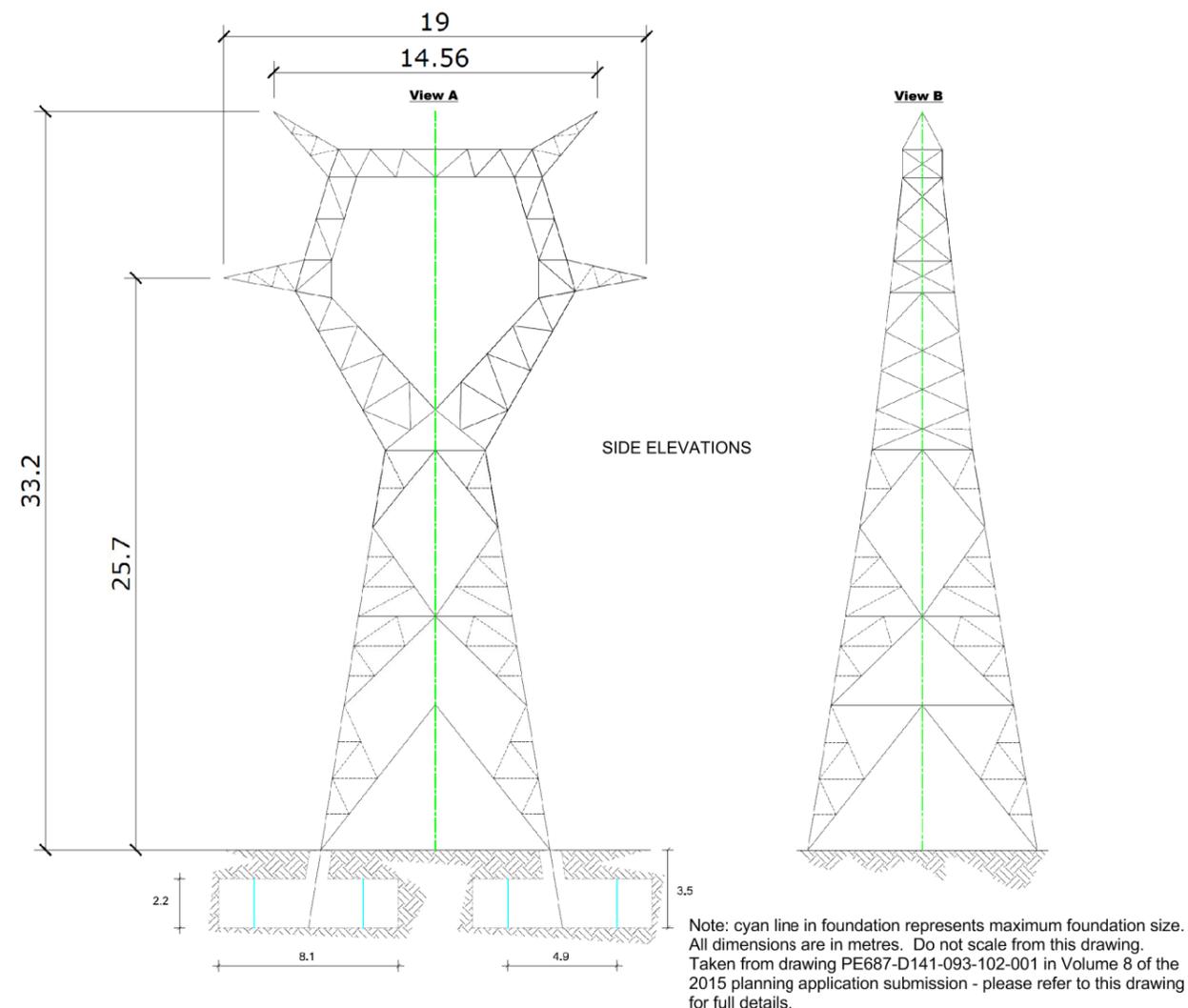


PLAN VIEW
NOT TO SCALE - DO NOT SCALE FROM THIS DRAWING

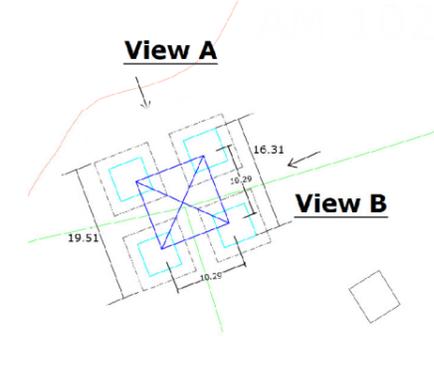


Legend:	
Proposed 400 kV Tower -	
Minimum Foundation -	
Maximum Foundation -	
Hedgerows -	
Watercourse -	
Contours -	

2015 PLANNING SUBMISSION TYPE "C-IVI" TENSION TOWER - 60° LINE ANGLE



PLAN VIEW
NOT TO SCALE - DO NOT SCALE FROM THIS DRAWING



Legend:	
Proposed 400 kV Tower -	
Minimum Foundation -	
Maximum Foundation -	
Hedgerows -	
Watercourse -	
Contours -	

Client:

Project: TYRONE TO CAVAN INTERCONNECTOR CONSOLIDATED ES ADDENDUM

Title: NON-TECHNICAL SUMMARY FIGURE IV:
REVISED TOWER FOUNDATION
AT TOWER 102

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Chk'd: JM
Date: 27/05/2015
No: 60032220/3528/CESA/NTS/FIGIV

Drawn: GB
App'd: FL
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