

# SKYE REINFORCEMENT PROJECT

## Appendix V6-6.4: Alternative Alignment Groundwater Dependent Terrestrial Ecosystem (GWDTE) Assessment

Prepared for: Scottish & Southern Electricity  
Networks Transmission (SSEN Transmission)

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## 1.0 Introduction

This Appendix presents an assessment of potential areas of Groundwater Dependent Terrestrial Ecosystems (GWDTE) for the Alternative Alignment within Section 3 of the project between Broadford and Kyle Rhea, hereafter referred to as the 'Proposed Development'.

A number of surveys, including a programme of peat depth probing and a National Vegetation Classification (NVC) survey have been undertaken and which have been used to inform this assessment.

This Appendix should be read in conjunction with the following Chapters in Volume 6 of the Environmental Impact Assessment (EIA) Report:

- Chapter 6: Water Environment, which contains a detailed description of the local hydrology and hydrogeology, flow mechanisms and hydraulic properties of the soils and geology;
- Chapter 7: Geology and Soils Environment, which contains details of peat depths and further details of the superficial and solid geology; and
- Chapter 4: Ecology, which contains a detailed description of the NVC survey undertaken and survey methodology.

### 1.1 Conceptual Hydrological Site Model

The following conceptual hydrological site model has been developed, following a review of the site setting as outlined in the Chapters referenced above:

- the Proposed Development is located in an area that receives frequent rainfall and has a high annual rainfall total;
- where there are no drift deposits present, there is potential for some shallow groundwater to be present in the upper weathered surface of the bedrock. This is however generally on elevated sloping ground where rainfall would preferentially form surface runoff and thus limit the production of groundwater;
- where shallow groundwater flow does occur in the weathered bedrock deposits it will follow topography; and
- the potential for rainwater recharge to groundwater within the bedrock is limited by the presence regionally of peat and clays associated with the glacial till deposits. Incident rainfall is likely to preferentially pond on the ground surface and where surface gradients allow form surface runoff or shallow interflow within the acrotelm (top) layer of the peat rather than infiltrate and form significant groundwater recharge.

The absence of significant quantities of groundwater in the superficial and bedrock deposits is confirmed by published mapping (see Chapter 6 Figure V6-6.2 and V6-6.3) and Confidential Appendix V6-6.3 (Alternative Alignment Drinking Water Protected Area and Private Water Supply Risk Assessment) which records few groundwater abstractions.

The hydrological site surveys have confirmed that rare groundwater springs are present regionally and are used to support private water supplies.

## 2.0 NVC Mapping and Occurrence of Potential GWDTE

### 2.1 NVC Mapping

The survey methodology and findings of the NVC are discussed in detail in Volume 6, Chapter 4 of the EIA Report.

In total, 46 NVC communities, 14 intermediates, and 28 non-NVC communities were recorded within the survey area extent for the whole Reinforcement Project (Sections 0-6).

Weather conditions for the most part was amenable to survey with light to moderate winds and good visibility prevailing. Overall, weather conditions did not notably limit surveys.

Many of the surveys were undertaken in the months of October and March, with a lesser amount of survey effort taking place in the months of November and February. These months are generally considered to be outside the optimal survey period for vegetation and habitats. However, despite the time of year, the overall character and type of vegetation was still readily recognisable and could still be accurately attributed a NVC community due to surveyor knowledge and survey area from other ecological surveys throughout the year and the persistent and still easily identifiable vegetation present in many areas.

### 2.2 Occurrence of Potential GWDTE

The assessment of GWDTE began with identifying the NVC communities which are cited in SEPA guidance<sup>1</sup>. Four categories have been used to classify potential GWDTE area, as shown on **Figure V6.6.4**:

- Highly Dominant, where potential high GWDTEs dominant the survey polygon (over 50% of the polygon);
- Highly Sub-dominant, where potential high GWDTEs make up a sub-dominant percentage of the survey polygon (less than 50% of the polygon);
- Moderately Dominant, where potential moderate GWDTEs dominant the survey polygon (over 50% of the polygon) and no potential high GWDTEs are present; and
- Moderately Sub-dominant, where potential moderate GWDTEs make up a sub-dominant percentage of the survey polygon (less than 50% of the polygon) and no potential high GWDTEs are present.

Areas determined to be Highly Dominant and Moderately Dominant were then subject to further site-specific scrutiny in terms of topography and hydro-ecological context and are discussed in the paragraphs below.

#### 2.2.1 Habitats with Potential Moderate Groundwater Dependency

**Table 2-1** details areas of potential moderate groundwater dependent habitats determined to be Moderately Dominant and discusses whether these habitats are likely to be sustained by groundwater.

As shown on **Figure V6-6.4**, generally the areas designated as Moderately Dominant cover large areas over a range of elevations and slopes. This distribution is not typical of that which is sustained by emerging groundwater, such as springs or seepage line.

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<sup>1</sup> SEPA (2017) Land Use Planning System SEPA Guidance Note 31, Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Version 3.

**Table 2-1: Moderately Dominant Habitats**

NVC Community	Location / Distribution	Discussion
M15	Extensive areas across the entire Proposed Development.	The habitats are typically located ground which is underlain by low permeability glacial till deposits within the western extent of the Proposed Development. Habitat is not rare is present across large areas of Scotland.
M25	Extensive areas across the entire Proposed Development.	Given this distribution and location it is considered that these habitats are sustained by the high average annual rainfall witnessed in the west of Scotland, surface water runoff and surface water ponding rather than by groundwater. Buffers specified in SEPA guidance to this habitat therefore need not apply, but safeguards will be required during construction to maintain existing surface water flow paths to this habitat during and following dismantling/construction.
MG10	Small areas within the western extent of the Proposed Development.	<p>The habitats largely coincide with watercourse channels. It is therefore considered that these habitats are sustained by surface water rather than by groundwater.</p> <p>Again, buffers to this habitat specified in SEPA guidance need not apply, but safeguards will be required during construction to maintain existing surface water flow paths to this habitat during and following dismantling/construction.</p>
W1	Discrete areas across the entire Proposed Development.	<p>Habitat generally located on sloping ground, which is underlain by glacial till and peat deposits, particularly within the western extent of the Proposed Development. These habitats are not associated with a particular ground elevation nor correlate with specific geological units, which would not suggest potential groundwater dependence.</p> <p>Habitat is likely to be sustained by the regional high average annual rainfall, surface water runoff and surface water ponding rather than by groundwater. Buffers to this habitat therefore need not apply, but safeguards will be required during construction to maintain existing surface water flow paths to this habitat during and following dismantling/construction.</p>

Note: Table lists the largest proportion of habitat recorded in a NVC polygon. Where a polygon records intermediate communities of potential moderate groundwater dependency these are not presented or discussed.

## 2.2.2 Habitats with Potential High Groundwater Dependency

**Table 2-2** details communities determined to be potentially Highly Dominant and discusses whether they are likely to be sustained by groundwater.

As shown on **Figure V6-6.4**, generally the areas designated as Highly Dominant largely coincide with watercourse channels or areas immediately adjacent to the watercourses.

**Table 2-2: Highly Dominant Habitats**

NVC Community	Location	Discussion
M6	Small extents across the entire Proposed Development.	<p>These habitats largely coincide with watercourse channels or sloped ground adjacent to the watercourses. It is therefore considered that these habitats are sustained by surface water, runoff and waterlogging of soils, rather than by groundwater.</p> <p>Buffers specified in SEPA’s guidance to this habitat therefore need not apply, but safeguards will be required during dismantling/construction to maintain existing surface water flow paths. Works in these areas should be supervised by the project Ecological Clerk of Works (ECoW).</p>
M10	Localised area near Allt a’Choire Bhuidhe	
M23	Small areas within the western extent of the Proposed Development.	
W7	Small areas within the eastern extent of the Proposed Development	
W4	Small areas within the eastern extent of the Proposed Development	<p>The habitats largely coincide with watercourse channels or sloped ground adjacent to the watercourses, with the exception of one area near Kylerhea.</p> <p>The habitat at Kylerhea is located on a flatter area underlain by superficial sand and gravel deposits which are underlain by glacial till deposits.</p> <p>Where near watercourse channels it is likely that this habitat is sustained by surface water rather than groundwater.</p> <p>Shallow groundwater may be present in the sand and gravel recorded at Kylerhea. However, groundwater is unlikely to form the major water input that supports the habitat and rainfall runoff and ponding is likely to be the dominant water source which sustains the habitat. As detailed in Chapter 6, the proposed construction methods minimise the potential for groundwater dewatering and provision would be made for returning any dewatering water associated with the construction stage of the project back to ground at source. No dewatering would occur following construction. With these safeguards no permanent change to the water source that maintains this habitat would occur.</p> <p>Buffers specified in SEPA’s guidance to this habitat therefore need not apply, but safeguards will be required</p>

NVC Community	Location	Discussion
		during construction to maintain existing surface water flow paths. Works in these areas should be supervised by the project ECoW.

Note: Table lists the largest proportion of habitat recorded in a NVC polygon. Where a polygon records intermediate communities of potential high groundwater dependency these are not presented or discussed.

### 2.2.3 Additional NVC Communities

In addition to the moderately dominant and highly dominant habitats described in **Table 2-1** and **Table 2-2**, the following potential groundwater dependent habitats were also noted as part of the NVC survey as intermediate communities:

- M28 – a potential moderate groundwater dependent community, recorded within an area determined to be Highly Sub-dominant within the western extent of the Proposed Development. The area is located on sloped ground near a watercourse channel, which is underlain by low permeability glacial till deposits.
- M14 – a potential high groundwater dependent community, typically classified as flush features, recorded within an area determined to be Highly Sub-dominant, located along the banks of a tributary of the Kylerhea River.
- M32 – a potential high groundwater dependent community. Two springs were noted near Harrapool, which corresponded with M32 flush habitats. These M32 habitats are considered to be groundwater dependent, however, these are noted upstream of the Proposed Development and therefore not considered to be at risk.
- U6 – a potential moderate groundwater dependent community recorded within an area determined to be Moderately Dominant associated with M15 habitats, as discussed in **Table 2-1**.
- U16 – a potential high groundwater dependent community recorded within areas determined to be Highly Sub-dominant, located along the banks of the Allt Mor and its tributaries.

With the exception of M32, the distribution of the above habitats is not consistent with habitats that are sustained by groundwater but rather it is expected they are predominately sustained by rainfall and surface water runoff.

As with M10, habitats which are designated as M14 and M32 are typically classified as flush features that tend to be supported by a contribution of base-rich waters. Works in near these communities should be supervised by the project ECoW to ensure potential groundwater and surface water flow paths are maintained.

### 2.2.4 Summary

After review of **Figure V6-6.4**, and **Table 2-1** and **Table 2-2** above, it is evident that potential groundwater dependent habitats are located over large areas or in/adjacent to watercourse corridors. This distribution is not consistent with habitats sustained by groundwater but rather habitats predominantly sustained by the high average annual rainfall, surface water runoff and surface water ponding.

No permanent dewatering or groundwater management is required as part of the Proposed Development and therefore no permanent change to groundwater levels and flow direction will occur. Any existing groundwater contribution to habitats will therefore continue.

It is concluded therefore that buffers to potential High and Moderate GWDTE specified in SEPA guidance<sup>1</sup> need not apply, but safeguards will be required during construction to maintain existing surface water flow paths to these habitats. Micro-siting (for example of tracks and foundations) will also be required under direction of the project ECoW to safeguard valuable habitats, such as flushes.



Examples of proposed safeguards are provided in Volume 6, Chapter 6 (Water Environment) of the EIA Report which will be included in the final CEMP. It also includes the provision of an ECoW to supervise construction works and whom would have the authority or approve drainage measures, and ensure their efficacy, deployed during the project.

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