



**Reinforcement to the North Shropshire Electricity Distribution Network:  
132kV Electrical Circuit from Oswestry to Wem**

**APPENDICES 10.1 – 10.2 FLOOD RISK, WATER QUALITY AND RESOURCES**

**Preliminary Environmental Information Report**

**November 2017**

## APPENDIX 10.1

# FLOOD RISK, WATER QUALITY AND RESOURCES

## ASSESSMENT METHODOLOGY

## APPENDIX 10.1

### FLOOD RISK, WATER QUALITY AND RESOURCES METHODOLOGY

#### 1.1 INTRODUCTION

1.1.1 This section outlines the technical methods used to determine what changes to the baseline are likely to occur as a result of the Proposed Development and sets out the significance criteria which will be used moving forward in to the Environmental Statement (ES) stage.

##### Assessment Guidance And Methods

1.1.2 The proposed assessment follows a standard approach:

- Establish baseline conditions against which the effects of the Proposed Development will be assessed;
- Determine the nature of the receptor likely to be affected, i.e. its sensitivity;
- Predict the nature or magnitude of the effect likely to occur (which combines judgments about the likely size and scale of the change, the geographical extent of the area over which it is likely to occur, whether it is direct or indirect) and positive, negative or neutral; and
- Assess whether a significant effect is likely to arise by considering the predicted magnitude of change together with the sensitivity of the receptor, taking into account any identified mitigation measures.

1.1.3 The assessment will be based entirely on published information and no surveys or field measurements will be taken specifically for the assessment.

1.1.4 The sensitivity of the watercourses and groundwater in the area will be assessed using the criteria in Table 10.1.1.

Table 10.1.1: Significance Criteria		
Sensitivity/ Importance and Typical Descriptors	Typical Example	
<b>Very High</b> (attribute has a high quality and rarity on a regional or national scale)	Surface Waters	EC Designated Salmonid/ Cyprinid fishery. High ecological quality. Site protected under EU or UK wildlife legislation (SAC, SPA, SSSI, Ramsar site).
	Groundwater	Major aquifer providing a regionally important resource or supporting site protected under wildlife legislation Source Protection Zone (SPZ) I
	Flood Risk	Flood plain or defence protecting more than 100 residential properties from flooding
<b>High</b> (attribute has a high quality and	Surface Waters	Good ecological quality Major Cyprinid Fishery

Table 10.1.1: Significance Criteria		
Sensitivity/ Importance and Typical Descriptors	Typical Example	
rarity on a local scale)		Species protected under EU or UK wildlife legislation
	Groundwater	Major aquifer providing locally important resourced or supporting river ecosystem SPZII
	Flood Risk	Flood plain or defence protecting between 1 and 100 residential properties or industrial premises from flooding.
<b>Medium</b> (attribute has a medium quality and rarity on a local scale)	Surface Waters	Moderate ecological quality
	Groundwater	Aquifer providing water for agricultural or industrial use with limited connection to surface water SPZII
	Flood Risk	Flood plain or defence protecting 10 or fewer industrial properties from flooding
<b>Low</b> (attribute has a low quality and rarity on a local scale)	Surface Waters	Poor or bad ecological quality
	Groundwater	Non-aquifer
	Flood Risk	Flood plain with limited constraints and low probability of flooding of residential and industrial properties.

1.1.5 The magnitude of change caused during the construction and operational phases of the Proposed Development will be qualitatively described, based on the descriptions detailed in Table 10.1.2 below.

Table 10.1.2: Magnitude of Change Criteria		
Magnitude of Potential Change	Criteria	
High	Adverse	Results in loss of attribute and/ or quality and integrity of the attribute.
	Beneficial	Results in major improvement of attribute quality.
Medium	Adverse	Results in effect on integrity of attribute, or loss of part of attribute.
	Beneficial	Results in moderate improvement of attribute quality.

Table 10.1.2: Magnitude of Change Criteria		
Magnitude of Potential Change		Criteria
Low	Adverse	Results in some measurable change in attribute's quality or vulnerability.
	Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.
Negligible		Results in effect on attribute, but of insufficient magnitude to affect the use or integrity.

1.1.6 The magnitude of changes caused during the construction and operational phases of the proposed development will be qualitatively described, based on the descriptions detailed in Table 10.1.3.

Table 10.1.3: Significance of Effect					
		Magnitude of Change			
		High	Medium	Low	Negligible
Importance Of Attribute	Very High	Major	Major	Moderate	Negligible
	High	Major	Moderate	Minor	Negligible
	Medium	Moderate	Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible

## APPENDIX 10.2

# FLOOD RISK, WATER QUALITY AND RESOURCES

## BASELINE AND ASSESSMENT

## APPENDIX 10.2:

### FLOOD RISK, WATER QUALITY AND RESOURCES BASELINE AND ASSESSMENT

#### 1.1 INTRODUCTION

1.1.1 This section describes the hydrology baseline and assesses the effects on hydrological attributes.

#### 1.2 BASELINE ENVIRONMENT

##### Surface Water

1.2.1 The new overhead line would originate east of Oswestry and the A5, in farmland north of Middleton Road, just south of Round Wood. The proposed development then runs some 21km broadly east to west across the farmed landscape of north-west Shropshire. The overhead line would terminate in farmland immediately south of the B5063 Ellesmere Road, close to the Wem substation.

1.2.2 The topography of the area is typical of the Shropshire Plain, being low lying and relatively flat or gently undulating. There are some areas of higher ground (between 110 – 120mAOD) in the north-west close to Oswestry.

1.2.3 The area lies entirely within the Severn catchment and features many small watercourses and drainage channels, particularly in the west of the Preferred Line Route. There are no large rivers, and each of the watercourses crossed by the proposed development will be simply spanned without requiring support within watercourse channels. The new overhead line would cross two watercourses recognised by the Environment Agency as main rivers, the Rivers Perry and Roden and a drainage channel which flows alongside the Roden across low lying land and then flows separately to the north of the Roden, and joins it on the outskirts of Wem.

1.2.4 All other watercourses crossed by the Preferred Line Route are classed as ordinary watercourses.

1.2.5 The new overhead line would also cross the Montgomery Canal.

1.2.6 Groundwater resources are significant within bedrock in the area, although substantial areas of less permeable superficial deposits exist in many areas which offer protection to the groundwater.

1.2.7 The most significant groundwater resource is the Shropshire Groundwater Scheme in the western part of the study area. There are also licensed abstractions of surface and groundwater in the River Perry and the River Roden catchments for agricultural purposes, principally for spray irrigation.

1.2.8 There are no licensed private water supplies in the study area.

##### Flood Risk Areas

1.2.9 Areas of fluvial flood risk associated with each river with a catchment area greater than 3km<sup>2</sup> been identified by the Environment Agency. These areas are defined and mapped as three flood zones for the purposes of planning by the Environment Agency, as follows:

- Flood Zone 1 where the annual fluvial flood risk is less than 0.1% (i.e. less than 0.1% risk of fluvial flooding occurring in any one year);

- Flood Zone 2 where the annual risk is between 1% and 0.1%; and
- Flood Zone 3 where the annual flood risk is considered greater than 1%.

1.2.10 Both of the main rivers crossed are associated with land in Flood Zone 3, i.e. land with an annual flood risk of greater than 1% and Flood Zone 2, with an annual flood risk of between 0.1% and 1%. The defined risks are for the current climate and are likely to increase with the effects of climate change in the future. For the purposes of assessment, Flood Zone 2 will be taken as an indication of the worst case estimate of the extent of Flood Zone 1 during the lifetime of the project.

1.2.11 Flood extents associated with small un-modelled watercourses with catchment areas less than 3 km<sup>2</sup> and other areas away from identified watercourses will be identified using mapping of surface water flood risk. This is flooding which results from intense rainfall where water cannot be adequately absorbed by the land surface and surface ponding or overland flow results. Mapping showing the possible flood depth and velocity of flow for “low risk” events, with an annual probability between 1% and 0.1% will be used to assess these remaining flood risk areas.

1.2.12 The table below shows points where the Proposed Development crosses areas of identified flood risk.

Table 10.2.1 –Potential flood risk locations	
Area of flood risk	Summary description and overall effect
West of Montgomery Canal	Extensive area of low relief land with drainage channel associated with River Perry. 1100 m of line within flood zone 2 or 3 (approx. poles 32 – 40).
River Perry at Rednal Mill (Main river)	River crossed twice but limited flood extent. Pole 50 is very close to channel.
River Perry	Pole 64 is adjacent to watercourse and requires stays. Poles 64 – 66 are within flood zone 2 and 3.
Area north-east of Wackley Lodge	Poles 111 to 115 are within an area of flood zone 2 and 3 associated with local drainage channels. Poles 112 and 115 are immediately adjacent to drainage channels
Sleep Brook	Poles 130 to 134 are within an area of flood zone 2 and 3 associated with drainage channels on tributary of Sleep Brook. Poles 130, 133 and 134 are immediately adjacent to drainage channels.
River Roden (Main river)	Poles 158 to 170 are within an extensive area of flood zone 2 and 3 associated with the River Roden and its tributary. Poles 164, 167, 169 and 171 are immediately adjacent to river channels

### Water Resources

1.2.13 Groundwater resources are significant within bedrock in the area, although substantial areas of less permeable superficial deposits exist in many areas which offer protection to the groundwater.

1.2.14 The Preferred Line Route passes through a total catchment (zone 3) groundwater source protection zone associated with a public water supply at Woodhouse. This is the area around a source within which all groundwater recharge is presumed to be discharged at the source. The groundwater abstraction is used for potable supply by Severn Trent Water Ltd.

1.2.15 It is likely that further exploitation of groundwater in the area will occur in the future and phase 7 of the Shropshire Groundwater Scheme is expected to require the construction and maintenance



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of groundwater wells in the western part of the study area.

1.2.16 There are also licensed abstractions of surface and groundwater in the River Perry and the River Roden catchments for agricultural purposes, principally for spray irrigation.

1.2.17 Private water supplies may exist in more remote rural areas where a public supply is not available.

### 1.3 ISSUES IDENTIFIED

#### Construction

1.3.1 The likely effects of the Proposed Development on water resources during the construction phase are likely to be limited to short term, temporary water quality impacts arising from disturbance of soils which may lead to sediment being released into watercourses.

#### Operation

1.3.2 The Preferred Line Route crosses two rivers classified as 'main' by the Environment Agency and many smaller ditches and watercourses. All of the watercourse channels crossed are relatively small and can easily be spanned by the proposed Trident poles.

1.3.3 There are six areas of identified flood risk along the route of the proposed development as shown in Table 10.1. Where the Proposed Line crosses these areas there is a potential risk of an effect on flood risk to others and also a possible risk to the project from flood effects such as erosion and undermining of pole foundations.

### 1.4 PRELIMINARY ASSESSMENT OF IMPACTS AND EFFECTS

1.4.1 Adequate mitigation for construction impacts on water resources is expected to be provided through the application of normal construction good management methods as outlined in the Construction and Environment Management Plan (CEMP) and by meeting the requirements of any permits required by the Environment Agency.

1.4.2 It is anticipated that the proposed development will have no effect on water resources, either for groundwater or surface water, during the construction phase.

1.4.3 The areas of identified flood risk along the route of the proposed development are associated with relatively small watercourses with in agricultural land use and no property is directly affected. The Proposed Development is likely to have only a minor or insignificant effect on flood risk.

1.4.4 Some poles are currently sited close to watercourse channels and these might be subject to flood damage.