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SEVERN
TRENT
WATER

HRA Report

Final Water Resources Management Plan 2019 Habitats Regulations Assessment

Final Report for Severn Trent Water Ltd

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Executive Summary

Water companies in England and Wales have a statutory requirement to prepare a Water Resource Management Plan (WRMP) every five years; the Severn Trent's draft WRMP19 was submitted to the Secretary of State in December 2017 to seek his agreement for issuing for public consultation during early 2018. The public consultation on the draft WRMP19 commenced in February 2018. A Statement of Response to the comments received during the consultation, and how they had been addressed was published in early September 2018. The revised draft WRMP19 was submitted to the Secretary of State for approval to publish as the Final WRMP19 in early 2019 and approval was given by the Secretary of State in July 2019. The purpose of WRMPs is to set out a strategy for each water supply area over a minimum planning period of 25 years. This statutory requirement is defined under the Water Act 2003.

A water company must ensure its WRMP meets the requirements of the Habitats Regulations before implementation. The requirement for a Habitats Regulations Assessment (HRA) is established through Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. This directive, known as the Habitats Directive, is transposed into national legislation by the Conservation of Habitats and Species Regulations 2017; commonly referred to as the Habitats Regulations. Under Regulations 63 and 105, any plan or project which is likely to have a significant effect on a European Site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to a HRA to determine the implications for the site in view of its conservation objectives. Under UK Government policy, wetland sites designated under the international Ramsar Convention 1971 should also be subject to HRA and are also referred to as 'European Sites' in this context. In relation to the WRMP 2019 (WRMP19) the HRA needs to consider whether there are any likely significant effects (LSE) arising from construction or implementation activities and/or operation of any of the solutions (and constituent components) considered in the Final WRMP19.

Ricardo Energy & Environment was commissioned by Severn Trent to undertake a HRA of a 'feasible' list of components in its draft WRMP 2019 (dWRMP19). By considering HRA from the outset, the intention is to seek to avoid components being included in the WRMP that would lead to LSE on European Sites. Since the publication of the dWRMP19, there has been an important judgment in the Court of Justice of the European Union (CJEU) in April 2018¹ (the "People over Wind" or "Sweetman" judgment) which ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures should be assessed within the framework of an Appropriate Assessment and that it is not permissible to take account of mitigation measures at the screening stage. This HRA Report documents the HRA process for the 'feasible' list of components, which has been updated since the dWRMP19 to reflect the "People over Wind" ruling, and the findings of the Appropriate Assessment of solution NOT04 Heathy Lea to North Nottinghamshire transfer solution (component 305).

All components screened for consideration were taken forward into the decision-making modelling process to provide an indication of the solutions to be included in the preferred programme. A colour coding system was applied to represent the outcome of the assessment of each component, where 'green' refers to no LSE, 'amber' is LSE where further assessment/information regarding the component may enable the effects to be reduced and 'red' for those components with LSE and where significant modification to the component would be required to avoid LSE. A total of 111 feasible supply-side options (consisting of 117 supply components) and six demand-side options were assessed for Final WRMP19.

A total of 22 solutions (and constituent components) have been included in the Final WRMP19 to resolve the forecast supply-demand deficits over the planning period. These solutions (and constituent components) are:

- NOT04 Heathy Lea to North Nottinghamshire transfer solution (component 305)
- DOR05 Site C WTW enhancements (component 99E)
- DOR02 Site I WTW enhancements (component 99B)

¹ Court of Justice of the European Union Case C-323/17: People over Wind & Sweetman

- WIL05 Site E WTW expansion and transfer main supported by raw water augmentation of the River Trent (components 7A and 14B)
- LIT01 Site F WTW expansion (component 32)
- DOR08 Site B WTW enhancements (component 99D)
- UNK07 Improve Site L WTW outputs during low raw water periods (component 195)
- GRD18 Peckforton Group BHs rehabilitation and treatment enhancement (component 200)
- CRO06 River Soar to support Site B WTW (component 54)
- WTW05 East Midlands raw water storage including new WTW (component 31C)
- MEL29 River Trent support to Q WTW with WTW enhancements (component 61B and 99G)
- DAM07 Draycote Reservoir capacity increase (Size A) with transfer main from Site C WTW to Coventry (components 122A and 310)
- DAM01 Stanford Reservoir capacity increase (Size A) (component 84A)
- CRO05 Thornton Reservoir to support Site B WTW (component 35)
- NOT01 Ambergate to Mid Nottinghamshire transfer solution (component 304)
- DAM03 Whitacre Reservoir capacity increase (Sub-option A) (component 84C)
- BHS07 Ladyflatte BHs recommissioning (component 198)
- DAM02 Lower Shustoke capacity increase (Size A) (component 84B)
- BHS06 Maximise deployment from Diddlebury WTW and Munslow BH (component 191)
- BAM03 Site R WTW to Grindleford pipeline capacity increase (component 312)
- NOT05 Site E WTW to South Nottinghamshire transfer solution (component 306)
- OGS01 Site J WTW expansion (component 95B)

The HRA has determined that, typically, demand management solutions involve relatively small-scale and temporary activity and are largely concentrated within urban and suburban areas. As a result of this, they are unlikely to be in close proximity to European sites and effects will be small-scale, temporary and geographically confined at the point of delivery. Effects resulting from the demand management solutions, both alone and in-combination, are therefore assessed as unlikely to have a significant effect on qualifying features of any European sites.

With one exception, the HRA screening assessment concluded that the supply-side solutions included in the preferred programme would have no LSE on any European site. The screening assessment could not rule out LSE from implementation of the NOT04 solution (Heathy Lea to North Nottinghamshire transfer solution (component 305)), and consequently an Appropriate Assessment was carried out of this solution. The Appropriate Assessment concluded that implementation of solution NOT04 would not have any adverse effects on the integrity of any European site.

An in-combination effects assessment was undertaken on the solutions included in the preferred programme to identify whether any potential construction and operational in-combination effects may occur between the solutions and between other plans or projects. None of the preferred solutions were shown to have in-combination effects with any other solutions included in preferred programme. No in-combination adverse effects have been identified in relation to the current published Drought Plans of neighbouring water companies and no in-combination effects are currently anticipated with the developing draft 2019 WRMPs of these water companies. No in-combination effects have been identified in relation to any other plans or projects.

Given the findings of the HRA, it can be concluded that the Final WRMP will have no adverse effects on any European site, either alone or in combination with any other plans or projects.

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PART A Screening

1 Introduction

1.1 Background and Purpose of Report

Water companies in England and Wales have a statutory requirement to prepare a Water Resources Management Plan (WRMP) every five years. The draft WRMP19 was submitted to the Secretary of State by the 1 December 2017 and was approved to be published for public consultation in February 2018. A Statement of Response to the comments received during the consultation, and how they had been addressed was published in early September 2018. The revised draft WRMP19 was submitted to the Secretary of State for approval to publish as the Final WRMP19 in early 2019 and approval was given by the Secretary of State in July 2019. The WRMP also informs the regulatory water company business planning Price Review process through which the Water Services Regulation Authority (Ofwat) sets the prices that water companies can charge their customers for water (and wastewater) services. The latest price review will be completed in December 2019.

A water company must ensure its WRMP meets the requirements of the Habitats Regulations before implementation. The requirement for a Habitats Regulations Assessment (HRA) is established through Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, hereby referred to as the 'Habitats Directive', in Articles 6(3) and 6(4). The Habitats Directive is transposed into national legislation by the Conservation of Habitats and Species Regulations 2017, commonly referred to as the Habitats Regulations. Under Regulations 63 and 105, any plan or project which is likely to have a significant effect on a European site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to a HRA to determine the implications for the site in view of its conservation objectives. In relation to the Final WRMP 2019, the HRA needs to consider whether there are any likely significant effects (LSE) arising from construction or implementation activities and/or operation of any of the components considered in the Final WRMP19.

European Sites include Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) (also known as Natura 2000 Sites). UK Government policy also requires Ramsar sites to be assessed in the same way:

- SPAs are classified under the European Council Directive 'on the conservation of wild birds' (2009/147/EC; 'Birds Directive') for the protection of **wild birds and their habitats** (including particularly rare and vulnerable species listed in Annex 1 of the Birds Directive, and migratory species).
- SACs are designated under the Habitats Directive (92/43/EEC) and target particular **habitats** (Annex 1) **and/or species** (Annex II) identified as being of European importance.
- The Government also expects potential SPAs (pSPAs), candidate SACs (cSACs), associated compensation habitat and Ramsar sites to be included within the assessment.
- Ramsar sites support **internationally important wetland habitats** and are listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971).

For ease of reference through this HRA report, these designations are collectively referred to as "European Sites", despite Ramsar designations being made at the international level rather than EU level.

The HRA screening has been undertaken in accordance with available guidance for England^{2,3,4,5,6,7} and based on the precautionary approach as required under the Habitats Regulations. Where options considered are located within Wales or might affect European sites within Wales, reference has been made to the relevant sections of the Regulations pertaining to Wales. Both the 'Strategic Environmental Assessment (SEA) and HRA - Guidance for Water Resources Management Plans and Drought Plans' and 'Final Water Resources Planning Guideline' recommend that all WRMPs should be subject to the first stage of HRA, i.e. screening for LSE. The Water Resources Planning Guideline additionally states that an Appropriate Assessment (AA) (HRA Stage 2) will be needed if a component included in the WRMP could have likely significant effects on any designated European site and that companies must clearly test their plans using HRA where applicable.

The HRA has been undertaken in parallel with the SEA and Water Framework Directive (WFD) assessment of the Final WRMP19, to ensure an integrated approach to environmental assessment such that environmental considerations are integral to the development of the 'best value programme' of components.

The overall objective of the HRA was to establish whether solutions included in the Final WRMP19 are likely to have an adverse effect on European Sites, alone or in-combination with other solutions in the plan, or with other plans and projects. Where LSE cannot be ruled out, adopting the precautionary principle, the objective is to determine through Appropriate Assessment whether the component would adversely affect the integrity of the European site(s).

The initial 'unconstrained' list of components considered for possible inclusion in the Final WRMP19 was subject to high-level HRA screening to assess whether any components should be ruled out from the outset as they would almost certainly lead to an adverse effect on one or more European sites. Those options not screened out were taken forward into the constrained list of components which were included for consideration within the decision-making modelling processes to provide an indication of the solutions to be included in the preferred programme. HRA Stage 1 screening was carried out on all of all the constrained list components as set out in this report.

By considering HRA from the outset, the intention was to avoid, wherever possible, components being included in the Final WRMP19 that could lead to adverse effects on European sites.

The HRA process adopted for the WRMP19 can be summarised as follows:

- Screening (Stage 1 HRA) was initially carried out on the constrained list of components to identify potential effects on European sites arising from any single component, and to consider whether these effects are likely to be significant (see Section 4).
- The outcomes of the screening exercise were considered in the programme appraisal process leading to the selection of the preferred programme for the Final WRMP19 (a combination of solutions, comprising one or more components). The aim of the screening was to reject components being included within any solutions that would have LSE on any European sites.
- Following the development of the preferred programme solutions, Appropriate Assessment was required for one solution where LSE could not be ruled out (see Part B of this report).
- Finally, potential in-combination effects of the solutions within the preferred programme were considered along with consideration of in-combination effects with other plans or projects (see Section 5).

2 European Commission Environment DG (2001) Assessment of plans and projects significantly affecting European Sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

3 Department for Communities and Local Government (DCLG) (2006) Planning for the Protection of European Sites. Guidance for Regional Spatial Strategies and Local Development Documents.

4 English Nature (1997) The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations, 1994. Guidance Note HRGN1.

5 English Nature (1997) The Determination of Likely Significant Effect under The Conservation (Natural Habitats &c.) Regulations 1994. Guidance Note HRGN3.

6 Defra (2012) The Habitats and Wild Birds Directives in England and its seas: Core guidance for developers, regulators & land/marine managers.

7 Tyldesley, D. & Chapman, C. (2015) The Habitats Regulations Assessment Handbook. DTA Publications. Version 4.

1.2 Requirement for Habitats Regulations Assessment

Under the Habitats Regulations, the responsibility for undertaking the HRA lies with Severn Trent as the “Competent Authority”, or Plan making authority. This means that Severn Trent can make the judgements as to whether its plans or projects are likely to have significant effects on European sites, with advice from the Statutory Bodies, in particular, Natural England (NE) (and where relevant, Natural Resources Wales). The HRA Guidance for the appraisal of Plans⁸ has been followed in carrying out the assessments.

Regulation 63(5) states that the Plan making authority shall adopt, or otherwise give effect to, the Plan only after having ascertained that it will not adversely affect the integrity of a European site, subject to Regulation 64 or 105 of the Habitats Regulations.

Regulation 105 (and Article 6 of the Directive) relates to the requirement for an Appropriate Assessment should Stage 1 HRA screening identify LSE. Regulation 105 of the Habitats Regulations states:

(1) Where a land use plan—

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and

(b) is not directly connected with or necessary to the management of the site, the plan-making authority for that plan must, before the plan is given effect, make an appropriate assessment of the implications for the site in view of that site’s conservation objectives.

(2) The plan-making authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.

(3) The plan-making authority must also, if it considers it appropriate, take the opinion of the general public, and if it does so, it must take such steps for that purpose as it considers appropriate.

(4) In the light of the conclusions of the assessment, and subject to regulation 107, the plan-making authority must give effect to the land use plan only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

(5) A plan-making authority must provide such information as the appropriate authority may reasonably require for the purposes of the discharge by the appropriate authority of its obligations under this Chapter.

(6) This regulation does not apply in relation to a site which is—

(a) a European site by reason of regulation 8(1)(c), or

(b) a European offshore marine site by reason of regulation 18(c) of the Offshore Marine Conservation Regulations (site protected in accordance with Article 5(4) of the Habitats Directive).

Article 6 of the Habitats Directive states:

6(3). Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Regulations 64 (and Article 6(4) of the Directive) describes the criteria for assessing whether a Plan can go ahead with LSE whereby there are imperative reasons of overriding public interest (IROPI). This relates to Stages 3 and 4 of HRA. Best practice guidance⁸ is available for this process. The HRA of the Final WRMP19 did not identify the need to subject the plan to these final two stages of the assessment process.

⁸ Tyldesley, D. & Chapman, C. (2015) The Habitats Regulations Assessment Handbook. DTA Publications. Version 4.

1.3 Consultation

NRW, NE and the EA were consulted throughout the development of the WRMP19, including on the HRA methodology and on the emerging findings from the HRA screening. The public consultation on the dWRMP19 commenced in February 2018. A Statement of Response to the comments received during the consultation, and how they would be addressed in the Final WRMP19, was published in early September 2018.

1.4 Structure of the Report

The report is divided into the following sections:

Part A - HRA Stage 1: Screening Assessment

Section 1: Introduction

Section 2: Methodology

Section 3: Severn Trent's WRMP19

Section 4: HRA Screening of Feasible Components

Section 5: HRA Screening Findings for the Final WRMP19 Preferred Programme

Section 6: Conclusions and Recommendations

Part B - HRA Stage 2: Appropriate Assessment

Section 7: Introduction and Approach

Section 8: Appropriate Assessment of NOT04 New Strategic Transfer Capacity from Strategic Grid to Sunnyside (component 305)

2 Methodology

To provide an indication of the likely significant effects on a European site(s), those feasible components that were within 10km of a European site or hydrologically / environmentally connected over a longer distance were identified. Consideration was also given to the relative locations of components and designated sites within the same surface and groundwater catchments (where this information is available) to ensure that any connectivity over a longer distance that might affect water-dependent sites, qualifying features and designated mobile species has also been taken into account. To further inform the assessment of likely significant effects on European sites, the NE Site of Special Scientific Interest (SSSI) Impact Risk Zone (IRZ) datasets were also applied. The IRZs are reviewed regularly to ensure they reflect the current understanding of specific site sensitivities and potential risks posed to SSSIs, many of which overlap and underpin the interests of European sites. Where the qualifying features of a European site and SSSI are different, the SSSI IRZs are set so that they reflect both. As such, these IRZs can be used as part of a HRA to assist with determining whether there are likely to be significant effects from off-site impacts of a particular development on the qualifying features of the European site.

The assessment considered both construction effects and operational effects of each component. In determining the likelihood of significant effects on European sites from the feasible components, particular consideration was given to the possible source-receptor pathways through which effects may be transmitted from activities associated with the feasible components to features contributing to the integrity of the European sites (e.g. groundwater or surface water catchments, air, etc.). **Table 2.1** provides examples of the types of effects the feasible components could have on European site qualifying features.

The attributes of the European sites, which contribute to and define their integrity, were considered with reference to Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites. An analysis of these information sources enabled the identification of the site's qualifying features. This information, as well as Article 17 reporting, site conservation objectives, supplementary guidance, and Site Improvement Plans (SIPs) were used to identify those features of each site that determine current conservation status, site integrity and the specific sensitivities of the site. Analysis of how potential effects of the Final WRMP19 component may affect a European site was undertaken using this information.

Although screening for LSEs was determined on a proximity basis for many of the types of impacts, there are many uncertainties associated with using set distances as there are very few standards available as a guide to how far impacts will extend. Different types of impacts can occur over different distances, and therefore professional judgement was applied based on experience and the evidence available. The assumptions used in this HRA and justification for them are shown in **Table 2.1**.

Since the publication of the dWRMP19, there has been an important judgment in the Court of Justice of the European Union (CJEU) in April 2018⁹ (the "People over Wind" or "Sweetman" judgment). This ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures should be assessed within the framework of an Appropriate Assessment and that it is not permissible to take account of mitigation measures at the screening stage. The screening for the dWRMP19 was therefore re-visited following this ruling and amended to note the requirement to take any component through to Stage 2 Appropriate Assessment if the need for mitigation is identified to prevent adverse effects on a European site.

All the feasible components screened for consideration were taken forward into the WRMP decision-making appraisal processes to provide an indication of the solutions to be included in the preferred programme. A colour coding was assigned to represent the outcome of the assessment of each component, where:

- 'green' signified no LSE
- 'amber' signified LSE where further assessment/information regarding the component may enable the effects to be reduced or mitigated to avoid adverse effects on a European site

⁹ Court of Justice of the European Union Case C-323/17: People over Wind & Sweetman

- 'red' signified LSE but where significant modification to the component would be required and where mitigation measures may not be sufficient to avoid adverse effects (and therefore such components should not be included in the preferred programme unless there are no other feasible alternative options).

Table 2.1 Potential impacts of feasible components on European sites

Broad categories, and examples, of potential impacts on European sites	Examples of operations responsible for impacts (<i>Distance assumptions shown in italics</i>)
Physical loss <ul style="list-style-type: none"> - Removal (including offsite effects, e.g. foraging habitat) - Smothering 	<p>Development of built infrastructure associated with component, e.g. reservoir embankments, water treatment plant, pipelines, pumping stations.</p> <p>Indirect effects from a reduction in flows e.g. drying out marginal habitat, such that there is a loss of/change in a particular habitat type.</p> <p><i>Physical loss is most likely to be significant where the boundary of the component extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated), or where natural processes link the component to the site, such as through hydrological connectivity downstream of a component.</i></p>
Physical damage <ul style="list-style-type: none"> - Sedimentation / silting - Prevention of natural processes - Habitat degradation - Erosion - Trampling - Fragmentation - Severance/barrier effect - Edge effects - Alterations to current management 	<p>Construction of structures associated with scheme e.g. reservoir embankments, water treatment plant, pipelines, pumping stations.</p> <p><i>Physical damage is likely to be significant where the boundary of the component extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated), or where natural processes link the component to the site, such as through hydrological connectivity downstream of a component.</i></p>
Non-physical disturbance <ul style="list-style-type: none"> - Noise - Visual presence - Human presence - Light pollution 	<p>Noise from construction activities.</p> <p><i>Taking into consideration the noise level generated from general building activity¹⁰ (c. 122dB(A)) and considering the lowest noise level identified in appropriate guidance¹¹ as likely to cause disturbance to bird species, it is concluded that noise impacts could be significant up to 1km from the boundary of the European site but can be up to 1.7km for construction traffic transport routes¹². From a review of EA internal guidance on HRA and various websites it is considered that effects of vibration and noise are more likely to be significant if development is within 500 metres of a European site. A precautionary approach is taken based on likely noise levels and frequency.</i></p> <p>Plant and personnel involved in construction and operation of components e.g. for maintenance.</p> <p><i>These effects (noise, visual/human presence) are only likely to be significant where the boundary of the component extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting,</i></p>

10 British Standards Institute (BSI) (2009) BS5228 - Noise and Vibration Control on Construction and Open Sites. BSI, London.

11 Environment Agency (2013) Bird Disturbance from Flood and Coastal Risk Management Construction Activities. Overarching Interpretive Summary Report. Prepared by Cascade Consulting and Institute of Estuarine and Coastal Studies.

12 A series of studies carried out in the Netherlands have shown that road noise levels above 42-43dB and 47dB results in a rapid fall in population of woodland and grassland breeding bird species, with disturbance distances varying between species from 20 to 1700 metres from the road (at 5000 cars a day) and up to 3.53 kilometres at 50,000 cars a day. The most recent study is: Reijnen, R.; Foppen, R.; Veenbaas, G. (1997) Disturbance by traffic of breeding birds: evaluation of the effect and considerations in planning and managing road corridors. Biodiversity and Conservation 6 (4), 567-581.

Broad categories, and examples, of potential impacts on European sites	Examples of operations responsible for impacts (<i>Distance assumptions shown in italics</i>)
	<p><i>breeding habitat (that supports species for which a European site is designated).</i></p> <p><i>Development of built infrastructure associated with component, which includes artificial lighting. Effects from light pollution are only likely to be significant where the boundary of the component is within 500 m of the boundary of the European site. From a review of EA internal guidance on HRA and various websites it is considered that effects of light are more likely to be significant if development is within 500 metres of a European site.</i></p>
<p>Water table/availability</p> <ul style="list-style-type: none"> - Drying - Flooding - Other changes to surface water levels and flows - Changes in groundwater levels and flows - Changes to coastal water movement 	<p>Changes to water levels and flows due to water abstraction, storage and drainage interception.</p> <p><i>These effects are only likely to be significant where the boundary of the component extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the component and the European site, and sometimes, whether the component is up or down stream from the European site.</i></p>
<p>Toxic contamination</p> <ul style="list-style-type: none"> - Water pollution - Soil contamination - Air pollution 	<p>Pollution of surface water bodies due to site runoff from construction sites.</p> <p>Contamination of soils result from the mobilisation of contaminants during excavation.</p> <p>Air emissions associated with vehicular traffic during construction of component. <i>This effect is only likely to be significant where the transport route to and from the component is within or in proximity to (200m) the boundary of the European site¹³</i></p>
<p>Non-toxic contamination</p> <ul style="list-style-type: none"> - Nutrient enrichment (e.g. of soils and water) - Changes in salinity - Changes in thermal regime - Changes in turbidity - Air pollution (dust) 	<p>Changes to water salinity, nutrient levels, turbidity, thermal regime.</p> <p><i>These effects are only likely to be significant where the boundary of the component extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the component and the European site, and sometimes, whether the component is up or down stream from the European site. This level of information is not available until data such as groundwater modelling is collected to accompany planning applications.</i></p> <p>Emissions of dust during earthworks, construction of plant and tunnel/pipeline construction associated with components.</p> <p><i>This effect is only likely to be significant where the construction works for the component are within 350m of the boundary of the European sites¹⁴.</i></p> <p>Air emissions associated with plant and vehicular traffic during construction and operation of schemes.</p> <p><i>The effect of dust is only likely to be significant where site is within or in proximity to the boundary of the European site^{15,16}. Without mitigation, dust and dirt from the construction site may be transported onto the public road network and then deposited/spread by vehicles on roads up to 500m from large sites, 200m from medium sites, and 50m from small sites as measured from the site exit.</i></p>

¹³ Highways Agency (2003) Design Manual for Roads and Bridges (DMRB), Volume 11.

¹⁴ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction v1.1.

¹⁵ Highways Agency (2003) Design Manual for Roads and Bridges (DMRB), Volume 11.

¹⁶ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction v1.1.

Broad categories, and examples, of potential impacts on European sites	Examples of operations responsible for impacts (<i>Distance assumptions shown in italics</i>)
	<i>Effects of road traffic emissions from the transport route to be taken by the project traffic are only likely to be significant where the protected site falls within 200 metres of the edge of a road affected¹⁷.</i>
Biological disturbance <ul style="list-style-type: none"> - Direct mortality - Out-competition by non-native species - Selective extraction of species - Introduction of disease 	Potential mortality or injuring of terrestrial, aquatic and marine species during building of structures associated with the component, and potential introduction of disease or non-native species into the receiving water from canal and river transfers. Potential for favouring completing species could disturb ecological balances, resulting in rapid population fluctuations.

2.1 Review of Existing Abstraction Licences and Recent Data

The WRMP19 sets out Severn Trent's long-term strategy for maintaining reliable and resilient water supplies to its customers. The strategy includes the use of existing water resources to meet demand as well as existing demand management measures to ensure sufficient supply under current baseline conditions.

The EA Review of Consents (RoC) process undertaken for Severn Trent's existing water source abstraction licences is, therefore, relevant to those potential options in Severn Trent's WRMP19 that involve increasing existing abstraction at licensed water sources while remaining within the existing abstraction licence limit. The EA RoC was undertaken by considering all European sites within Severn Trent's supply area (and adjacent catchments outside of the supply area where applicable). The findings have been taken into account in carrying out this HRA of the WRMP19.

2.2 Review of Potential In-Combination Effects

The HRA considered the in-combination effects of the preferred programme of the Final WRMP19, adopting a staged approach:

- Following the development of the preferred programme, the likely timings and implementation regimes were considered to inform the potential in-combination effects of the solutions included in the preferred programme
- Following this assessment, an assessment of in-combination effects with other plans and projects was undertaken. Other programmes, plans and projects included projects or options identified in other Severn Trent plans (e.g. Drought Plan), neighbouring water company draft or revised draft 2019 WRMPs (as available in February 2019) and Drought Plans, any major projects being brought forward by Severn Trent or other organisations in the vicinity of the WRMP19 solutions, and any other relevant land use and infrastructure plans that could affect the same European sites.

The findings of the in-combination effects assessment of the preferred programme are provided in Section 5.3 and 5.4.

¹⁷ Natural England Internal Guidance – Approach to Advising Competent Authorities on Road Traffic Emissions and HRAs V1.4 Final - June 2018

3 Severn Trent's WRMP 2019

3.1 Introduction

This section provides an overview of the water resources management planning process, the Severn Trent supply system and Severn Trent's WRMP19. For further detail, reference should also be made to Severn Trent's Final Water Resources Management Plan (WRMP) 2019.

Water resources management planning is undertaken by all water companies in England and Wales in order to ensure reliable, resilient water supplies over the long-term planning horizon. The process includes forecasting how much water will be available and how much water customers will need over the planning period (assessing supply and demand). If a potential deficit is identified in the supply-demand balance, the WRMP will determine how best to close the gap.

Water companies in England and Wales have a statutory requirement to prepare a WRMP every five years and this has been described above in Section 1, along with the consultation process and outcome in Section 2.1. Severn Trent's WRMP19 consultation programme commenced in 2016 and continued as the WRMP19 was developed through 2016 to 2018. The public consultation on the draft WRMP19 commenced in February 2018. Following comments on the draft plan and accompanying documents, including the HRA Report, a Statement of Response was prepared by Severn Trent in September 2018 setting out how it has taken account of the comments received in producing a revised draft WRMP19 for the Secretary of State's approval to publish as a final plan. Approval to publish the final plan was given by the Secretary of State in July 2019.

Severn Trent identified feasible components from an unconstrained list containing a much greater breadth of components. The feasible list is a set of components that Severn Trent considered suitable for inclusion in its options appraisal to determine the preferred programme of solutions for meeting any potential future supply deficit. Each solution comprises one or more feasible components.

The solutions were assessed to understand the costs, the benefits to the supply-demand balance, the effect on carbon emissions and the environmental and social effects (through the SEA process and associated HRA and WFD assessments). The solutions are subsequently compared through a comprehensive options appraisal process to determine the 'best value' programme of solutions to maintain a supply-demand balance over the planning period.

3.2 Severn Trent's Supply System and Water Resources

Severn Trent is one of the largest water and wastewater companies in England and Wales, providing high quality water and wastewater services over an area of 21,000km² in the Midlands and the Chester area, and stretching west to east from the Bristol Channel to the Humber. Severn Trent provides water to 8 million people, supplying some 1,800 million litres of water per day (Ml/d) to homes and businesses. Water is supplied through nearly 47,000km of water mains fed from multiple sources including 28 impounding reservoirs and 181 groundwater sites. Groundwater sources, river derived sources and impounding reservoirs provide 35%, 35% and 30% respectively of the total volume of water put into supply. For water resource planning purposes, Severn Trent's water supply area is divided into 15 independent Water Resources Zones (WRZs) reflecting the different characteristics of the supply area and associated risks to meeting demand in dry weather conditions. The 15 WRZs are shown in **Figure 3.1**. The WRMP19 also considered a range of feasible components beyond the company's water supply area boundary, such as within parts of the upper River Severn and River Wye catchment areas, including within Wales. The following sections summarise the characteristics of each WRZ.

1. Strategic Grid

By far the largest WRZ, the Strategic Grid extends from the Peak District in the north, encompassing most of Derbyshire and Leicestershire. The WRZ then extends south-west through Warwickshire to Gloucester, and then north-west covering most of Worcestershire and some of Shropshire. The strategic grid is made up of 14 major water treatment works (WTW), five reservoir complexes, three major grid booster pumping stations and a number of strategic

pipeline network connections and aqueducts. The WRZ serves a population of 5.08 million (64.9% of the total population supplied by STW).

2. Nottinghamshire

The Nottinghamshire WRZ is supported by inter-linked groundwater sources and can also receive transfers from the Strategic Grid. The zone is largely supplied from a sandstone aquifer, which is a large unit that responds slowly to abstraction and drought pressures. The WRZ serves 1.04 million people (13.3% of the total).

3. Newark

The Newark WRZ is supplied from local boreholes and imports from Nottinghamshire WRZ. The WRZ serves a population of 45,530 (0.6% of the total).

4. North Staffordshire

This WRZ extends from L reservoir in the Peak District south-west towards Market Drayton. The WRZ is well connected and flexible. Water is routinely transferred from Site L WTW to support the groundwater supplied areas to the south-west of the zone. Similarly, when Site L WTW output is reduced, demand in the North Staffordshire area can be met by increased output from the groundwater sources. This allows the conjunctive use of ground water and surface water resources. The WRZ serves a population of 534,890 (6.8% of the total).

5. Stafford

There are four borehole groups which supply the distribution reservoirs in the zone, allowing an even distribution of water throughout the zone. The zone has no defined connections to the surrounding WRZs under normal operation. The WRZ serves a population of 95,330 (1.2% of the total).

6. Whitchurch and Wem

This WRZ lies on the English side of England-Wales border and extends from Whitchurch southwards to Wem. The WRZ is supplied from local boreholes. There are no connections with surrounding WRZs under normal operation. The WRZ serves a population of 29,190 (0.4% of the total).

7. Kinsall

This WRZ lies to the west of the Whitchurch and Wem WRZ. The WRZ is supplied from local boreholes. There are no connections with surrounding WRZs under normal operation. The WRZ serves a population of 12,370 (0.2% of the total).

8. Mardy

This WRZ runs along the Welsh border encompassing Oswestry. The zone is supplied from a local borehole. There are no connections to the surrounding WRZs under normal operation. The WRZ serves a population of 8,190 (0.1% of the total).

9. Ruyton

The zone is supplied from a local borehole and a limited connection from the Shelton WRZ. The WRZ serves a population of 12,830 (0.2% of the total).

10. Shelton

This WRZ is centred on the Shelton area and extends westwards to the England-Wales border and eastwards towards Wolverhampton. The zone is connected by a strategic link from Shelton to Telford that allows water resources to be effectively utilised throughout the zone from Shropshire to west Staffordshire. The WRZ serves a population of 460,920 (5.9% of the total).

11. Wolverhampton

The zone is supplied with water from Severn Trent's shared South Staffordshire Asset, with support from a number of local groundwater sources. The WRZ serves a population of 238,700 (3.1% of the total).

12. Bishops Castle

The zone is supplied from local boreholes. There are no connections to the surrounding WRZs under normal operation. The WRZ serves a population of 6,170 (0.1% of the total).

13. Chester

This zone is supplied predominantly by the River Dee (85%), with 10% from impounding reservoirs and 5% from a spring source at Llangollen and a groundwater source at Mickle Trafford. The WRZ serves a population of 99,760 (1.3% of the total).

14. Rutland

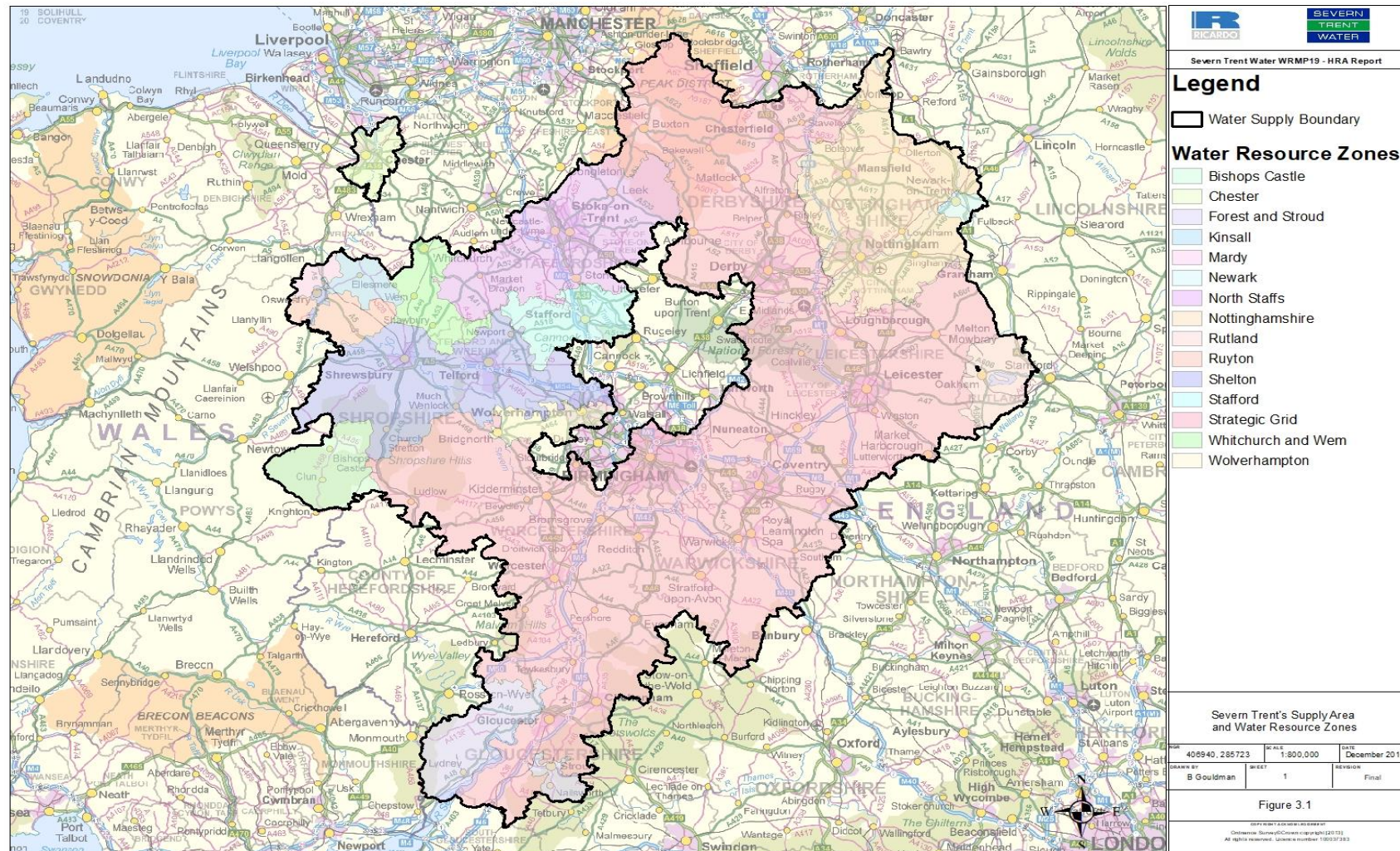
This zone on the eastern edge of the supply area receives all of its water from bulk supply transfers from Anglian Water. The WRZ serves a population of 31,240 (0.4% of the total).

15. Forest and Stroud

This zone is supplied with water from Site K WTW, which can be distributed throughout the zone, and local groundwater and spring sources. The WRZ serves a population of 134,070 (1.7% of the total).

Further details about the Severn Trent's supply system are provided on the Severn Trent website (www.stwater.co.uk).

Figure 3.1 Severn Trent: Supply Area and WRZs



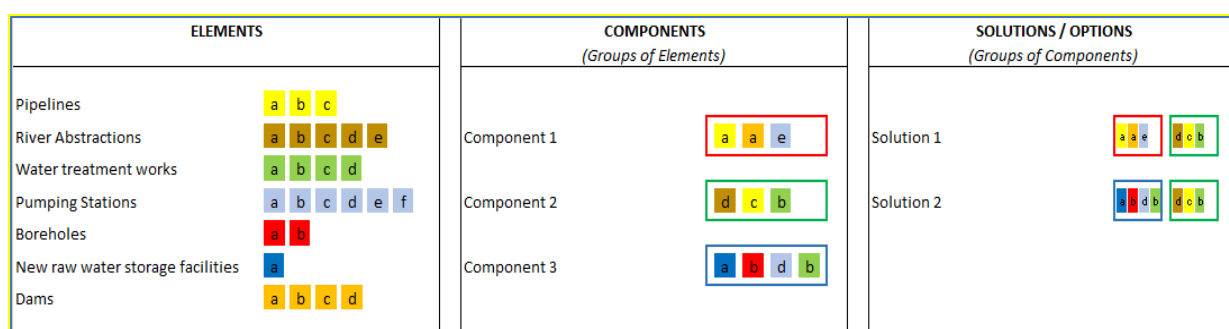
4 HRA Screening of Feasible Components

4.1 Screening of Options

Severn Trent initially considered HRA (and SEA and WFD) principles in moving from the 'constrained' list of options to development of its Feasible List of options - through this process, options which were found to have unacceptable adverse effects were rejected from the 'pool' of potential options and did not reach the feasible list of options that were then subject to SEA.

From the feasible list, options were selected to create options to the forecast supply deficit. Each option could comprise one or more separate components which in turn comprise a range of individual elements (**Figure 4.1**). A series of alternative programmes of options (**Figure 4.1**) were then considered through the SEA programme appraisal process to help inform the final decision on the best value set of options for the preferred programme.

Figure 4.1 Options Development Approach for WRMP19



HRA for each component listed for all feasible options were carried out in detail for Final WRP19 (**Table 4.1**). The below 'look up' table also provide information on how each feasible option is comprising one or more separate components for the Final WRMP19.

Table 4.1 Loop-Up Table for List of Feasible Options for Final WRMP19

Option Reference	Component References	Option Name	Supply-Demand Benefit (Ml/d)
Demand-side Options			
WE003A		Enhanced Household Water Efficiency Audit	0.15
WE003B		Enhanced Household Water Efficiency Audit	0.30
WE004A		Enhanced Social Housing Water Efficiency Audit	0.08
WE004B		Enhanced Social Housing Water Efficiency Audit	0.21
WE005		Leakage Reduction (50% reduction)	211.7
WE006		Increased Metering	29.9
Supply-side options			
BAM01	4	Site R WTW to Ambergate pipeline capacity increase	7.5
BHS10	71	Elmhurst BH asset enhancements and transfer to Site L WTW	2
UNK01	58	New WTW on the River Weaver near Nantwich	20
BHS02	159	Waverly Road BHs asset and water treatment enhancements	2

Option Reference	Component References	Option Name	Supply-Demand Benefit (Ml/d)
GRD10	108	North Staffs WRZ to Stafford WRZ transfer solution	7
BHS09	22	Elmhurst BH asset and water treatment enhancements	2
RAW07	101	Potable water import to Kinsall WRZ at Whittington	1
GRD11	110	Site U WTW to North Staffs WRZ transfer solution	15
MEL39	64 99G	BH raw water transfer to Site Q WTW with Site Q WTW enhancements	5
RIV01	81	Potable water import to Chesterfield	20
UNK03	88	Support L Site WTW from the River Weaver	20
WTW29	44 308	New WTW on the River Trent near Stafford, Staffordshire	22.5
WTW28	45Z	New WTW on the River Trent near Stoke Bardolph, Nottinghamshire	30
WTW08	50	New WTW on the River Severn near Ombersley, Shropshire	15
WIL05	7A 14B	Site E WTW expansion and transfer main supported by raw water augmentation of the River Trent	35
WTW16	53	New WTW on the River Severn near Buildwas, Shropshire	15
LIN01	142	New source and treatment at Linacre reservoir	5
MEL29	61B 99G	River Trent support to Site Q WTW with WTW enhancements	26
BHS12	30	New GW source in the Hopton GWMU	3.5
GRD19	16	DVA to Nottingham transfer pipeline capacity increase	15
RAW08	25A	Site C WTW output increase using additional and supported abstractions from the River Avon	10
BHS11	27	Haseley Spring source asset and WTW enhancement	2
LIT01	32	Site F WTW expansion	10
DAM01	84A	Stanford Reservoir capacity increase (Size A)	2.5
BHS13	112A	Croxtan BH output increase and transfer to Hob Hill DSR	2.5
MEL23	61 99G	River Trent to Site Q WTW transfer with Site Q WTW enhancements	15
UNK06	152	Maximise outputs from Shared South Staffordshire Asset	30
BHS01	158	Watery Lane BHs asset and water treatment enhancements	3
BHS04	163	Swynnerton BHs asset and water treatment enhancements	7
DOR07	99G	Site Q WTW enhancements	0
GRD09	105	Site M WRZ to Ruyton WRZ transfer solution	1
GRD12	111	Site Q WTW to North Staffs WRZ transfer solution	7
MEL37	138 99G	Raw water augmentation of Staunton Harold Reservoir with Site Q WTW enhancements	5

Option Reference	Component References	Option Name	Supply-Demand Benefit (Ml/d)
WTW01	7A 150	New WTW on the River Trent near Little Haywood supported by raw water augmentation of the River Trent	13
BHS05	166	Broomleys BHs asset and water treatment enhancements	1.1
CRO06	54	River Soar to support Site B WTW	17
DOR02	99B	Site I WTW enhancements	2
DOR05	99E	Site C WTW enhancements	8
GRD07	103	Site M WRZ to Mardy WRZ transfer solution adapting existing assets (Solution 2)	1
GRD08	104	Nottingham WRZ to Newark WRZ transfer solution	5
CRO04	134A	Blackbrook Reservoir to support Site B WTW	12
CRO05	135	Thornton Reservoir to support Site B WTW	8
DAM05	123A	Tittesworth Reservoir capacity increase (Size A)	5
WTW07	190	East Midlands existing raw water storage (including new WTW and infrastructure)	18
BHS06	191	Maximise deployment from Diddlebury WTW and Munslow BH	0.9
BHS17	192A	Site M WRZ to Mardy WRZ transfer solution adapting existing assets (Solution 1)	3
GRD16	194A	Clungunford / Oakley Farm BH enhancements	2
UNK07	195	Improve Site L WTW outputs during low raw water periods	7
BHS18	192B	Shelton WRZ to Mardy WRZ transfer solution using new assets	3
GRD17	194B	Strategic Grid to Bishops Castle WRZ transfer solution	1.3
CARSC01	187C 128 95B 32	Carsington to Site L, J and F WTWs	100
CARSC02	187C 128 32 14B	Carsington to Site L, F and E WTWs	100
CARSC03	187C 128Z 95B 14B 32	Carsington to Site L, J, F and E WTWs	100
DAM06	123B	Tittesworth Reservoir capacity increase (Size B)	14
BAM02	4 302A	Potable water import to Site R WTW with Bamford to Ambergate pipeline capacity increase	60
CLYWB01	186B F-120 66	Site U and Site P WTW upgrades supported by River Severn raw water storage capacity increase	90

Option Reference	Component References	Option Name	Supply-Demand Benefit (ML/d)
RAW11	120A 122A	River Severn to C mutual support solution with supported River Avon abstractions - Size AA (Upper)	84.5
RAW12	120B 122C	River Severn to Draycote mutual support solution - Size BC (Upper)	78.5
RAW13	120C 122B	River Severn to Draycote mutual support solution with supported River Avon abstractions - Size CB (Mid)	79
RAW14	120D 122A	River Severn to Draycote mutual support solution with supported River Avon abstractions - Size DA (Lower)	64.5
RAW15	120E 122B	River Severn to Draycote mutual support solution - Size EB (Mid)	59
RAW16	120F 122A	River Severn to Draycote mutual support solution - Size FA (Lower)	44.5
BHS15	12	Birmingham BHs conversion to potable supply	9
MIT01	121	Site O WTW to Site K WTW raw water transfer main	15
DAM07	122A 310	Draycote Reservoir capacity increase (Size A) with transfer main from Site C WTW to Coventry	9
BHS14	112B	Croxtton BH Output Increase and transfer to Hanchurch DSR	2.5
DAM02	84B	Lower Shustoke capacity increase (Size A)	2.5
GRD15	132	Whaddon (Strategic Grid WRZ) to Forest & Stroud WRZ transfer solution	5
RAW17	128	Carsington reservoir to Tittesworth transfer solution	10
DAM03	84C	Whitacre Reservoir capacity increase (Sub-option A)	2.5
RAW09	25B	Site C and Site U WTW output increase using additional and supported abstractions from the River Avon	20
BHS07	198	Ladyflatte BHs asset and water treatment enhancements	2.7
GRD13	117	Potable water import to Peckforton and North Staffs WRZ	5
GRD18	200	Peckforton Group BHs asset and water treatment enhancements	36
OGS01	95B	Site J WTW expansion	15
GRD06	82	Cross Wolverhampton strategic transfer solution	15
GRD22	82Z	Cross Wolverhampton strategic transfer solution	10
GRD05	90	Leek to Stoke trunk main enhancements	5
RAW01	144A	Raw water import from CRT to Milford WTW	15
RAW02	144B	Raw water import from CRT to Site C WTW	15
MEL41	125A 99G	Site Q WTW enhancements with new supported abstractions from the River Derwent	15
GRD01	79	Site U WTW transfer to Wolverhampton and Telford WRZ	21.5
SHE01	33	Site M WTW Expansion	18
SHE05	33Z	Site M WTW expansion	10

Option Reference	Component References	Option Name	Supply-Demand Benefit (Ml/d)
DAM11	34 F-190	West area new raw water storage with Site U WTW enhancement and deployment infrastructure upgrades	180
WTW05	31C	East Midlands raw water storage including new WTW	45
WTW06	31D	East Midlands raw water storage including new WTW	45
WIL02	14B	Site E WTW expansion and transfer main	21
BHS08	204	New GW Source in Coven GWMU	3.5
MIL01	205	Milford BH output enhancements	2
DOR08	99D	Site B WTW enhancements	3.6
WTW30	66	Site P WTW expansion	15
BHS03	162	Preston Brockhurst BH asset and water treatment enhancements	1.5
BHS16	193	Much Wenlock BH treatment enhancements	0.7
VYR01	303 66 F-30	River Severn raw water import to Site U and Site P WTWs	60
VYR02	303 F-60	River Severn raw water import to Site U WTW	60
GRD20	89D20	New WTW on River Dove near Uttoxeter supported by Carsington reservoir and deploying to Stoke (Size A)	18
GRD21	89D30	New WTW on River Dove near Uttoxeter supported by Carsington reservoir and deploying to Stoke (Size B)	27
NOT01	304	Ambergate to Mid Nottinghamshire transfer solution	30
NOT04	305	Heathy Lea to North Nottinghamshire transfer solution	25
NOT05	306	E to South Nottinghamshire transfer solution	30
SHE04	309	Shared South Staffordshire Asset to Nurton Transfer (High Flow)	18
SHE06	309Z	Shared South Staffordshire Asset to Shelton WRZ transfer solution (Low flow)	10
MEL47	7A 61 99G	Site Q WTW enhancements supported by raw water augmentation of the River Trent	20
BAM03	312	Site R WTW to Grindleford pipeline capacity increase	7.5
BAM04	313	Site R WTW to Baslow pipeline capacity increase	20
BAM05	314	Site R WTW to Ambergate transfer solution	50
CRO07	134A 135	Blackbrook Reservoir and Thornton Reservoir to support Site B WTW	17
SHE02	301A	Potable water import to Shelton WRZ (localised)	12
SHE03	301B	Potable water import to Shelton WRZ (WRZ wide)	18
DAM12	303 50	New WTW on the River Severn near Ombersley with raw water imports into the River Severn	30

4.2 Potential Likely Significant Effects of WRMP19 Components

The approach to HRA screening is described above in Sections 1 and 2 above. The assessment area for the HRA is associated with a large number of European and internationally designated sites as shown on **Figure 4.2**. The assessment area is more extensive than the Severn Trent supply area (Figure 3.1) in order to take account of the potential for WRMP feasible components being located outside of the supply area and/or having the potential to affect European sites outside of the supply area, including European sites within Wales.

The HRA screening of likely significant effects (LSE) on any European site for demand management feasible components is provided in **Table 4.2** and for potential water supply feasible components in **Table 4.3**. Where uncertainty was identified, this indicates that a confident conclusion of no LSE is not yet possible based on the information currently available about the component and/or the impact pathways to one or more European sites. Where uncertainty remains, or LSE has been identified, a Stage 2 HRA Appropriate Assessment (AA) is required if the component is included within the solutions comprising the preferred programme. The AA assesses whether there would be an adverse effect on any European site due to implementation of the component, taking account of any mitigation measures and/or refinement of the design of the component to seek to avoid adverse effects.

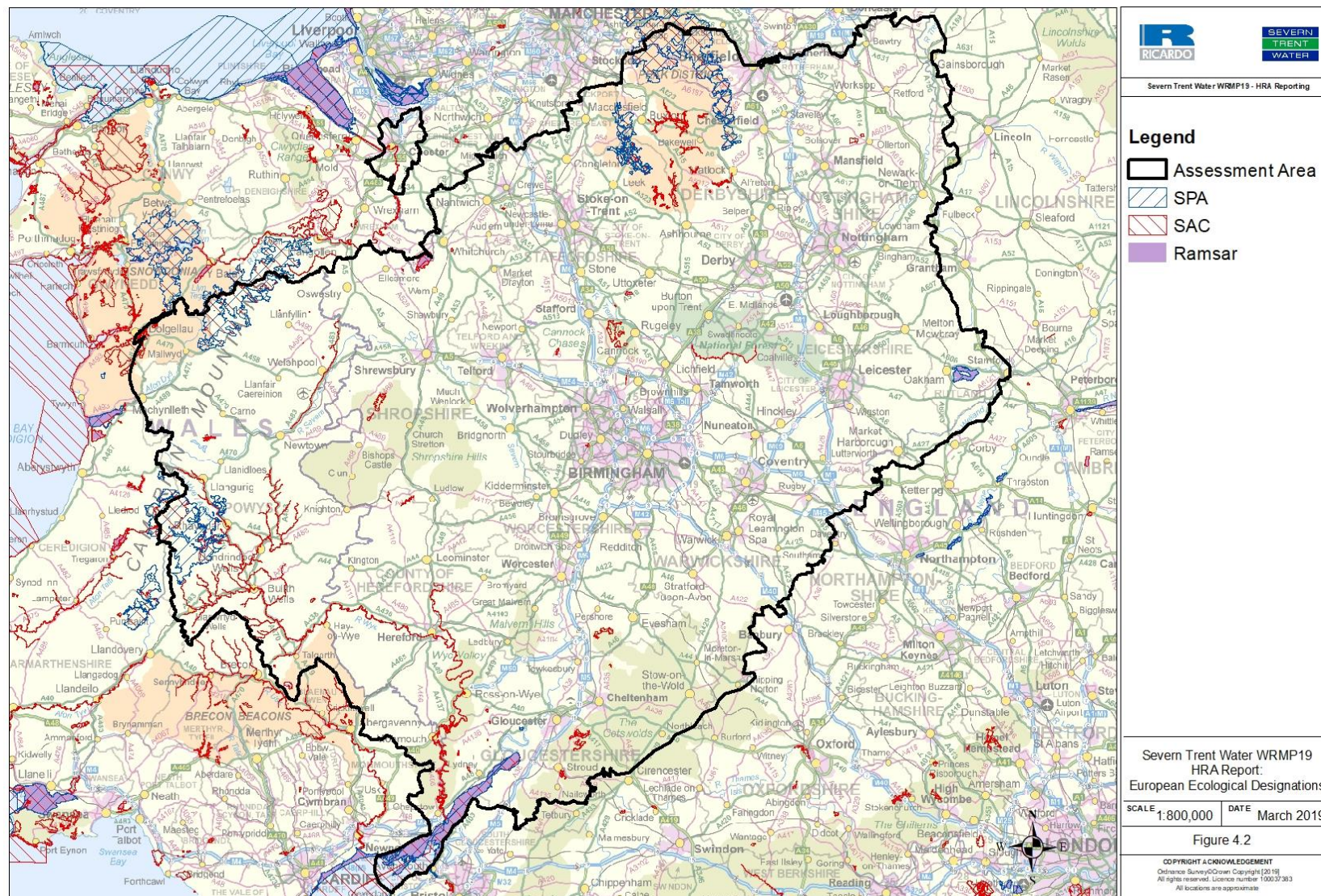
Figure 4.2 European sites within the HRA study area

Table 4.2. Screening of demand management feasible components for effects on European sites

Solution No.	Component	HRA Outcome	Comments
Demand Management Components			
WE003A	Enhanced Household Water Efficiency Audit	No LSE	This water efficiency component involves a detailed audit of household water efficiency. As this option is targeted at increased efficiency audits it will not be associated with any European Sites.
WE003B	Enhanced Household Water Efficiency Audit	No LSE	This water efficiency component involves a detailed audit of household water efficiency. As this option is targeted at increased efficiency audits it will not be associated with any European Sites.
WE004A	Enhanced Social Housing Water Efficiency Audit	No LSE	This water efficiency component involves a detailed audit of social household water efficiency. As this option is targeted at increased efficiency audits it will not be associated with any European Sites.
WE004B	Enhanced Social Housing Water Efficiency Audit	No LSE	This water efficiency component involves a detailed audit of social household water efficiency. As this option is targeted at increased efficiency audits it will not be associated with any European Sites.
WE005	Leakage Reduction	No LSE	This demand management component is to reduce leakage. Severn Trent will use measures including active leakage control and pressure management in District Meter Areas covering all water resources zones of their network during AMP7. The activities will not be associated with any European Sites.
WE006	Increasing in Metering	No LSE	This demand management component proposes to increase the number of rateable value billed customers switching to a metered supply (domestic and industrial meter optants). The activities will not be associated with any European Sites.

Table 4.3. Screening of water supply feasible components for effects on European sites

Component Reference	Component Name	HRA Outcome	Comments
4	Site R WTW to Ambergate pipeline capacity increase	Moderate Risk: Stage 2 HRA Appropriate Assessment required	<p>Works associated with Component 4 are likely to have significant effects on the qualifying features of the designated sites 'alone' and in combination' with each other. Stage 2 Appropriate Assessment is therefore required of this component if it is included in the WRMP preferred programme. The component involves construction works upstream of the following features: bullhead, brook lamprey and white-clawed crayfish.</p> <p>White-clawed crayfish are particularly sensitive to sedimentation and disease. It is possible that they may be present within the upstream reach of the River Derwent and tributaries, in the area of the works. There could be temporary loss of this habitat for construction, which could affect</p>

Component Reference	Component Name	HRA Outcome	Comments
			population survival. Additional mitigation maybe required.
12	Birmingham BHs conversion to potable supply	No LSE	
7A	River Trent Raw Water Augmentation	No LSE ¹⁸	This is a provisional assessment pending finalisation of the source of the raw water augmentation of the River Trent.
14B	Site E Expansion	No LSE	
16	DVA to Nottingham transfer pipeline capacity increase	No LSE	
17	Site Q (Dove) Conjunctive Use	No LSE	
22	Elmhurst BH asset and water treatment enhancements	No LSE	
25A	Site C WTW output increase using additional and supported abstractions from the River Avon	No LSE	
25B	Draycote and Site U WTW output increase using additional and supported abstractions from the River Avon	No LSE	
27	Haseley Spring source asset and WTW enhancement	No LSE	
30	New GW source in the Hopton GWMU	Moderate Risk: HRA Stage 2 Appropriate Assessment required	Works associated with Component 30 have potential for significant effects to Cannock Chase SAC during construction and in operation. A Stage 2 Appropriate Assessment is required of this component if it is included in the WRMP preferred programme.
31C	East Midlands raw water storage including new WTW	No LSE	
31D	East Midlands raw water storage including new WTW	No LSE	
32	Site F Conjunctive Use	No LSE	
33	Site M WTW Expansion	No LSE	
33Z	Site M WTW Expansion	No LSE	
34	Longdon Marsh Reservoir	No LSE	
44	New river WTW nr. Stafford	Major Risk: HRA Stage 2 Appropriate Assessment required	The proposed component pipeline intercepts the Cannock Chase SAC boundary in the north of the site. More information is required on the pipeline route and potential to adjust the route to avoid adverse effects and any mitigation practices in relation to the new pipeline. As it stands, there is likely to be direct habitat loss and possible indirect effects to adjacent habitat within the SAC but there is potential to avoid this through re-routing the pipeline. Stage 2 Appropriate Assessment is required of this component if it is included in the WRMP preferred programme.
45Z	New river WTW on Notts Trent	No LSE	
50	New river WTW at Ombersley	No LSE	

¹⁸ The Habitats Regulations Assessment: Stage 1 Screening will need to be updated once a final decision regarding the source of water for augmentation has been made.

Component Reference	Component Name	HRA Outcome	Comments
53	New WTW on the River Severn near Buildwas, Shropshire	No LSE	
54	River Soar to support B WTW	No LSE	
58	New WTW on the River Weaver near Nantwich	No LSE	
61	River Trent to Site Q	No LSE	
64	Stanton/Milton to Supply at Site Q	No LSE	
66	Expand Site P	No LSE	
71	Elmhurst BH asset enhancements and transfer to Site L WTW	No LSE	
79	Site U WTW transfer to Wolverhampton and Telford WRZ	No LSE	
81	Potable water import to Chesterfield	No LSE	
82	Cross-Wolverhampton Strategic transfer solution	No LSE	
82Z	Cross-Wolverhampton Strategic transfer solution	No LSE	
84A	Stanford Reservoir capacity increase (Size A)	No LSE	
84B	Lower Shustoke capacity increase (Size A)	No LSE	
84C	Whitacre Reservoir capacity increase (Size A)	No LSE	
88	Support Tittesworth WTW from the River Weaver	No LSE	
89D-20	New WTW on River Dove near Uttoxeter supported by Carsington reservoir and deploying to Stoke (Size A)	No LSE	
89D-30	New WTW on River Dove near Uttoxeter supported by Carsington reservoir and deploying to Stoke (Size B)	No LSE	
90	Leek to Stoke trunk main enhancements	No LSE	
95B	Site J WTW Output Increase	No LSE	
99B	Site I WTW enhancements	No LSE	
99D	Site B WTW enhancements	No LSE	
99E	Site C WTW enhancements	No LSE	
99G	Component 99G - DO Recovery – Site Q	No LSE	
101	Potable water import to Kinsall WRZ at Whittington	No LSE	
103	Shelton WRZ to Mardy WRZ transfer solution adapting existing assets (Solution 2)	No LSE	
104	Nottingham WRZ to Newark WRZ transfer solution	No LSE	
105	Shelton WRZ to Ruyton WRZ transfer solution	No LSE	
108	North Staffs WRZ to Stafford WRZ transfer solution	Moderate risk HRA Stage 2 Appropriate	Component is directly adjacent to Cannock Chase SAC and therefore construction and operation impacts could

Component Reference	Component Name	HRA Outcome	Comments
		Assessment required	arise. A Stage 2 Appropriate Assessment is therefore required to assess the potential effects if this component is included in the WRMP preferred programme to determine whether there would be an adverse effect on site integrity
110	Site U WTW to North Staffs WRZ transfer solution	No LSE	
111	Site Q WTW to North Staffs WRZ transfer solution	Moderate risk: HRA Stage 2 Appropriate Assessment required	Component lies adjacent to Cannock Chase SAC and potentially within the hydrological catchment of West Midland Mosses SAC. A Stage 2 Appropriate Assessment is therefore required to assess the effects further if this component is included in the WRMP preferred programme to determine whether there would be an adverse effect on site integrity.
112A	Croxton BH Output increase and transfer to Hob Hill DSR	Moderate Risk: HRA Stage 2 Appropriate Assessment required	Midland Meres and Mosses Phase 2 Ramsar Site is not hydrologically connected to Component 112A by surface water but the works do lie 0.85km uphill from the wetland site and therefore there is a risk of run-off and accidental pollution to degrade the site during construction. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
112B	Croxton BH Output increase and transfer to Hanchurch DSR	No LSE	
117	Potable water import to Peckforton and North Staffs WRZ	No LSE	
120A	Middle Severn to Draycote	Moderate Risk: HRA Stage 2 Appropriate Assessment required	The components involve a raw water transfer between catchments and the WFD and SEA have highlighted a potential risk of spreading non-native species from the River Severn to the Draycote catchment, based on the known presence of Invasive Non-native Species (INNS). Whilst there are no designated sites within 10km of the component location, this could affect designated sites beyond the 10km search area. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
120B	Middle Severn to Draycote	Moderate Risk: HRA Stage 2 Appropriate Assessment required	A Stage 2 Appropriate Assessment is required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
120C	Middle Severn to Draycote	Moderate Risk: HRA Stage 2 Appropriate	A Stage 2 Appropriate Assessment is required if this component is included in the WRMP preferred programme so as to

Component Reference	Component Name	HRA Outcome	Comments
		Assessment required	assess the construction effects further on site integrity.
120D	Middle Severn to Draycote	Moderate Risk: HRA Stage 2 Appropriate Assessment required	A Stage 2 Appropriate Assessment is required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
120E	Middle Severn to Draycote	Moderate Risk: HRA Stage 2 Appropriate Assessment required	A Stage 2 Appropriate Assessment is required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
120F	Middle Severn to Draycote	Moderate Risk: HRA Stage 2 Appropriate Assessment required	A Stage 2 Appropriate Assessment is required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
121	Site O WTW to Site K WTW raw water transfer main	Moderate Risk: HRA Stage 2 Appropriate Assessment required	Works associated with Component 121 could affect the use of offsite functional habitat by the qualifying features of the Wye Valley & Forest of Dean Bat Sites SAC during construction. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
122A	Raise water level at Draycote Reservoir (6% (1400MI))	No LSE	
122B	Raise water level at Draycote Reservoir (25% (5800MI))	No LSE	
122C	Raise water level at Draycote Reservoir (50% (11500MI))	No LSE	
123A	Tittesworth Reservoir capacity increase (Size A)	No LSE	
123B	Tittesworth Reservoir capacity increase (Size B)	No LSE	
125A	Unlock unused Carsington storage /Lower Derwent to Site Q / Site F/ Site E	No LSE	
128	Carsington to Tittesworth main	Moderate Risk: HRA Stage 2 Appropriate Assessment required	Construction could interrupt migration by brook lamprey (Peak District Dales SAC). A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
128Z	Carsington to Tittesworth main (14MI/d)		
132	Whaddon (Strategic Grid WRZ) to Forest & Stroud WRZ transfer solution	No LSE	
134A	Use Blackbrook reservoir to provide additional supply of raw water to Site B WTW	No LSE	

Component Reference	Component Name	HRA Outcome	Comments
135	Use Thornton reservoir to provide additional supply of raw water to Site B WTW	No LSE	
138	Packington Reuse	No LSE	
142	New source and treatment at Linacre reservoir	No LSE	
144A	Raw water import from CRT to Milford WTW	No LSE	
144B	Raw water import from CRT to Site C WTW	No LSE	
150	Little Haywood new WTW on Upper Trent incl main to Meir	No LSE	
152	Maximise outputs from Shared South Staffordshire Asset	No LSE	
158	Watery Lane BHs asset and water treatment enhancements	No LSE	
159	Waverly Road BHs asset and water treatment enhancements	No LSE	
162	Preston Brockhurst BH asset and water treatment enhancements	No LSE	
163	Swynnerton BHs asset and water treatment enhancements	No LSE	
166	Broomleys BH asset and water treatment enhancements	No LSE	
186B	Expand Clywedog 13m 45600MI	No LSE	
187C	Expand Carsington - 25000MI	No LSE	
190	East Midlands existing raw water storage including new WTW and infrastructure	No LSE	
191	Maximise deployment from Diddlebury WTW and Munslow BH	No LSE	
192A	Shelton WRZ to Mardy WRZ transfer solution adapting existing assets (Solution 1)	No LSE	
192B	Shelton WRZ to Mardy WRZ transfer solution using new assets	No LSE	
193	Much Wenlock BH treatment enhancements	No LSE	
194A	Clungunford/Oakley Farm BH enhancements	Moderate Risk: HRA Stage 2 Appropriate Assessment required	<p>The proposed component is within 1.72km of the River Clun SAC and 0.18km from the River Clun upstream of the SAC boundary.</p> <p>Although there is no risk of direct effects, as works are outside of the designated site boundary, there is potential for indirect effects to freshwater pearl mussel, which lie downstream of the component. The adjacent aquifer abstraction could result in alterations in river flow that could result in habitat degradation to the Site and functionally linked habitat. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.</p>

Component Reference	Component Name	HRA Outcome	Comments
194B	Strategic Grid to Bishops Castle WRZ transfer solution	Moderate Risk: HRA Stage 2 Appropriate Assessment required	The proposed component is within 1.72km of the River Clun SAC and 0.18km from the River Clun upstream of the SAC boundary. Although there is no risk of direct effects as works are outside of the Site boundary, there is potential for indirect effects to freshwater pearl mussel from habitat degradation of functionally linked habitat. Construction of the proposed component could cause disturbance, mortality, habitat loss or degradation, due to sedimentation. During operation, alteration of the habitat from low flows could also degrade their habitat. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
195	Improve Site L WTW outputs during low raw water periods	No LSE	
198	Ladyflatte BHs asset and water treatment enhancements	No LSE	
200	Peckforton Group BHs asset and water treatment enhancements	No LSE	
204	New GW Source in Coven GWMU	No LSE	
205	Milford BH output enhancements	Moderate Risk: HRA Stage 2 Appropriate Assessment required	Cannock Chase SAC lies immediately adjacent to the proposed new borehole construction. There is potential for temporary effects during construction on the qualifying habitat features; European dry heaths and North Atlantic wet heaths with <i>Erica tetralix</i> during construction from run-off and pollution incidents. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
F-190	Site U 190MI/d	No LSE	
301A	Potable water import to Shelton WRZ (localised)	No LSE	
301B	Potable water import to Shelton WRZ (WRZ wide)	No LSE	
302A	UU import to Site R	Moderate Risk: HRA Stage 2 Appropriate Assessment required	
303	River Severn raw water import to Site U WTW	No LSE	
304	Ambergate to Mid Nottinghamshire transfer solution	No LSE	
305	Heathy Lea to North Nottinghamshire transfer solution	Moderate Risk: HRA Stage 2 Appropriate Assessment required	The western end of the Component is located 0.8 km from the South Pennine Moors SAC and the Peak District Moors SPA and within the Natural England Impact Risk Zone for these designations.

Component Reference	Component Name	HRA Outcome	Comments
			The proposed pipeline intercepts five watercourses and therefore Likely Significant Effects could arise from release of suspended sediments and pollution incidents. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
306	Site E to South Nottinghamshire transfer solution	No LSE	
308	Peasley Bank – Hanchurch Pipeline	No LSE	
309	Shared South Staffordshire Asset to Nurton Transfer (High Flow)	No LSE	
309Z	Shared South Staffordshire Asset to Site M WRZ transfer solution (Low Flow)	No LSE	
310	Transfer main from Site C WTW to Coventry	No LSE	
312	Site R WTW to Grindleford pipeline capacity increase	No LSE	
313	Site R WTW to Baslow pipeline capacity increase	No LSE	
314	Site R WTW to Ambergate transfer solution	High Risk: HRA Stage 2 Appropriate Assessment required	Works associated with Component 314 are likely to have a significant effect on the South Pennine Moors SAC, Peak District Moors (South Pennine Moors Phase 1) SPA and Peak District Dales SAC as ~7k of pipeline is routed through these designated sites, or works are in close proximity and hydrologically linked. A Stage 2 Appropriate Assessment is therefore required if this component is included in the WRMP preferred programme so as to assess the construction effects further on site integrity.
F-30	River Severn raw water import to Site U WTW (30 MI/d)	No LSE	
F-60	River Severn raw water import to Site U WTW (60 MI/d)	No LSE	
F-120	Site U 120MI/d	No LSE	

4.3 HRA Screening Conclusions

The screening process indicated that no demand management feasible components were assessed as having likely significant effects on European sites.

The screening process identified several components which would have a LSE on the associated European sites:

- Component number 4 (Site R Conjunctive Use)
- Component number 30 (New BH in Hopton GWMU)
- Component number 44 (New River WTW nr. Stafford)
- Component number 108 (Stoke to Stafford Link)

-
- Component number 111 (Site Q to Staffs Link)
 - Component number 112A (Croxtan BH Output Increase)
 - Component number 120A, 120B, 120C, 120D, 120E, 120F (Middle Severn to Draycote)
 - Component number 121 (Site O to Site K main)
 - Component number 128 (Carsington to Tittesworth main)
 - Component number 194A (Clungunford/Oakley Farm Support)
 - Component number 194B (Clungunford/Oakley Farm Support)
 - Component number 205 (Milford DO recovery)
 - Component number 305 (Heathy Lea to North Nottinghamshire transfer solution)
 - Component number 314 (DVA Site R to Ambergate Enhancement)

Only one of these components has been included in the solutions for the preferred programme for the Final WRMP19: component 305 (Heathy Lea to North Nottinghamshire transfer). A Stage 2 Appropriate Assessment has therefore been completed of this component (see Part B of this report).

Following the screening of these feasible components, the Stage 1 HRA considered the likely significant in-combination effects between the solutions (and constituent components) included in the preferred programme for the Final WRMP19. This considered the timing and implementation regime of the solutions that make up the preferred programme. This was followed by an assessment of the likely significant in-combination effects of solutions in the preferred programme with other programmes, plans and projects that could have an effect on the European sites. This assessment included consideration of the outcome of the Appropriate Assessment of the Heathy Lea to North Nottinghamshire transfer.

5 HRA Screening Findings for the Final WRMP19 Preferred Programme

5.1 Introduction

HRA screening (see Section 4) was completed for all of the feasible components and was used to inform the development and refinement of the preferred programme. The components considered as part of the solutions for the preferred programme are identified in **Table 5.1**.

Section 5.2 discusses the potential effects of the individual solutions which are included in the preferred programme of the Final WRMP19. Sections 5.3 and 5.4 discuss in-combination likely significant effects within the Final WRMP19 and in-combination likely significant effects of the Final WRMP19 solutions with other plans and projects, respectively.

Components that were included within the feasible list, but which were not selected for inclusion as solutions in the preferred programme are unlikely to be progressed; however, should any of these components be brought back into consideration in the future, the in-combination likely significant effects assessment (and any identified need for Appropriate Assessment) should be completed at this stage.

Table 5.1: HRA screening conclusions for the Final WRMP19 solutions

Solution Ref	Solution name	Components	Effect from components alone
Demand Management			
WE003B	Enhanced Household Water Efficiency Audit	-	No LSE
WE004B	Enhanced Social Housing Water Efficiency Audit	-	No LSE
WE005	Leakage Reduction (50% reduction)	-	No LSE
WE006	Increase in Metering	-	No LSE
Supply Solutions			
NOT04	Heathy Lea to North Nottinghamshire transfer solution	Component Refs: 305	Appropriate Assessment required
DOR05	Site C WTW enhancements	Component Refs: 99E	No LSE
DOR02	Site I WTW enhancements	Component Refs: 99B	No LSE
WIL05	Site E WTW expansion and transfer main supported by raw water augmentation ¹⁹ of the River Trent	Component Refs: 7A & 14B	No LSE ²⁰
LIT01	Site F WTW expansion	Component Refs: 32	No LSE
DOR08	Site B WTW enhancements	Component Refs: 99D	No LSE
UNK07	Improve Site L WTW outputs during low raw water periods	Component Refs: 195	No LSE
GRD18	Peckforton Group BHs rehabilitation and treatment enhancement	Component Refs: 200	No LSE
CRO06	River Soar to support Site B WTW	Component Refs: 54	No LSE
WTW05	East Midlands raw water storage including new WTW	Component Refs: 31C	No LSE

¹⁹ Following consultation on the Environmental Report for the Draft WRMP between February and April 2018 and responses concerning this solution, alternative approaches regarding raw water flow augmentation have been investigated. This solution has been re-designed for the Final WRMP and no longer involves the use of effluent from the Barnhurst sewage treatment works. The source of the raw water for the flow augmentation is currently being finalised.

²⁰ The HRA Stage 1 Screening will need to be updated for component 7A once a final decision regarding the source of water for augmentation has been made.

Solution Ref	Solution name	Components	Effect from components alone
MEL29	River Trent support to Site Q WTW with WTW enhancements	Component Refs: 61B & 99G	No LSE
DAM07	Draycote Reservoir capacity increase (Size A) with transfer main from Site C WTW to Coventry	Component Refs: 122A & 310	No LSE
DAM01	Stanford Reservoir capacity increase (Size A)	Component Refs: 84A	No LSE
CRO05	Thornton Reservoir to support Site B WTW	Component Refs: 135	No LSE
NOT01	Ambergate to Mid Nottinghamshire transfer solution	Component Refs: 304	No LSE
DAM03	Whitacre Reservoir capacity increase (Sub-option A)	Component Refs: 84C	No LSE
BHS07	Ladyflatte BHs recommissioning	Component Refs: 198	No LSE
DAM02	Lower Shustoke capacity increase (Size A)	Component Refs: 84B	No LSE
BHS06	Maximise deployment from Diddlebury WTW and Munslow BH	Component Refs: 191	No LSE
BAM03	Site R WTW to Grindleford pipeline capacity increase	Component Refs: 312	No LSE
NOT05	Site E to South Nottinghamshire transfer solution	Component Refs: 306	No LSE
OGS01	Site J WTW expansion	Component Refs: 95B	No LSE

5.2 Potential Effects of the Final WRMP19

Table 5.2 and **Table 5.3** presents the HRA screening assessment of potential effects of the schemes that are included in the preferred programme of the Final WRMP19, both alone and in-combination.

The results of the screening process in **Table 5.2** and **Table 5.3** show that, with one exception, the individual solutions included in the preferred plan are not likely to have any significant effect on any European sites. The screening assessment could not conclude that there would be no LSE of Solution NOT04 New Strategic Transfer Capacity from Strategic Grid to Sunnyside (component 305), and consequently an Appropriate Assessment of this solution was required (see Part B of this report).

5.3 Potential In-Combination Effects within the Final WRMP19

The matrix in **Figure 5.1** illustrates potential construction and operational in-combination likely significant effects between the solutions within the Final WRMP19. A potential in-combination effect arises where an overlap in the project construction / operation programme is identified which could affect the same designated site. The results of the in-combination likely significant effects assessment are presented in below paragraphs.

From **Figure 5.1** it is evident that four of the solutions included in the preferred programme could have potential in-combination likely significant effects on European sites, as discussed further below.

Figure 5.1: Matrix indicating the solutions considered to have potential in-combination likely significant effects.

Solution	Potential In-combination Effects																				Legend	
NOT04																						
NOT05																						
DOR05																						
DOR02																						
WIL05																						
LIT01																						
DOR08																						
OGS01																						
UNK07																						
GRD18																						
CRO06																						
WTW05																						
MEL29																						
DAM07																						
BAM03																						
DAM01																						
CRO05																						
NOT01																						
DAM03																						
BHS07																						
DAM02																						
BHS06																						
	NOT04	NOT05	DOR05	DOR02	WIL05	LIT01	DOR08	OGS01	UNK07	GRD18	CRO06	WTW05	MEL29	DAM07	BAM03	DAM01	CRO05	NOT01	DAM03	BHS07	DAM02	BHS06

A number of options have also been screened for potential in-combination likely significant effects on the following designated sites:

- Peak District Moors SPA – BAM03 (Site R WTW to Grindleford pipeline capacity increase), NOT04 (Heathy Lea to North Nottinghamshire transfer solution), UNK07 (Improve Site L WTW outputs during low raw water periods).
- Peak District Dales SAC – BAM03 (Site R WTW to Grindleford pipeline capacity increase), BHS07 (Ladyflatte BHs recommissioning), NOT01 (Ambergate to Mid Nottinghamshire transfer solution) and NOT04 (Heathy Lea to North Nottinghamshire transfer solution).
- South Pennine Moors SAC – BAM03 (Site R WTW to Grindleford pipeline capacity increase), NOT04 (Heathy Lea to North Nottinghamshire transfer solution) and (Improve Site L WTW outputs during low raw water periods).

The majority of the solutions/components are at sufficient distance from the designated sites to avoid in-combination likely significant effects. The options of BAM03 and NOT04 are both in close proximity (0.5km) of the South Pennine Moors SAC and Peak District Moors (South Pennine Moors Phase 1) SPA. The NOT04 option has been subject to a Stage 2 Appropriate Assessment. Based on the current understanding of how the pipe will be cleaned for BAM03, and the locations for the launch and receptor pits on the pipeline, no in-combination likely significant effects are anticipated. However, this assessment should be reviewed once final construction methods and programmes are known as part of the project-specific HRA.

5.3.1 Carsington Water

There is the potential in-combination likely significant effects associated with solutions LIT01, WIL05 and OGS01. Solution LIT01 involves component 32. There are no European sites associated with component 32 and therefore no in-combination significant effects are likely. Solution WIL05 involves components 7A and 14B. The precise source of the flow augmentation for component 7A (raw water augmentation) has yet to be finalised, but it is unlikely to involve new infrastructure or new abstraction that would lead to any likely significant effects on qualifying features of any European sites during construction or operation, either alone or in-combination. The HRA conclusions for component 7A will be reviewed upon the finalisation of the flow augmentation solution for component 7A, and an updated HRA compliance assessment (both 'alone' and 'in combination') will be produced and included within the project-specific HRA that will accompany any necessary environmental permitting and/or planning

applications when the scheme is being promoted. There are no European sites associated with component 14B and therefore no in-combination likely significant effects are anticipated. Solution OGS01 involves component 95B, which is located between 8km and 9.5km from a number of designated sites; Peak District Moors (South Pennine Moors Phase 1) SPA, South Pennine Moors SAC, Peak District Dales SAC and Birklands and Bilhaugh SAC. The component is located at a sufficient distance from these designated sites as to avoid any likely significant effects, and there is no overlap with the screened designated sites for the other options so no in-combination likely significant effects are anticipated.

Given the above summary of the screening assessments, no in-combination LSEs are expected from the concurrent operation and/or construction of these solutions in the preferred programme of the Final WRMP19.

5.3.2 Site C WTW and Draycote Reservoir Expansion

The DOR05 (Site C WTW enhancements) and DAM07 (Draycote Reservoir capacity increase (Size A) with transfer main from Site C WTW to Coventry) solutions have been identified as having potential for in-combination likely significant effects related to the construction activities. However, the screening assessment concluded that there are no SACs, SPAs or Ramsar sites located within 10km of either of the DAM07 and DOR05 solutions.

As such, there are no in-combination LSEs expected from the construction of these solutions.

5.3.3 Shustoke and Whitacre Reservoir Expansions

The DAM02 (Lower Shustoke capacity increase (Size A)) and DAM03 (Whitacre Reservoir capacity increase (Sub-option A)) were identified as having potential for in-combination effects due to overlap in construction programme. However, as there are no SACs, SPAs or Ramsar sites located within 10km of either of the DAM07 and DOR05 solutions the assessment concluded that no in-combination LSEs will arise from the construction of these solutions.

5.3.4 Solutions affecting the River Trent from Dove to Derwent

The simultaneous operation of solutions WTW05 (component 31c – abstraction from River Soar upstream of the River Trent confluence) and WIL05 (components 7A and 14B – supported abstraction from the River Trent) and MEL29 (components 99G and 61B – abstraction from River Trent) has the potential for in-combination effects on the River Trent from the Dove to Derwent confluences.

The WIL05 solution abstraction will be supported by the raw water augmentation. Given the flows in the River Trent and the raw water augmentation, the abstraction will not have any adverse impact on the flow regime or the aquatic ecology of the watercourses. The precise source of the flow augmentation for component 7A (raw water augmentation) has yet to be finalised, but it is unlikely to involve new infrastructure or new abstraction that would lead to any likely significant effects on the qualifying features of any European sites during construction or operation. The HRA conclusions for component 7A will be reviewed upon the finalisation of the flow augmentation solution for component 7A, and an updated HRA compliance assessment (both ‘alone’ and ‘in combination’) will be produced and included within any necessary environmental permitting and/or planning applications as may be required when the scheme is being promoted.

There are no SACs, SPAs or Ramsar sites located within 10km of Solution WTW05 or component 7A of WIL05 or Solution MEL29, or downstream of the abstraction for many kilometres. As such, there are no in-combination LSEs expected from the operation or construction of these solutions.

5.4 Potential In-Combination Effects with Other Plans and Projects

Potential in-combination likely significant effects of the preferred programme with other plans and projects, where relevant, were assessed as set out in **Table 5.3** and **Table 5.4**.

The assessment of the demand management solutions concluded that there would be no in-combination likely significant effects on any European sites between these solution and any other plans or programmes.

5.4.1 Severn Trent's Draft Drought Plan 2018

Severn Trent published its Draft Drought Plan in early 2018. The concurrent implementation of the measures in the Draft Drought Plan alongside the Final WRMP19 may result in some likely significant effects, particularly in terms of the risks of environmental water stress in drought conditions.

A review of the supply-side options in the Draft Drought Plan 2018 identified one potential operational in-combination likely significant effect with the Final WRMP19. There is potential for in-combination likely significant effects between the Ambergate to Mid Nottinghamshire transfer solution (NOT01) and the River Derwent at Ambergate Drought Permit Option as they both involve abstraction from the River Derwent. However, in-combination likely significant effects are not anticipated as the proposed solution and the Drought Permit option are located downstream of any European sites.

The Draft Drought Plan 2018 demand management measures complement the demand management solutions included in the Final WRMP19. While their concurrent implementation may exacerbate some of the potential adverse effects of the leakage management measures, specifically in relation to vehicle movements and associated effects on air quality, transport, community and nuisance, these will not lead to any likely significant effects on any European sites. The concurrent implementation should result in an overall beneficial in-combination effect on water resources (with indirect beneficial effects on environmental receptors) because of the reduced consumption use of water.

5.4.2 Neighbouring Water Company WRMPs and Drought Plans

The following water companies border Severn Trent's water resource zones:

- South Staffordshire Water
- Anglian Water
- United Utilities Water
- Yorkshire Water
- Thames Water
- Bristol Water
- Wessex Water
- Dŵr Cymru Welsh Water
- Hafren Dyfrdwy

From a review of available information (published draft and revised draft WRMP19s (as available at February 2019), it can be concluded that none of the plans of the neighbouring water companies include options that could affect the same designated sites that have been assessed in the HRA of Severn Trent's Final WRMP19. The closest options are those in Anglian Water's revised draft WRMP, located towards the Elsham and Gainsborough areas, and therefore they are not likely to give rise to in-combination effects on the Peak District Moors SPA and South Pennine Moors SAC. Beneficial effects may arise in respect of measures for water efficiency and demand management included in each of the water company WRMPs.

No in-combination adverse effects have been identified in relation to the current published Drought Plans of neighbouring water companies. Beneficial effects may arise in respect of the Drought Plan measures for water efficiency and demand management with similar activities in the Severn Trent's Final WRMP19.

5.4.3 Land Use and Spatial Plans

It is necessary to consider potential in-combination likely significant effects with development programmes contained within Local Plans. The Local Plans are relatively high-level policy documents and whilst they identify potential areas for future development and zones for particular activities, the

uncertainty of future developments (including precise spatial location and timing) make it difficult to identify any potential in-combination likely significant effects with the Final WRMP19. Large areas of housing are proposed in the Charnwood Local Plan (adopted 2015) and the Broxtowe, Gedling and Nottingham Borough Aligned Core Strategies Local Plan (adopted 2014). However, the Final WRMP19 solutions CRO06 and NOT05 that could potentially give rise to in-combination likely significant effects with these Local Plan proposals, respectively, were screened out of having any LSE on any European designated sites. Consequently, no in-combination likely significant effects will occur.

As the Final WRMP19 solutions are brought forward for promotion in the future, an assessment will need to be carried out of possible construction and/or operational in-combination likely significant effects with known local developments in dialogue with the relevant local planning authorities.

5.4.4 River Basin Management Plans (RBMP)

The HRA for the 2015 RBMP for the Severn River Basin District²¹ concluded that none of the proposed measures in the RBMP were likely to have any significant effects on any European sites, alone or in-combination with other plans or projects. Three of the solutions included in the Final WRMP19 preferred programme (DAM07, DAM01 and BHS06) will be located within the Severn River Basin District. These solutions have been assessed and no in-combination LSEs with the RBMP activities were identified.

The remainder of the Final WRMP19 solutions are all associated with the Humber River Basin District (RBD). An HRA has also been completed for the 2015 Humber RBMP²². This HRA also concluded that none of the RBMP proposed measures will have any LSEs on any European sites, alone or in-combination with other plans or projects.

The solutions included in the Final WRMP19 in the Humber RBD have been assessed and no in-combination LSEs with the Humber RBMP activities were identified.

It is recommended that, once the WRMP19 solutions are brought forward for promotion and development in the future, a further assessment of potential in-combination effects with the latest versions of the RBMPs and associated measures is carried out as part of the HRA of the relevant planning permissions and/or environmental permit applications.

5.4.5 Major Projects

The potential for in-combination likely significant effects with some of the significant projects and developments identified in Severn Trent's supply area include High Speed Two (HS2); M42 Junction 6 Improvement Scheme, M54 to M6 Link Road; Avonmouth Deep Sea Container Terminal; Hinkley Point C Nuclear Power Plant and the Wednesbury to Brierley Hill Metro Extension. In-combination LSEs for these projects are not considered likely as the zones of influence of these projects largely do not overlap with the Final WRMP19 solutions due to differing construction periods, or otherwise the effects have been identified as small-scale and geographically distributed.

Table 5.2: Habitats Regulations screening of preferred programme demand management solutions for effects on European sites, alone and in-combination

Solution Ref	Solution name	LSE from solution alone	LSE from solutions within Final WRMP	LSE with other plans and programmes
WE003B	Enhanced Household Water Efficiency Audit	No	No	No
WE004B	Enhanced Social Housing Water Efficiency Audit	No	No	No
WE005	Leakage Reduction	No	No	No
WE006	Increase in Metering	No	No	No

²¹ River basin management plan for the Severn River Basin District Habitats Regulations Assessment Updated December 2015

²² River basin management plan for the Humber River Basin District Habitats Regulations Assessment Updated December 2015

Table 5.3: Habitats Regulations screening of the preferred programme supply-side solutions for effects on European sites, alone and in-combination

Solution Ref	Solution name	Solution Components	LSE from solution alone	LSE from solutions within Final WRMP	LSE with other plans and programmes
NOT04	Heathy Lea to North Nottinghamshire transfer solution	Refs: 305	Yes	No	No
DOR05	Site C WTW enhancements	Refs: 99E	No	No	No
DOR02	Site I WTW enhancements	Refs: 99B	No	No	No
WIL05	Site E WTW expansion and transfer main supported by raw water augmentation ²³ of the River Trent	Refs: 7A&14B	No ²⁴	No ²²	No ²²
LIT01	Site F WTW expansion	Refs: 32	No	No	No
DOR08	Site B WTW enhancements	Refs: 99D	No	No	No
UNK07	Improve Site L WTW outputs during low raw water periods	Refs: 195	No	No	No
GRD18	Peckforton Group BHs rehabilitation and treatment enhancement	Refs: 200	No	No	No
CRO06	River Soar to support Site B WTW	Refs: 54	No	No	No
WTW05	East Midlands raw water storage including new WTW	Refs: 31C	No	No	No
MEL29	River Trent support to Site Q WTW with WTW enhancements	Refs: 61B & 99G	No	No	No
DAM07	Draycote Reservoir capacity increase (Size A) with transfer main from Site C WTW to Coventry	Refs: 122A & 310	No	No	No
DAM01	Stanford Reservoir capacity increase (Size A)	Refs: 84A	No	No	No
CRO05	Thornton Reservoir to support Site B WTW	Refs: 135	No	No	No
NOT01	Ambergate to Mid Nottinghamshire transfer solution	Refs: 304	No	No	No
DAM03	Whitacre Reservoir capacity increase (Sub-option A)	Refs: 84C	No	No	No
BHS07	Ladyflatte BHs recommissioning	Refs: 198	No	No	No
DAM02	Lower Shustoke capacity increase (Size A)	Refs: 84B	No	No	No
BHS06	Maximise deployment from Diddlebury WTW and Munslow BH	Refs: 191	No	No	No
BAM03	Site R WTW to Grindleford pipeline capacity increase	Refs: 312	No	No	No
NOT05	Site E to South Nottinghamshire transfer solution	Refs: 306	No	No	No
OGS01	Site J WTW expansion	Refs: 95B	No	No	No

²³ Following consultation on the Environmental Report for the Draft WRMP between February and April 2018 and responses concerning this solution, alternative approaches regarding raw water flow augmentation have been investigated. This solution has been re-designed for the Final WRMP and no longer involves the use of effluent from the Barnhurst sewage treatment works. The source of the raw water for the flow augmentation is currently being finalised.

²⁴ The HRA screening will need to be updated for component 7A once a final decision regarding the source of water for augmentation has been made. However, no LSEs either alone or in-combination are anticipated based on the options under consideration.

6 Stage 1 Screening Conclusions

A screening assessment of the potential for any LSE on the integrity of European sites arising from the demand solutions and supply-side components included in the feasible list of components for the Final WRMP19 has been carried out. Consultation was undertaken with NE, NRW and the EA to inform the HRA screening assessment. The outcomes of the HRA screening were considered in the selection of solutions included in the preferred programme.

Following the programme appraisal process, the Final WRMP19 preferred programme includes both demand management solutions and water supply solutions (comprising one or more components). The HRA screening assessment concluded that, with the exception of one solution, the solutions included in the preferred programme are not likely to have any likely significant effect on the integrity of any European sites, either alone or in-combination with each other or with other plans, projects and programmes. One option (NOT04 Heathy Lea to North Nottinghamshire transfer solution), was identified as having Likely Significant Effects on the South Pennine Moors SAC and the Peak District Moors (South Pennine Moors Phase 1) SPA due to the proximity of the proposed pipeline route. This has been subject to HRA Stage 2 Appropriate Assessment as detailed in Part B of this report.

PART B APPROPRIATE ASSESSMENT

7 Introduction to Appropriate Assessment

7.1 Legislation and guidance

The responsibility for undertaking the Appropriate Assessments rests with Severn Trent as the plan-making authority, as described earlier in this HRA report. The Appropriate Assessment has been carried out in accordance with the Habitats Directive and the Conservation of Habitats and Species Regulations 2017 and taking account of available national guidance from Natural England and the Habitats Regulations Assessment Handbook.

7.1.1 Conservation objectives

The Habitats Regulations require that the Appropriate Assessment considers “the implications for the site in view of that site’s conservation objectives”. In accordance with the Habitats Directive, these objectives aim to achieve the favourable conservation status of the habitat and species features for which the European site is designated (see **Box 7.1**).

Box 7.1 Favourable conservation status definition

Favourable conservation status as defined in Articles 1(e) and 1(i) of the Habitats Directive

“The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas it covers within that range are stable or increasing, and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable.

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as ‘favourable’ when:

- Population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.”

7.1.2 Assessment

The Appropriate Assessment considers the potentially damaging aspects of the proposed WRMP solution NOT04 and the potential effects on the qualifying features of the relevant European sites and likely achievement of the conservation objectives of the sites. The assessment characterises the effects in terms of their likelihood, nature, scale, severity and duration.

The potential for adverse effect on the integrity of the site depends on the scale and magnitude of the effects of Solution NOT04 and the predicted effects, taking into account the distribution of the qualifying features across the relevant European sites in relation to the predicted effect and the location of the solution components as well as the timing and duration of construction works. Consideration has also been given to the level of understanding of any identified effects, such as whether they have been

recorded before and, based on current ecological knowledge, whether any identified mitigation measures can be expected to operate at the site in question.

Where qualitative and/or quantitative information was available, this has been used to inform the assessment. Where this information was not available, professional judgement has been used. In some cases, the ecological functioning of the site and the likely effects are well understood and documented elsewhere, for instance in studies previously commissioned to inform the Environment Agency's Habitats Directive Review of Consents. Where there is not sufficient information to undertake the assessment, this has been identified.

The Appropriate Assessment set outs, in sufficient detail for it to be transparent and understandable, what the effects of the proposed solution (either alone or in-combination with other measures, activities, plans or programmes) are likely to be on each qualifying feature of the relevant European site. Guidance states that the size or complexity of the assessment will not necessarily reflect the scale of the proposal, but rather the complexity of the potential effects. The length of the Appropriate Assessment may not reflect the complexity of ecological judgements made to arrive at the necessary conclusions. Very complex ecological analysis and judgements may be expressed succinctly, with detailed supporting analyses clearly referenced where necessary.

7.1.3 Mitigation Measures

The HRA Stage 2 assessment of effects includes consideration of mitigation measures. These measures can include both avoidance and reduction measures, with the former being the preferred option, that may be needed to prevent any adverse effect on the designated site.

7.1.4 In-combination Assessment

In accordance with the legislation, an in-combination assessment with other WRMP19 solutions and other plans and projects has been undertaken. The approach to this is described as a series of questions below:

- STEP 1 – Does the Option have no adverse effect on the European site? If not, then there is no requirement for in-combination assessment.
- STEP 2 - Does the Option, alone, have an adverse effect on the European site? If so, then there is no need for in-combination assessment as consent cannot be given for the plan to be approved, unless the HRA Stages 3 and 4 derogation tests are met, in which case all residual effects of the scheme acting alone will need to be compensated for.
- STEP 3 – Does this Option have a discernible effect, but one which does not lead to an adverse effect on site integrity alone? If so, then an in-combination assessment is required.
- STEP 4 – Identify the other Solutions in the WRMP19, and other plans or projects, that might also have discernible effects that whilst not leading to adverse effects alone might act in combination with the effects of the WRMP Solution.
- STEP 5 – Assess these other relevant solutions, plans and projects in combination with Solution NOT04.

The above steps recognise that it is only those effects that may become adverse when acting in combination that are included in the in-combination assessment.

Equally, in accordance with best-practice guidance, any projects or plans which have been completed, consented and implemented are considered to be part of the baseline (and should have been subject to their own HRA before being consented and implemented). Therefore, these will not be included as part of any in-combination assessment for this proposed solution, but any ongoing operational effects will be noted as part of the baseline environment.

7.1.5 Additional Mitigation Measures

Where the solution has been assessed as having an adverse effect in relation to the site's conservation objectives, additional mitigation may be necessary to satisfy the integrity test. Such mitigation is that which is in addition to the measures described in section 7.1.4 above, and which is usually imposed by a Competent Authority through enforceable conditions or restrictions.

7.2 Integrity Test

The integrity test is the conclusion of the Appropriate Assessment and requires the competent authority to ascertain whether the proposed solution (either alone or in-combination with other plans or projects), will not have an adverse effect on site integrity. The following definition of site integrity is provided by Defra. The integrity of the site is:

“the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the level of populations of the species for which it was classified”.

7.3 Limitations and Residual Uncertainties

Information provided by third parties, including publicly available information and databases, is considered correct at the time of publication. Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this HRA report, and the implementation of the proposed solution. This HRA Report is a strategic, plan-level assessment to support the Final WRMP19 and is not an application-specific (“project” level) assessment. A more detailed, application-specific Appropriate Assessment will be required to support any actual planning application and/or environmental permit application relating to the solution.

8 Appropriate Assessment of NOT04 New Strategic Transfer Capacity from Strategic Grid to Sunnyside

8.1.1 Assessment of Effects on Qualifying Features

The potential effects of the proposed WRMP19 solution NOT04 (acting alone) on each qualifying feature of the designated sites (South Pennine Moors SAC and Peak District Moors (South Pennine Moors Phase 1) SPA) are detailed below in **Tables 8.1 and 8.2**. Both the construction phase and operation phase of the solution are assessed.

8.1.2 In-combination Effects

As this solution forms part of a broader programme of the WRMP19, the in-combination effects acting across several solutions included in the WRMP19 has been assessed through the WRMP Programme-level HRA screening (see Part A, Section 5.4). Given the findings of the Appropriate Assessment and the earlier screening conclusions, no in-combination adverse effects on the SAC or SPA are anticipated.

8.1.3 The Integrity Test

The assessment set out in tabular format in **Tables 8.1 and 8.2** has concluded that there are sufficient mitigation measures available that can feasibly be implemented to avoid adverse effects to site integrity of the SAC and SPA sites. No in-combination effects have been identified.

At the detailed design stage, the option may be further modified and additional mitigation measures may be identified as part of the project-specific HRA. If, through this project-specific HRA, it is concluded that adverse effects cannot be avoided, a different solution from the WRMP19 feasible components list will be selected instead to address the supply deficit in the water resource zone.

Table 8.1: Assessment of potential effects on South Pennine Moors SAC

DESIGNATED SITE: South Pennine Moors SAC REF: UK0030280			PLAN NAME: Severn Trent WRMP 19 OPTION NAME & REF: NOT04 New Strategic Transfer capacity from Strategic Grid to Sunnyside		
Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
CONSTRUCTION PHASE ²⁵					
4030 European dry heaths	<p>Distribution: Dry heaths occur throughout the UK. They are particularly abundant in the uplands, where they may form extensive stands, which dominate the landscape. They are more localised in lowland areas, especially in south and central England, where they have declined in extent due to afforestation and agricultural improvement.</p> <p>Article 17 status: Bad and deteriorating: (range: favourable, area: favourable, structure and function: bad and deteriorating, future prospects: bad but improving).</p> <p>Main threats and pressures: Over-grazing (grazing; abandonment of pastoral systems); invasive species; development (urbanised areas, human habitation; continuous urbanisation; discontinuous urbanisation; communications networks; energy transport; other forms of transportation and communication); burning; air pollution and; climate change (other pollution or human effects/ activities).</p>	<p>The underlying SSSI is the Eastern Peak District Moors SSSI:</p> <ul style="list-style-type: none">30.94% favourable68.75% unfavourable recovering0.31% unfavourable no change <p>The SSSI units to the north of the B6050 and A619 are all in unfavourable recovering condition as follows:</p> <ul style="list-style-type: none">Unit 106 – This is a woodland unit on the fringe of the moorland and consists predominantly of birch in stands of both mixed and same age structures. There is very occasional willow, rowan and hawthorn with some new planting of oak. The seedling regeneration is mostly rowan with surprisingly little birch and the understorey layer is pretty much absent. This should appear over time with reduced grazing pressure but does need monitoring. The ground flora is a mixture of mosses and grasses but there is well over 50% bracken cover and some control should be considered. Parts of the unit are open moorland with a mix of dwarf shrub and there are some wet flushes which all add to the diversity of the unit making it favourable for birds and invertebrates.Unit 104 – This site has been subject to heavy sheep grazing in the past but now has cattle-only grazing. It will be some time before the effect of the new management becomes apparent. There was a high proportion of dead heather. It looked like there has been a heather beetle attack as the young heather north of the 3 ships has also been affected. The main issue on Birchin Edge is the lack of age structure for the dwarf shrubs. There is very little pioneer heather.Unit 105 – Species poor blanket bog. Dominated by Molinia. Rushy in places. Currently cattle grazed. On Clod Hall the main issue is the level of tree cover. Scrub control may be needed in the future.Unit 107 - This unit has a mixture of habitats with dry heath, birch scrub, bracken and some wet heath which is favourable for birds and invertebrates. The dry heath passes on moss cover, grazing, and burning, however the stands are species poor being dominated by Calluna and grasses and there is more than 10% bracken and scrub encroachment.	<p>Baseline: The site is representative of upland dry heath at the southern end of the Pennine range, the habitat's most south-easterly upland location in the UK. Dry heath covers extensive areas, occupies the lower slopes of the moors on mineral soils or where peat is thin, and occurs in transitions to acid grassland, wet heath and 7130 blanket bogs. The upland heath of the South Pennines is strongly dominated by heather <i>Calluna vulgaris</i>. Its main NVC types are H9 <i>Calluna vulgaris</i> – <i>Deschampsia flexuosa</i> heath and H12 <i>Calluna vulgaris</i> – <i>Vaccinium myrtillus</i> heath. More rarely H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> heath and H10 <i>Calluna vulgaris</i> – <i>Erica cinerea</i> heath are found. On the higher, more exposed ground H18 <i>Vaccinium myrtillus</i> – <i>Deschampsia flexuosa</i> heath becomes more prominent. In the cloughs, or valleys, which extend into the heather moorlands, a greater mix of dwarf shrubs can be found together with more lichens and mosses. The moors support a rich invertebrate fauna, especially moths, and important bird assemblages.</p> <p>Effect Assessment: The proposed pipeline route will be constructed through the B6050 or A619 which extends between the two components of the SAC at Robin Hood. The pipeline may require crossings of a number of brooks that feed the SAC e.g. Blackleah Brook and Heathy Lea Brook. The works therefore have the potential to result in the following effects:</p> <ul style="list-style-type: none">Offsite habitat degradation – compaction of soils and hydrologically connected vegetation between the two components of the SAC.Water quality – accidental oil spills, sediment laden runoff.Contamination – smothering of vegetation from dust and potential nitrogen loading.Biological disturbance – introduction of non-native invasive species. <p>Offsite habitat degradation The proposed pipeline route will extend between the two components of the SAC at Robin Hood. Priority habitat mapping suggests that the majority of habitat between the components is deciduous woodland. However, any areas of marshy land is likely to provide hydrological connectivity and continuity between the components. Construction works could cause temporary degradation of adjacent habitats through compaction of vegetation and soils which could alter water availability by disrupting surface and groundwater flows.</p>	<p>Baseline:</p> <ul style="list-style-type: none">NVC survey of construction corridor and adjacent habitats to confirm broad type, species composition and diversity and quality to update assessment to confirm offsite area to be temporarily lost during construction, and hydrological pathways to SAC.Air quality monitoring to inform assessment of N deposition from construction works. <p>Effect Mitigation: <i>Offsite habitat loss and degradation</i></p> <ul style="list-style-type: none">Install pipeline within road and avoid installing sections of pipeline in land adjacent to SAC which could be hydrologically linked.Minimise construction corridor.Topsoil strip the trench width only rather than whole working corridor.Ground protection matting to minimise compaction of adjacent wet heath habitat.Topsoil stripping, keeping soil layers separate to maintain the seed bank and habitat recovery following open cut pipeline installation for open cut sections.Undertaking the pipeline installation in short sections to minimise run-off.Locate construction compounds on habitats that are not hydrologically linked to the SAC.Ensure continued supply of water along ditches if being crossed by pipeline e.g. over pumping. <p>Water quality</p> <ul style="list-style-type: none">Adherence to EA Pollution Prevention Guidelines (now archived) and NRW, SEPA's Guidance on Pollution Prevention including Works and Maintenance in or near Water (2017). <p>Contamination – dust and NOx</p> <ul style="list-style-type: none">Complete an air quality assessment of potential for N loading on sensitive	No adverse effects on conservation objectives or site integrity

²⁵ Only European dry heaths and oak woodland considered in the construction phase as identified by priority habitat mapping available as being in close proximity to the pipeline route. There are no areas of wetland habitat in close proximity to the pipeline route. These are however considered in operation as the pipeline could permanently impede surface and groundwater flows to the habitats.

DESIGNATED SITE: South Pennine Moors SAC REF: UK0030280			PLAN NAME: Severn Trent WRMP 19 OPTION NAME & REF: NOT04 New Strategic Transfer capacity from Strategic Grid to Sunnyside		
Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
		<p>Bilberry was only found at one stop [<i>location not provided in SSSI condition assessment</i>]. The wetter areas have Calluna and some cotton grasses amongst the molinia/ deschampsia. The eastern end is fenced off and there is very little dwarf shrub present amongst the molinia. The bracken and scrub issues should be dealt with through the HLS.</p> <p>To the south, one unit is located adjacent to the proposed pipeline route, which is unfavourable recovering:</p> <ul style="list-style-type: none">Unit 117 - This is a large unit that extends from Emperor stream to just north of Beeley triangle. The Northern section has been fenced out and planted with woodland. This is one of the Jubilee Woods. Further South, in the vicinity of the access track, there are issues with sheep over-grazing on the sparse patches of Calluna. As you travel south the unit changes to a Calluna grassland mosaics and then becomes Calluna dominated. Further issues of over grazing are found along Harland edge where sheep have clipped bilberry excessively. There are several large bracken patches, the largest being on Harland edge. This was treated in 2014 in an effort to control the spread. Further treatment will be required in 2015 to bring the level below 10%. The unit fails on species diversity as it is dominated by Calluna. Bilberry is found mainly along Harland edge. Cowberry, Crowberry and Erica species were found to be rare. The unit is favourable for merlin and short-eared owl. Some potentially suitable habitat for ring ouzel occurs along Harland edge but the lack of fruit-bearing plants limits its favourability. <p>The Site Improvement Plan includes the following objectives that could be impacted by the proposed option:</p> <p>1. Hydrological changes - A103(B) Peregrine, A140(B) Golden Plover, A222(B) Shorteared Owl, A466(B) Dunlin, Breeding bird assemblage, H4010 Wet heathland with cross-leaved heath, H7130 Blanket bogs, H7140 Very wet mires often identified by an unstable `quaking` surface.</p> <p>5.Public access/disturbance - Breeding bird assemblage, H4010 Wet heathland with crossleaved heath, H4030 European dry heaths, H7130 Blanket bogs, H7140 Very wet mires often identified by an unstable `quaking` surface, H9180 Mixed woodland on base-rich soils associated with rocky slopes</p> <p>6.Air pollution-impact of atmospheric nitrogen</p>	<p>Open cut is proposed for the pipeline installation, and where possible the width of the construction corridor (20m) topsoil stripped will be minimised to the trench width. Ground protection matting will be used to minimise compaction of soils which will aid recovery and prevent the loss of vegetation structure. Topsoil will be stripped to keep the layers separate thereby retaining the seed bank and root balls and expediting habitat recovery.</p> <p><u>Water quality – pollution incidents, runoff</u></p> <p>Given the proximity to the river, and likely requirement for dewatering during the works due to a high water table in the area, there is the potential for indirect effects of pollution such as excess sediment discharge, discharge of contaminated water from dewatering activities, and accidental oil spill. In order to mitigate for such effects, all petrochemicals will be stored within designated areas located a suitable distance from the SAC. All refuelling of vehicles will also be undertaken off site and works will ensure appropriate spill kits are available to ensure accidental spills are intercepted prior to reaching the designated site. Appropriate measures will also be employed to ensure excess sediment is not released into the designated site, this may include (but is not limited to) installation of silt fencing in-between works areas and the watercourse, use of silt busters to capture and filter surface water run-off. No surface water runoff or dewatering water will be discharged directly to the channel of the designated site.</p> <p><u>Contamination - dust and NOx</u></p> <p>Topsoil stripping and excavation works have potential for indirect adverse effects from dust pollution with smothering of the heath habitats predicted in the absence of mitigation. This will only effect habitats within 100m without mitigation, as identified through the commonly applied distance thresholds of dust from large construction sites^{26,27}.</p> <p>The use of heavy plant and vehicles during the construction phase may alter the air quality in the proximity of the site with increased concentrations of nitrogen oxides (NOx). Such increases may directly interfere with site improvement plans to control, reduce and ameliorate atmospheric nitrogen impacts.</p> <p>Increased nitrogen can lead to increased fertility leading to changes in plant community. The Air Pollution Information System estimates that the current critical loading (i.e. over which effects of N deposition would start to occur) for dry heath is 10-20 kg N ha⁻¹ year¹. Recent guidance published by Natural England notes that designated sites within 200m of roads to be used as part of a plan or project need to be assessed for nitrogen loading²⁸.</p>	<p>habitats once details of plant and construction programme have been confirmed (e.g. using method outlined in DMRB Air Quality Appendix F).</p> <ul style="list-style-type: none">If air quality assessment identifies an exceedance of the critical load due to stationary traffic being held as pipeline is installed in road, traffic must be diverted or other traffic management measures put in place to ensure critical load, and therefore an adverse effect on the site, is avoided.Dust suppression measures including dampening and dust screens to be applied to reduce dispersion to minimum distance <p><u>Non-native invasive species</u></p> <ul style="list-style-type: none">Best practice biosecurity measures, as recommended by the GB Non-Native Species Secretariat (http://www.nonnativespecies.org/index.cfm?sectionid=58) would guard against any potential for spreading invasive species as a result of construction. <p><u>General</u></p> <ul style="list-style-type: none">A Construction Management Plan will be drawn up to detail all exclusion and protection measures.All of the above mitigation measures will be monitored and enforced by an on-site Environmental Clerk of Works.	

²⁶ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction. IAQM, London

²⁷ Technical Statement TS/AQ1, Association of British Ports (ABP), 2000

²⁸ NE Internal Guidance – Approach to Advising Competent Authorities on Road Traffic Emissions and HRAs V1.4 Final - June 2018

DESIGNATED SITE: South Pennine Moors SAC REF: UK0030280			PLAN NAME: Severn Trent WRMP 19 OPTION NAME & REF: NOT04 New Strategic Transfer capacity from Strategic Grid to Sunnyside		
Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
		deposition - A098(B) Merlin, A103(B) Peregrine, A140(B) Golden Plover, A222(B) Short-eared Owl, A466(B) Dunlin, Breeding bird assemblage, H4010 Wet heathland with cross-leaved heath, H4030 European dry heaths, H7130 Blanket bogs, H7140 Very wet mires often identified by an unstable 'quaking' surface, H91A0 Western acidic oak woodland 14.Invasive species - H4010 Wet heathland with cross-leaved heath, H4030 European dry heaths, H91A0 Western acidic oak woodland	<p>It is currently unclear as to whether the construction will exceed the air quality thresholds for impacts (change of 1000 AADT (annual average daily traffic) or 200 HGV movements daily threshold above which significant air quality impacts can be experienced²⁹) as there may be a requirement to hold traffic whilst works are carried out in the road. Therefore, an increase in N loading is considered likely and an air quality assessment will need to be completed once the detailed construction methods and programme are known, to confirm whether there will be any issues from NOx loading. If this assessment concludes adverse effects, traffic will need to be rerouted or traffic management measures implemented to avoid the critical load being exceeded.</p> <p><u>Biological Disturbance – Invasive non-native species</u> The works have the potential to spread invasive non-native species given the close proximity of the works to the SAC and watercourse crossings required. Works, particularly in aquatic habitats should follow best practice biosecurity measures as standard.</p>		
910A Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	<p>Distribution: old sessile oak woods are widespread and locally extensive throughout the western part of the UK. They are much more thinly distributed in drier eastern regions.</p> <p>Article 17 status: Range, favourable; area, inadequate; specific structures and functions, bad; future prospects, bad.</p> <p>Main threats and pressures: forest and plantation management & use, grazing in forests/ woodland, air pollution, air-borne pollutants, invasive non-native species, grazing: deer grazing/ browsing/ trampling</p>	As above	<p><u>Baseline:</u> Around the fringes of the upland heath and bog of the south Pennines are blocks of old sessile oak woods, usually on slopes. These tend to be dryer than those further north and west, such that the bryophyte communities are less developed (although this lowered diversity may in some instances have been exaggerated by the effects of 19th century air pollution). Other components of the ground flora such as grasses, dwarf shrubs and ferns are common. Small areas of alder woodland along stream-sides add to the overall richness of the woods.</p> <p><u>Effect Assessment:</u> The proposed pipeline route will be constructed through the B6050 or A619 which extends between the two components of the SAC at Robin Hood. The pipeline may require crossings of a number of brooks that feed the SAC e.g. Blackleah Brook and Heathy Lea Brook. The works therefore have the potential to result in the following effects:</p> <ul style="list-style-type: none">• Offsite habitat degradation – compaction of soils and hydrologically connected vegetation between the two components of the SAC.• Water quality – accidental oil spills, sediment laden runoff.• Contamination – smothering of vegetation from dust and potential nitrogen loading.• Biological disturbance – introduction of non-native invasive species. <p><u>Offsite habitat degradation</u> The proposed pipeline route will extend between the two components of the SAC at Robin Hood. Priority habitat mapping</p>	<p>As above and:</p> <ul style="list-style-type: none">• Arboricultural Implications Assessment of pipeline route and proximity to oak woodland.• Pipeline must avoid root protection zones when extending close to SAC (although assumed to be minimal risk as road already exists within which the pipeline is being constructed).	No adverse effects on conservation objectives or site integrity

²⁹ Highways England. Design Manual for Roads and Bridges Volume 11 Section 3, Part 1 - Air Quality

DESIGNATED SITE: South Pennine Moors SAC REF: UK0030280			PLAN NAME: Severn Trent WRMP 19 OPTION NAME & REF: NOT04 New Strategic Transfer capacity from Strategic Grid to Sunnyside		
Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
			<p>suggests that the majority of habitat between the components is deciduous woodland. However, any areas of marshy land are likely to provide hydrological connectivity and continuity between the components. Construction works could cause temporary degradation of adjacent habitats through compaction of vegetation and soils which could alter water availability by disrupting surface and groundwater flows.</p> <p>Open cut is proposed for the pipeline installation, and where possible the width of the construction corridor (20m) topsoil stripped will be minimised to the trench width. Ground protection matting will be used to minimise compaction of soils which will aid recovery and prevent the loss of vegetation structure. Topsoil will be stripped to keep the layers separate thereby retaining the seed bank and root balls and expediting habitat recovery.</p> <p>An Arboricultural Implications Assessment will be required to ensure root protection zones are not compromised by the pipeline construction.</p> <p><u>Water quality – pollution incidents, runoff</u> Given the proximity to the river, and likely requirement for dewatering during the works due to a high water table in the area, there is the potential for indirect effects of pollution such as excess sediment discharge, discharge of contaminated water from dewatering activities, and accidental oil spill. In order to mitigate for such effects, all petrochemicals will be stored within designated areas located a suitable distance from the SAC. All refuelling of vehicles will also be undertaken off site and works will ensure appropriate spill kits are available to ensure accidental spills are intercepted prior to reaching the designated site. Appropriate measures will also be employed to ensure excess sediment is not released into the designated site, this may include (but is not limited to) installation of silt fencing in-between works areas and the watercourse, use of silt busters to capture and filter surface water run-off. No surface water runoff or dewatering water will be discharged directly to the channel of the designated site.</p> <p><u>Contamination - dust and NOx</u> Limited dust will be generated during the works as the proposed pipeline will be open cut. Concrete breakout from the road crossings will create the most dust, and dust issues could arise if the soil stockpiles are exposed for long periods of time in dry weather. Standard dust suppression measures will be applied to avoid adverse effects e.g. hoarding where in close proximity to SAC, dampening.</p> <p>The habitats in the SAC are considered to be sensitive to N deposition, particularly dry heaths. The Air Pollution Information System estimates that the critical loading (i.e. over which effects of N deposition would start to occur) for <i>Quercus</i> dominated woodland is 10-15Kg N/ha/year. An increase in N loading is considered likely given the potential works in the road and</p>		

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			<p>requirement to hold traffic during construction work. A detailed air quality assessment will need to be completed once the detailed construction methods and programme are known, to confirm whether there will be any issues from NOx loading. If this assessment concludes adverse effects, traffic will need to be rerouted or traffic management measures implemented to avoid the critical load being exceeded.</p> <p><u>Biological Disturbance – Invasive non-native species</u> The works have the potential to spread invasive non-native species given the close proximity of the works to the SAC and watercourse crossings required. Works, particularly in aquatic habitats should follow best practice biosecurity measures as standard.</p>		
OPERATION PHASE					
7130 Blanket bogs	<p>Distribution: Blanket bogs are found in the north and west of the UK, extending from Devon in the south to Shetland in the north. <i>Scirpus – Eriophorum</i> mire predominates in the west, particularly at lower altitude, while <i>Calluna – Eriophorum</i> mire is particularly abundant in the east and at higher altitudes. <i>Erica – Sphagnum</i> mire is widely but patchily distributed.</p> <p>Article 17 status: Range, favourable; area, inadequate; specific structures and functions, bad; future prospects, bad.</p> <p>Main threats and pressures: grazing, deer grazing/ browsing/ trampling , air pollution, air-borne pollutants, fire and fire suppression, human induced changes in hydraulic conditions, renewable abiotic energy use, roads, paths and railroads, outdoor sports and leisure activities, recreational activities, invasive non-native species, abiotic (slow) natural processes</p>	As above	<p><u>Baseline:</u> This site represents blanket bog in the south Pennines, the most south-easterly occurrence of the habitat in Europe. The bog vegetation communities are botanically poor. Hare's-tail cottongrass <i>Eriophorum vaginatum</i> is often overwhelmingly dominant and the usual bog-building <i>Sphagnum</i> mosses are scarce. Where the blanket peats are slightly drier, heather <i>Calluna vulgaris</i>, crowberry <i>Empetrum nigrum</i> and bilberry <i>Vaccinium myrtillus</i> become more prominent. The uncommon cloudberry <i>Rubus chamaemorus</i> is locally abundant in bog vegetation. Bog pools provide diversity and are often characterised by common cottongrass <i>E. angustifolium</i>. Substantial areas of the bog surface are eroding, and there are extensive areas of bare peat. In some areas erosion may be a natural process reflecting the great age (9000 years) of the south Pennine peats.</p> <p><u>Effect Assessment:</u> The proposed pipeline route will be constructed through the B6050 or A619 which extends between the two components of the SAC at Robin Hood. The pipeline may require crossings of a number of brooks that feed the SAC e.g. Blackleah Brook and Heathy Lea Brook. The works therefore have the potential to result in the following effects:</p> <ul style="list-style-type: none">• Permanent impedece of surface water and groundwater flows to water dependent habitats. <p>Around 2km from the western start of the pipeline (located immediately east of the village of Robin Hood) the distance between both flanking designated areas is at its narrowest (~51m), with the pipeline flanking the northern margin of the southern unit of the SAC, SPA and SSSI. Around 1.5km the pipeline sits towards the base of a valley within which a small watercourse flows (Wadshelf Brook, a tributary of the River Derwent). Thereafter toward 3.5km the pipeline is situated on higher ground above the watercourse.</p> <p>Surface flow vectors indicate that flow from the northern and southern designated areas is generally towards the south and north respectively, draining into Wadshelf Brook. For much of</p>	<ul style="list-style-type: none">• Best practice construction methods to avoid preferential flow of water along pipeline.	No adverse effects on conservation objectives or site integrity

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			<p>the area along the pipeline route considered, the designated areas lie at slightly higher topographic elevations than the pipeline.</p> <p>The geology underlying the pipeline is complex. Around the area of the pipeline route considered, the geology comprises of interbedded coarse sandstones and mudstones of the Carboniferous aged Namurian Millstone Grit Group trending to the finer sandstones and mudstones of the Carboniferous aged Langsettian Pennine Lower Coal Measures Formation. Siltstones, coals and marine bands are noted throughout the stratigraphy. Faulting is common in these rocks, however there is no faulting noted within the study area of the pipeline route. Data taken from the British Geological Survey (BGS) 1:50000 scale geology map, Sheet 112 (Chesterfield) indicates the dip of strata around the pipeline to be between 3-5 degrees and dipping generally in an easterly direction, although north of the pipeline these dips locally are to the south east and south of the pipeline they are locally to the north east (Figure 1). Superficial geology is limited to scattered head deposits towards the start of, and around, the pipeline.</p> <p>The hydrogeology of the area around the pipeline consists entirely of the Millstone Grit Group and Pennine Lower Coal Measures Formation aquifers which the BGS indicates as being moderately productive multi-layered aquifers where flow is nearly all via fractures and fissures in the rocks. There are no water wells indicated in the vicinity of the pipeline and no Environment Agency Source Protection Zones are present nearby. The nearest water wells indicated by BGS data are ~5km to the south east near Holymoorside. There are also very few boreholes adjacent to the site, therefore approximate water levels cannot be identified. However, understanding the general direction of dip and magnitude of dip of the rocks, it is indicated that groundwater flows are expected to be in an easterly direction. Specifically, the bedrock dips suggest that groundwater flow would be locally towards the pipeline where it is adjacent to the designated areas and, overall in an easterly direction.</p> <p>Due to the close proximity of the pipeline to the designated areas there is a potential that the pipeline route could impact on the hydrology and hydrogeology of these areas. The surface flow directions and elevation differences between the pipeline and the surrounding designated sites suggest that there will be no impact on surface hydrology from the construction and operation of the pipeline. However, it is recommended that good construction practices are adopted when building the pipeline to prevent movement of sediment and contaminants into the adjacent surface watercourse. Although there is no water level data, groundwater flow directions have been assessed by considering the local bedding dips and their orientations and it is clear that groundwater flow is away from the designated areas and towards the pipeline, ultimately in an easterly direction.</p>		

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			Furthermore, the complexity of the layered geology in the area further reduces the potential for the pipeline to exert any effect on the designated areas. Combining these findings, it is concluded that there is no overall effect on the groundwater supply to these designated areas from the construction and operation of the pipeline.		
4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>	<p>Distribution: Northern Atlantic wet heaths with <i>Erica tetralix</i> are restricted to the Atlantic fringe of Europe between Norway and Normandy. A high proportion of the EU resource occurs in the UK.</p> <p>Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath (<i>Erica tetralix</i>), heather (<i>Calluna vulgaris</i>), grasses, sedges and Sphagnum bog-mosses.</p> <p>In the UK, this vegetation corresponds to the following NVC types: H5 <i>Erica vagans</i> – <i>Schoenus nigricans</i> heath M14 <i>Schoenus nigricans</i> – <i>Narthecium ossifragum</i> mire, M15 <i>Scirpus cespitosus</i> – <i>Erica tetralix</i> wet heath, M16 <i>Erica tetralix</i> – Sphagnum compactum wet heath</p> <p>Article 17 status: range; favourable, area; favourable; specific structures and functions; bad, future prospects; bad.</p> <p>Current surface area of this habitat in the UK: 4677.14km² (Article 17 Habitats Directive Report)</p> <p>Main threats and pressures: grazing, deer grazing/ browsing/ trampling, air pollution, air-borne pollutants, fire and fire suppression, forest planting on open ground, renewable abiotic energy use, roads, paths and railroads, problematic native species, biocenotic evolution, succession</p>	As above	As above	As above	No adverse effects on conservation objectives or site integrity
7140 Transition mires and quaking bogs	<p>Distribution: Transition mires and quaking bogs are a widespread but local habitat type in the UK that is ecologically variable and occurs in a wide range of geomorphological contexts.</p> <p>Article 17 status: range: favourable, area: unknown, structure and function: bad and deteriorating, future prospects: bad</p> <p>Main threats and pressures: grazing;</p>	As above	As above	As above	No adverse effects on conservation objectives or site integrity

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Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
	abandonment of pastoral systems; water pollution; air pollution; other pollution or human impacts/activities; drainage; other human induced changes in hydraulic conditions; other natural processes.				

Table 8.2: Assessment of potential effects on the Peak District Moors (South Pennine Moors Phase 1) SPA

DESIGNATED SITE: Peak District Moors (South Pennine Moors Phase 1) SPA REF: UK9007021			PLAN NAME: Severn Trent WRMP19 OPTION NAME & REF: NOT04 New Strategic Transfer capacity from Strategic Grid to Sunnyside		
Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
CONSTRUCTION PHASE					
A098 <i>Falco columbarius</i> ; Merlin (Breeding) 30-36 breeding pairs (1990/1998) 2.3-2.8% GB population	<p>Distribution: In Europe, merlins have a northern distribution, from Iceland through Fennoscandia to Russia. Those breeding in Britain and Ireland are the most southerly in Europe. In the UK, merlin is confined as a breeding species to heather moorland areas, mainly in the uplands of Northern Ireland, Scotland, Wales and northern England, with small numbers in south-west England. The range extends into lowland moorland particularly around the north and west coasts of Scotland and on the Scottish islands. There has been an increase in the last 20–30 years of breeding in conifer plantations, particularly where these border moorland. The highest densities occur in north Yorkshire, the north Pennines and Lake District, and east Scotland (Rebecca & Bainbridge 1998).</p> <p>Article 12 status: Population numbers: Insufficient Range coverage: Insufficient Ecological sufficiency: Insufficient</p> <p>Main threats and pressures: open ground afforestation (coniferous), illegal persecution including egg-collecting, impacts from burning, e.g. of heather moorland or lowland heathland, reduction in availability of food prey items, climate change / change of conditions including habitat, phenology of migration, and population declines, modelled population declines due to climate change</p>	As for South Pennine Moors SAC	<p>Baseline Survey results suggest a decline in breeding pairs from 28 in 2004/05, to 20 in 2010 and 18 in 2014³⁰. Habitat requirements for merlin include medium to tall ground vegetation with clusters of scattered trees for nesting, and shorter grassland swards for feeding. It is not known where the key sites for breeding merlin are and this would need to be discussed with Natural England and relevant land management teams to confirm the conclusions of this assessment, with baseline breeding surveys carried out where necessary. However, it should be noted that mitigation is available to avoid adverse effects.</p> <p>Effect Assessment The proposed pipeline route will be constructed through the B6050 or A619 which extend between the two components of the SPA at Robin Hood. The pipeline may require crossings of a number of brooks that feed the SPA e.g. Blackleah Brook and Heathy Lea Brook. The works therefore have the potential to result in the following effects:</p> <ul style="list-style-type: none">Noise and visual disturbance during construction.Contamination – smothering of vegetation from dust and nitrogen loading resulting in a change to food availability. <p>Noise and visual disturbance During construction, workforce personnel will be carrying out activities directly adjacent to the SPA and within potential offsite functional habitat.</p> <p>Literature review suggests that merlin can be habituated to road noise, but a variety of exclusions zones have been implemented around nesting sites for visual disturbance, including as little as 91m and up to 400m cited in literature³¹. There is no evidence available regarding dispersion distances/flight responses to noise.</p> <p>To ensure no adverse effects, construction should be completed outside the breeding bird period (March-August inclusive).</p> <p>Contamination – dust and NOx loading Dust could be generated during the construction works where concrete breakout is required in the road. HGV and holding traffic by restricting flow to one lane during construction, could increase nitrogen loading on adjacent vegetation. Dust smothering and localised increases in nitrogen loading could change the availability of prey.</p>	<p>Baseline:</p> <ul style="list-style-type: none">Breeding bird survey to confirm whether nest sites occur along pipeline corridor and therefore whether exclusion measures are required.Complete baseline noise surveys and assessment to understand ambient noise environment and whether construction noise will be over and above this. <p>Effect Mitigation:</p> <p><i>Noise and visual disturbance</i></p> <ul style="list-style-type: none">Avoid breeding bird period (March-August inclusive) unless it can be demonstrated that there are no merlin breeding sites within 400m of construction corridor, or there is sufficient evidence to demonstrate that noise and visual disturbance will not occur. <p><i>Contamination – dust and NOx</i></p> <ul style="list-style-type: none">Complete an air quality assessment of potential for N loading on sensitive habitats once details of plant and construction programme have been confirmed (e.g. using method outlined in DMRB Air Quality Appendix F).If air quality assessment identifies an exceedance of the critical load due to stationary traffic being held as pipeline is installed in road, traffic must be diverted or other traffic management measures put in place to ensure critical load, and therefore an adverse effect on the site, is avoided.Dust suppression measures including dampening and dust screens to be applied to reduce dispersion to minimum distance.	No adverse effects on conservation objectives or site integrity

³⁰ <http://www.moorsforthefuture.org.uk/sites/default/files/2%20-%20Richard%20Pollitt.pdf>
³¹ Ruddock M and Whitfield D. P. (2007) A Review of Disturbance Distances in Selected Bird Species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

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Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
			<p>Guidance provided by the Institute of Air Quality Management³² specific to the assessment of dust from construction and demolition identifies that deposition could be an issue up to 50m from the boundary of the site and 50m from haulage routes used by construction vehicles for up to 500m from a large construction site, 200m from a medium construction site and 50m from a small construction site. Evidence from the Dibden Bay Public Inquiry suggests that vegetation soiling from large construction sites, operating for more than a year, could occur up to 100m, and 25m with mitigation³³.</p> <p>Given the small size of the construction activity, it is assumed that vegetation soiling could occur over 50m without mitigation. Therefore, the area that could be affected by dust deposition is estimated to be 1ha within the SPA, and 12.6ha of offsite functional habitat. Given the overall area of the SPA (45,270.52ha) and temporary nature of the works, significant adverse effects to the breeding population are considered unlikely.</p>	<p><i>General</i></p> <ul style="list-style-type: none">A Construction Management Plan will be drawn up to detail all exclusion and protection measures.All of the above mitigation measures will be monitored and enforced by an on-site Environmental Clerk of Works.	
<p>A140 <i>Pluvialis apricaria</i>; European golden plover (Breeding)</p> <p>435-445 breeding pairs (1990/1998) 1.9-2.0% GB population</p>	<p>Distribution:</p> <p>In Europe, breeding occurs through Iceland, Scandinavia, and the Baltic States, northern Russia and in northern/upland parts of Britain and Ireland. In Britain, the species is distributed widely throughout upland areas, with concentrations in northern and western Scotland and the north and south Pennines. Golden Plovers breed on heather moorland, blanket bog, acidic grasslands and montane summits, where they prefer to nest on high, flat or gently sloping plateaux, away from the moorland edge. Adjacent pastures with abundant earthworms and tipulid larvae are important for feeding adults, and chicks may be moved up to 2 km or more to feed in marshy areas rich in invertebrate food (Byrkjedal & Thompson 1998).</p> <p>Article 12 status:</p> <p>Population numbers: Sufficient Range coverage: Insufficient Ecological sufficiency: Insufficient</p> <p>Main threats and pressures:</p> <p>intensification of grass-cutting regimes, more frequent and/or earlier (e.g. change from hay to silage cropping), over-grazing by sheep, abandonment of pastoral systems, lack of grazing, abandonment of pastoral systems,</p>	<p>As for South Pennine Moors SAC</p>	<p>Baseline</p> <p>Survey results suggest a slight increase in breeding pairs from 435 in 1990 to 490 in 2004/2005 (no results available for 2014)³⁴. Habitat requirements for golden plover include a mix of short and taller vegetation for feeding and nesting respectively, with open, short vegetation or bare ground used for roosting. It is not known where the key sites for breeding golden plover are and this would need to be discussed with Natural England and relevant land management teams to confirm the conclusions of this assessment, with baseline breeding surveys carried out where necessary. However, it should be noted that mitigation is available to avoid adverse effects.</p> <p>Effect Assessment</p> <p>The proposed pipeline route will be constructed through the B6050 or A619 which extend between the two components of the SPA at Robin Hood. The pipeline may require crossings of a number of brooks that feed the SPA e.g. Blackleah Brook and Heathy Lea Brook. The works therefore have the potential to result in the following effects:</p> <ul style="list-style-type: none">Noise and visual disturbance during construction.Contamination – smothering of vegetation from dust and nitrogen loading resulting in a change to prey availability. <p>Noise and visual disturbance</p> <p>During construction, workforce personnel will be carrying out activities directly adjacent to the SPA and within potential offsite functional habitat.</p> <p>The Waterbird Mitigation Disturbance Toolkit considers the</p>	<p>Baseline:</p> <ul style="list-style-type: none">Breeding bird survey to confirm whether nest sites occur along pipeline corridor and therefore whether exclusion measures are required.Complete baseline noise surveys and assessment to understand ambient noise environment and whether construction noise will be over and above this. <p>Effect Mitigation:</p> <p><i>Noise and visual disturbance</i></p> <ul style="list-style-type: none">Avoid breeding bird period (March-August inclusive) unless it can be demonstrated that there are no golden plover breeding sites within 200m of construction corridor, or there is sufficient evidence to demonstrate that noise and visual disturbance will not occur. <p><i>Contamination – dust and NOx</i></p> <ul style="list-style-type: none">Complete an air quality assessment of potential for N loading on sensitive habitats once details of plant and construction programme have been confirmed (e.g. using	<p>No adverse effects on conservation objectives or site integrity</p>

³² Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction. IAQM, London

³³ Technical Statement TS/AQ1, Association of British Ports (ABP), 2000.

³⁴ <http://www.moorsforthefuture.org.uk/sites/default/files/2%20-%20Richard%20Pollitt.pdf>

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	lack of grazing, open ground afforestation (coniferous), conflicts with wind energy, general recreational disturbance, impacts from burning, e.g. of heather moorland or lowland heathland, lack of adequate regime for burning of heather moorland, unspecific ecosystem change including habitats, predator-prey dynamics etc.		<p>sensitivity of golden plover to visual and noise disturbance. It has been concluded that in an estuarine environment, they are moderately sensitive to noise and visual stimuli. A 200m exclusion zone has been considered for visual stimuli from workforces, and a noise threshold of 70dB at the receptor³⁵.</p> <p>To ensure no adverse effects, construction should be completed outside the breeding bird period (March-August inclusive).</p> <p><u>Contamination – dust and NOx loading</u> Dust could be generated during the construction works where concrete breakout is required in the road. HGV and holding traffic by restricting flow to one lane during construction, could increase nitrogen loading on adjacent vegetation. Dust smothering and localised increases in nitrogen loading could change the availability of food sources.</p> <p>Guidance provided by the Institute of Air Quality Management³⁶ specific to the assessment of dust from construction and demolition identifies that deposition could be an issue up to 50m from the boundary of the site and 50m from haulage routes used by construction vehicles for up to 500m from a large construction site, 200m from a medium construction site and 50m from a small construction site. Evidence from the Dibden Bay Public Inquiry suggests that vegetation soiling from large construction sites, operating for more than a year, could occur up to 100m, and 25m with mitigation³⁷.</p> <p>Given the small size of the construction activity, it is assumed that vegetation soiling could occur over 50m without mitigation. Therefore, the area that could be affected by dust deposition is estimated to be 1ha within the SPA, and 12.6ha of offsite functional habitat. Given the overall area of the SPA (45,270.52ha) and temporary nature of the works, significant adverse effects to the breeding population are considered unlikely.</p>	<p>method outlined in DMRB Air Quality Appendix F).</p> <ul style="list-style-type: none">If air quality assessment identifies an exceedance of the critical load due to stationary traffic being held as pipeline is installed in road, traffic must be diverted or other traffic management measures put in place to ensure critical load, and therefore an adverse effect on the site, is avoided.Dust suppression measures including dampening and dust screens to be applied to reduce dispersion to a minimal distance. <p><i>General</i></p> <ul style="list-style-type: none">A Construction Management Plan will be drawn up to detail all exclusion and protection measures.All of the above mitigation measures will be monitored and enforced by an on-site Environmental Clerk of Works.	
A222 <i>Asio flammeus</i> ; Short-eared owl (Breeding) 22-25 breeding pairs (1990/1998) 2.2-2.5% GB population	Distribution: Short-eared owls have a scattered breeding distribution in western Europe, occurring in upland, moorland and heathland areas of Britain, the Low Countries, Denmark and Germany. Further north and east, in Scandinavia, the Baltic States, Belarus and Russia, the species occurs much more extensively. In the UK, short-eared owls breed locally in south-east England, and in the uplands from the north Staffordshire moors,	As for South Pennine Moors SAC	Baseline Survey results suggest a slight increase in breeding pairs from 19 in 1990 to 24 in 2004/2005 (no results available for 2014) ³⁸ . Habitat requirements for short-eared owl include short to medium ground vegetation, scrub or trees for nesting, and open ground for feeding. It is not known where the key sites for the species are and this would need to be discussed with Natural England and relevant land management teams to confirm the conclusions of this assessment, with baseline breeding surveys carried out where necessary. However, it should be noted that mitigation is available to avoid adverse effects.	Baseline: <ul style="list-style-type: none">Breeding bird survey to confirm whether nest sites occur along pipeline corridor and therefore whether exclusion measures are required.Complete baseline noise surveys and assessment to understand ambient noise environment and whether construction noise will be over and above this.	No adverse effects on conservation objectives or site integrity

³⁵ N Cutts K Hemingway & J Spencer (March 2013) Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning & Construction Projects. Produced by the Institute of Estuarine & Coastal Studies (IECS) University of Hull, Version 3.2.

³⁶ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction. IAQM, London

³⁷ Technical Statement TS/AQ1, Association of British Ports (ABP), 2000.

³⁸ <http://www.moorsforthefuture.org.uk/sites/default/files/2%20-%20Richard%20Pollitt.pdf>

DESIGNATED SITE: Peak District Moors (South Pennine Moors Phase 1) SPA REF: UK9007021			PLAN NAME: Severn Trent WRMP19 OPTION NAME & REF: NOT04 New Strategic Transfer capacity from Strategic Grid to Sunnyside		
Qualifying Feature	Conservation Status: Status of species/habitat in EU and UK: numbers, distribution, trends, threats etc.	Site Condition (where relevant to feature): Refer to underpinning SSSI condition where relevant. Refer to Site Improvement Plan (SIP) where relevant.	Potential Effects	Mitigation	Effect on conservation objectives and site integrity
	<p>north to the Scottish border. The species is widely, but sparsely distributed (Stroud et al. 1990). In the breeding season they inhabit moorland, heaths, marshes, bogs, sand dunes and young forestry plantations (Stroud et al. 1990; Gibbons et al. 1993). The species is an opportunistic feeder, heavily reliant upon vole and mice populations, upon which its distribution and nesting success tend to revolve.</p> <p>Article 12 status: Population numbers: Sufficient Range coverage: Sufficient Ecological sufficiency: Sufficient</p> <p>Main threats and pressures: illegal persecution including egg-collecting, climate change / change of conditions including habitat, phenology of migration, and population declines</p>		<p><u>Effect Assessment</u> The proposed pipeline route will be constructed through the B6050 or A619 which extend between the two components of the SPA at Robin Hood. The pipeline may require crossings of a number of brooks that feed the SPA e.g. Blackleah Brook and Heathy Lea Brook. The works therefore have the potential to result in the following effects:</p> <ul style="list-style-type: none">Noise and visual disturbance during construction (temporary).Contamination – smothering of vegetation from dust and nitrogen loading resulting in a change to prey availability. <p><u>Noise and visual disturbance</u> During construction, workforce personnel will be carrying out activities directly adjacent to the SPA and within potential offsite functional habitat.</p> <p>There is limited literature available regarding the responses of short-eared owl to noise and visual stimuli. An exclusion zone of between 300 and 600m has been cited in one study gathering expert opinion on flight responses from human presence³⁹. There is no evidence available regarding dispersion distances/flight responses to noise.</p> <p>To ensure no adverse effects, construction should be completed outside the breeding bird period (March-August inclusive).</p> <p><u>Contamination – dust and NOx</u> As detailed for merlin.</p>	<p>Effect Mitigation:</p> <p><i>Noise and visual disturbance</i></p> <ul style="list-style-type: none">Avoid breeding bird period (March-August inclusive) unless it can be demonstrated that there are no short-eared owl breeding sites within 300-600m of construction corridor, or there is sufficient evidence to demonstrate that noise and visual disturbance will not occur. <p><i>Contamination – dust and NOx</i></p> <ul style="list-style-type: none">Complete an air quality assessment of potential for N loading on sensitive habitats once details of plant and construction programme have been confirmed (e.g. using method outlined in DMRB Air Quality Appendix F).If air quality assessment identifies an exceedance of the critical load due to stationary traffic being held as pipeline is installed in road, traffic must be diverted or other traffic management measures put in place to ensure critical load, and therefore an adverse effect on the site, is avoided.Dust suppression measures including dampening and dust screens to be applied to reduce dispersion to a minimal distance. <p><i>General</i></p> <ul style="list-style-type: none">A Construction Management Plan will be drawn up to detail all exclusion and protection measures.All of the above mitigation measures will be monitored and enforced by an on-site Environmental Clerk of Works.	

³⁹ Ruddock M and Whitfield D. P. (2007) A Review of Disturbance Distances in Selected Bird Species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

9 HRA Conclusions

The HRA has concluded that Severn Trent's' Final WRMP19 will have no adverse effects on the site integrity of any European sites, either alone or in-combination with any other plans, programmes or projects.

As the solutions in the Final WRMP19 are brought forward for development in the future, project-specific HRA will be carried out in support of the necessary applications for planning permission and/or environmental permits. The project-specific HRA will need to consider the prevailing conditions and European site conservation objectives and Site Improvement Plans in place at the time, as well as the final detailed design of the solution.



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