

APPENDIX 12

ENVIRONMENTAL APPRAISAL OF THE CONVERTER STATION SITE SELECTION AT FLAGFORD, COUNTY ROSCOMMON

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1. INTRODUCTION

In considering potential converter station sites, potential locations were first identified. Locations are 1km wide circular areas within which a converter station site could be identified. It is important to understand that the converter station site itself will only occupy about 5% of this area or 5.34 acres / 2.16 hectares; the identification of such a wider location is to facilitate the appropriate siting of a converter station, and to allow for comparative evaluation of location options.

A photograph of the existing 500MW converter station of the East West Interconnector in Woodland, Co. Meath is shown below in Figure 1. It is expected that a Generation 4 multilevel VSC station would be used for the Grid West project, which would be approximately the same size as that shown in the Figure. The size of the compound to house such a converter station would require approximately 180m x 120m or 5.34 acres.



Appendix 12 Figure 1 Existing 500MW Converter Station of the East West Interconnector in Woodland, County Meath

The first step in a site selection process is therefore to identify the best location for siting a converter station in north Mayo and near Flagford substation. The study areas selected for the converter stations for the purposes of the IEP Report have been confined to the areas around the sites identified as potential substation sites for the overhead line options, to ensure a balanced analysis for the ultimate comparative evaluation of the underground and overhead options, e.g. considering a

wider study area around Flagford may identify a site some distance from the existing substation which may be feasible but would require a significant additional amount of HVAC cable to connect the converter station to Flagford, leading to a significantly increased cost for the HVDC solution.

If the HVDC solution is ultimately identified as the preferred solution for Grid West, then EirGrid will revisit the converter station site selection process before arriving at a final decision.

1.1.1 North Mayo Converter Station Locations

In north Mayo, only two zones, DCB1 and DCB2 were considered suitable to be brought forward for further evaluation, given the heavily constrained nature of the area.



Appendix 12 Figure 2 Typical View of Location DCB1

Appendix 12 Figure 3 Typical View of Location DCB2

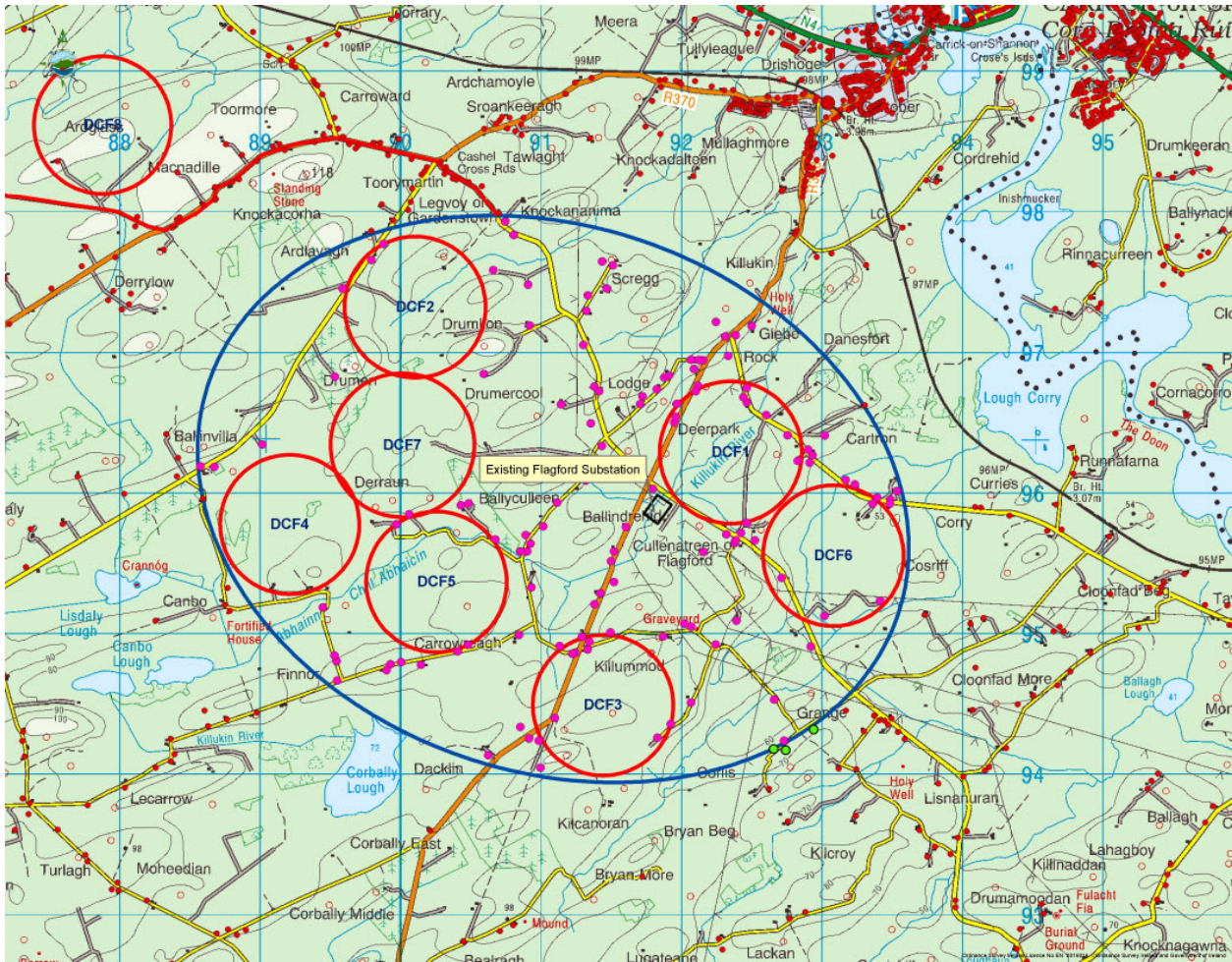


Appendix 12 Figure 4 North Mayo HVDC Converter Station Locations

1.1.2 Flagford Converter Station Locations

In the *HVDC Underground Route Options Preliminary Evaluation Report* (Appendix 8 of this IEP Report) six potential converter station locations were identified in the vicinity of Flagford Substation. In the Report these were designated DCF1 to DCF6.

During further public consultation, local residents identified a number of alternative locations that they considered would be preferable to the sites initially identified. Of these the project team identified two that met the general criteria and these have therefore been included in this evaluation. The first additional zone identified, designated DCF7, is within the converter station location zone while the second, designated DCF8, is outside the zone but very close to the emerging preferred underground cable route. The proposed converter station zone and associated converter station locations for Flagford are shown in Figure 5 and in the drawing included in Volume 3. The existing Flagford substation is immediately south west of DCF1.



Appendix 12 Figure 5 Revised Flagford HVDC Converter Station Locations (Post July 2014 Consultation)

1.1.3 Evaluation Criteria of Converter Station Locations

The following criteria are proposed for the evaluation of the converter station locations (these are the same criteria used in the Underground Route Options Preliminary Evaluation Report, July 2014):

1.1.3.1 Evaluation of North Mayo Converter Station Locations

Of the five potential converter station locations identified in north Mayo, three are located outside the converter station zone. Up to five 110kV circuits will be required to connect the Gate 3 generation to the HVDC substation. The majority of these circuits would become longer by approximately 8km each if sites outside the zone are selected. Adding this additional length of 110kV circuit into the area is undesirable, regardless of whether underground or overhead solutions could be progressed. Significant additional length of additional underground cable could increase undesirable technical issues on the network whereas five additional overhead circuits would have greater impact including the visual wirescape. Given that none of the three converter station sites outside the converter station zone have any particularly significant advantages, particularly in terms of distance from housing, these sites have not been taken forward for evaluation.

The following are the key points taken into consideration in evaluating the remaining two locations DCB1 and DCB2:

- **Proximity to housing:** For DCB1, there are no houses within the 1km wide location identified and a total of 11 houses within 500m of its boundary. For location DCB2, there are no houses within the 1km wide location identified, and 15 houses within 500m of its boundary. DCB1 therefore has less impact on local settlements than DCB2.
- **Topography:** both locations are generally relatively level, with only gentle gradients across the sites. There is little to separate the two sites on this criterion.
- **Geotechnical/Subsoil conditions:** Location DCB1 is within the Bellacorick Peat complex located within peat up to at least 3m deep. DCB2 is in an area with generally good ground conditions although there are small areas of localised peat. The ground conditions in location DCB1 would create significant engineering challenges for the construction of a facility of the size and nature of an HVDC converter station. Furthermore, the associated impact on the local ecology would require further more detailed investigation.
- **Access:** DCB2 is relatively close to the R315, providing much better access than is available to DCB1 where at least 2km of local roads would have to be upgraded and a further kilometre of new road, generally across peat, would have to be constructed.
- **Landscape and visual:** Location DB2 is located on a low ridge with limited opportunity for screening, while DCB1 is located against elevated ground with offers good opportunities for visual screening, thereby reducing its impact on the landscape.
- **Cultural heritage:** There is one megalith located within location DCB2 and a second just outside to the north-west (MA21:28 & 029), which causes this location to be more constrained than DCB1. However as the monument within the location is on the northern edge of the location, close to houses, the final site of the converter station could be selected so as to not impact on this monument.
- **Biodiversity, Flora and Fauna:** The area of location DCB2 is generally grazing farm land and the construction of a converter station in this location is unlikely to have significant impact on the local ecology. However DCB1 is located in bog, close to the Breaghwy River. To construct an HVDC Converter Station within this location would require excavation of the peat down to the underlying ground, with the drainage through the site being designed to ensure that the site does not flood. Substantial quantities of imported fill material would need to be transported into the site to create a platform for the station that would not be subject to flooding. The impact on the local ecology in the bog and the potential for indirect impacts on areas outside of the local site, such as watercourses that host fresh water pearl mussel etc. would need further detailed consideration.

Assessment Criteria	Location	
	DCB1	DCB2
Proximity to Housing		
Topography		
Geotechnical Conditions		
Access		
Landscape & Visual Impact		
Cultural Heritage ¹		
Ecology		

Most Constrained

Least Constrained



Appendix 12 Table 1 North Mayo Converter Station Location Evaluation Matrix

The evaluation matrix above represents the findings of the assessment to date. On balance the project team considers that DB2 is the least constrained of the two identified areas and is the preferred location of the north Mayo converter station, for the purposes of the IEP report. However two issues need further consideration and consultation before a final decision is made:

1. The increased impact on settlements in DCB2.
2. Further investigation into the construction of an HVDC converter station in the peat at DCB1 and the associated impact on the local ecology.

1.1.3.2 Evaluation of Flagford Converter Station Locations

In contrast to the north Mayo converter station locations, all eight locations in the Flagford converter station zone are reasonably suitable technically. Thus all eight have been taken forward into the evaluation.

Through the consultation process, members of the public identified a number of features, including historical monuments, visual aspects and karst features around the six locations originally identified. This information has now been considered as part of the preferred converter location in the Flagford area.

An analysis of each of the locations against each of the criteria is set out in Table 2 below.

¹Proximity to existing substation is not a criterion in this instance, since a practical location close to or adjacent to the existing Bellacorick substation is not available.

Location	Location DCF1	Location DCF2	Location DCF3	Location DCF4	Location DCF5	Location DCF6	Location DCF7	Location DCF8
Proximity to Housing	- 7 houses within the 1km wide location - 38 houses within 500m of its boundary.	- 1 houses within the 1km wide location -24 houses within 500m of its boundary	- 7 houses within the 1km wide location - 26 houses within 500m of its boundary	- 0 houses within the 1km wide location - 14 houses within 500m of its boundary	- 2 houses within the 1km wide location - 23 houses within 500m of its boundary	- 3 houses within the 1km wide location -26 houses within 500m of its boundary	- 1 houses within the 1km wide location - 8 houses within 500m of its boundary	- 1 houses within the 1km wide location - 15 houses within 500m of its boundary
Proximity to Existing Substation	Within 500m	Approx 2.5km	Approx 2km	Approx 4km	Approx 2km	Approx 1.5km	Approx 5.5km	Approx 6km, but on ugc route
Topography	Flat terrain	Sloping area	Gently sloping	Gently sloping	Gently sloping	Flat terrain	Flat areas, with other gently sloping areas	Sloping raised ground
Geotechnical Conditions²	Evidence received of some karst features in the area.	Good	Good	Good	Good	Good	Area of raised bog in the western half of location. Ground appears satisfactory to east	Good
Access	Good – opposite Flagford substation	Accessible from local road	Good access off R368	Accessible from local road	Accessible from local road	Accessible from local road	Accessible from a local road off the R370 and then approx. 1km of private access road	Accessible from a local road off the R370 and then approx. .5km of private access road
Landscape & Visual Impact	Low roadside vegetation resulting in open views from the nearest local road, close to Killukin River.	Not far from local roads but in between hills and could be screened by topography, in most views it will be seen against a backdrop of a hill	Low roadside vegetation resulting in open views from the nearest road – R368, within 1.5km from Corbally Lough	Within 1km from Lisdaly Lough, Canbo Lough and 0.5km from Killukin River and 1.5km from Corbally Lough. Open views from nearest local road	Close to Killukin River and within 1km from Corbally Lough	Close to local road but if carefully placed can be screened in views by topography or vegetation	Area is remote from any local roads, with one house in the location. Topography tends to screen the area with potential for further screening once site selected.	Location is on raised ground with distant views possible from south-west. Raised ground tends to screen location from south and east.
Cultural Heritage	There are six known archaeological sites including four ringforts (RO011-070, 073, 043, 073, 163), a mill (RO011-16201) and a field system (RO011-162002).	There is a ringfort (RO011-034) located in the vicinity of this location at the south east.	RO011-101 (Ringfort) located at southern end of this location.	No known cultural heritage sites in the immediate vicinity.	There is a ringfort (RO011-094) located in the vicinity of this location. It is situated on top of a hill and is a prominent and well preserved site.	There are 2 Ringforts (RO011-072001 and RO011-073) and a Souterrain (RO011-072002).	There are 4 known archaeological sites within the boundary (three ringforts in the south and a boundary/mound in the north). All are on outer edge of location	DCF8 has two known monuments in the middle and one at the very south eastern edge
Ecology	No protected sites. Killulín River cuts through location. There are recorded sightings of otters in this section of the river.	No protected sites	No protected sites	No protected sites	No protected sites	No protected sites	Detailed ecological survey would be required if converter station site impacts on bog.	No protected sites and limited impact on ecology

Appendix 12 Table 2: Analysis of Flagford Converter Station Locations

²Geotechnical conditions assessed using available geological mapping

The following are the key points taken into consideration in evaluating the potential locations:

- The new location designated DCF7 includes a relatively intact bog which requires a more detailed ecological survey if the converter station were to impact this bog. Before the end of the access road there is a willow scrub, wet grassland area. A conifer plantation is located on the west of the access road. Overall there is a good habitat variety in the area. There are no houses overlooking the area.
- The other new location, DCF8, included a semi mature conifer plantation approx. 15-20m in height with an access road leading to further plantation which becomes inaccessible due to deposits of builder's rubble. A view towards the south from this access road has very little screening, with lots of open space on raised ground, making the location visible from north, west and south. A private road marked on the map leads to an uninhabited old house surrounded by agricultural fields.
- DCF1 and DCF3 have the most impact on local settlements, with DCF1 in particular being assessed as having a significant impact.
- DCF2 is located on an area of sloping ground, which would make construction more difficult given the area of the converter station site.
- The converter station is a large prominent facility that will have a significant impact on the visual amenity. The least constrained are locations DCF6 and DCF2 as these can be screened from the nearest local roads. The location DCF4 is the least preferred due to close proximity to Lisdaly Lough, Canbo Lough and Killukin River. It is an open landscape near water, with characteristics of remoteness, due to the fact that there are no houses in the vicinity. There are areas of forestry, with potential for screening with careful siting and station design, followed by second least preferred locations – DCF1 and DCF3 mainly due to topography and low roadside vegetation that would allow views of the development from the nearest roads. From a landscape point of view DCF7 is better than DCF4, since area is remote from any local roads, with no houses in the location. Screening can be used to minimise any views from local roads or houses. DCF8 is a relatively exposed location situated on raised ground, which would be visible from local roads, although high ground does provide screening from the R370.
- There are a significant number of historical monuments in the area with only location DCF4 not having any recorded sites. However the individual sites can be avoided by appropriate positioning and design of the converter station within the location.
- There are no protected ecological sites in the vicinity of any location. However the Killukin River which cuts through DCF1 has recorded otter sightings. The network of streams and drains near all locations means aquatic receptors could be sensitive to construction stage impacts.

Assessment Criteria	Location							
	DCF1	DCF2	DCF3	DCF4	DCF5	DCF6	DCF7	DCF8
Proximity to Housing	Dark Blue	Green	Dark Blue	Green	Blue	Blue	Yellow	Green
Topography	Yellow	Green	Light Green	Light Green	Light Green	Yellow	Yellow	Green
Geotechnical Conditions	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Light Green	Yellow
Access	Yellow	Green	Light Green	Green	Light Green	Light Green	Green	Yellow
Landscape & Visual Impact	Blue	Green	Blue	Dark Blue	Green	Green	Light Green	Blue
Cultural Heritage	Blue	Light Green	Light Green	Yellow	Green	Green	Light Green	Light Green
Ecology	Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
Overall	Dark Blue	Green	Green	Green	Green	Light Green	Yellow	Light Green

Most Constrained
Least Constrained

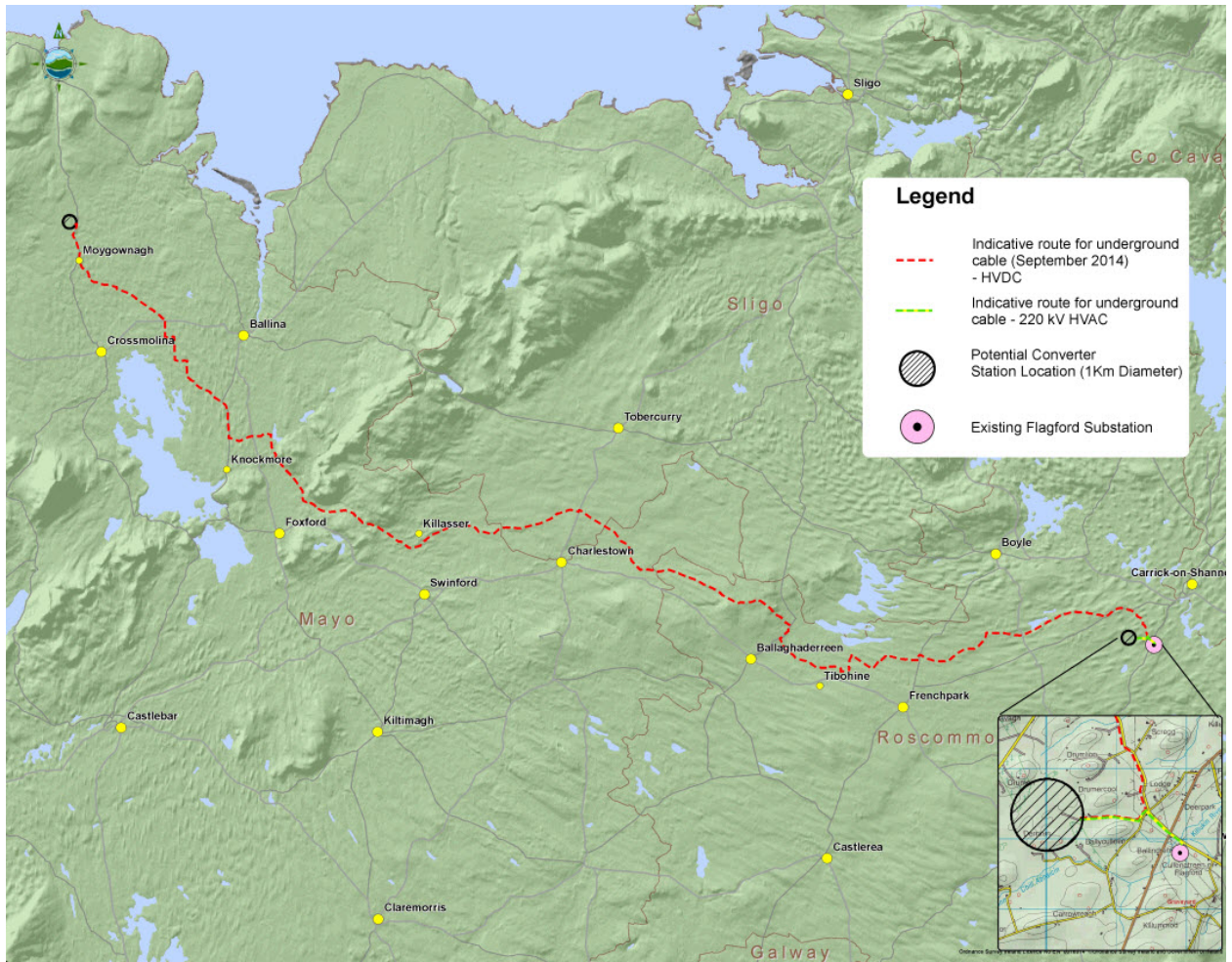


Appendix 12 Table 3 Flagford Converter Station Locations Evaluation Matrix

Consideration of the above evaluation matrix indicates that the new location DCF7 is the least constrained location, with little difference overall between DCF6 and DCF8, which are the next least constrained sites. If a converter station site is to be selected within the area of DCF7, it will be important to avoid the bog area, which restricts the availability of potential sites within the location. The new factors identified by the public following the consultation have changed the rating of DCF1 so as to make this location the most constrained.

1.1.4 Underground Cable Route

On the basis of the above the underground cable route considered in the IEP Report runs from DCB2, north-west of Moygownagh to DCF7, west of Flagford. A 220kV HVAC underground cable will connect the converter station in DCF7 to the existing Flagford substation.



Appendix 12 Figure 6 Overview Map of Underground Cable Option from DCB2 to DCF7