Llywodraeth Cymru / Welsh Government

A487 New Dyfi Bridge

Statement to Inform an Appropriate Assessment under the Conservation of Habitats and Species Regulations 2010

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1 Executive Summary

This report has been prepared to provide information to the Welsh Ministers ("the Competent Authority") in the form of a draft Statement to Inform an Appropriate Assessment (SIAA) of the implications of the proposed A487 New Dyfi Bridge (the Scheme) on European Sites as required by Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended) (the 'Habitats Regulations').

The potential for effects on the Dyfi Estuary Special Protection Area, the Pen Llyn a'r Sarnau Special Area of Conservation and the Merionydd Oakwoods and Bat Sites Special Area of Conservation have been considered within the Screening Stage of the Assessment of the Implications on European Sites process.

The Screening Stage concluded that although there is the potential for effects on lesser horseshoe bats, these are not considered to be significant. It is therefore not necessary for an Appropriate Assessment to be carried out for the Scheme.

(c) Therefore, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010, it is considered that there is a likelihood of no significant effects on the features European sites considered within this SIAA either alone or in-combination with other plans and projects.

2 Introduction

2.1 Purpose

2.1.1 This report has been prepared to provide information to the Welsh Ministers ("the Competent Authority") on the implications of the proposed A487 New Dyfi Bridge Scheme (the Scheme) on European Sites, as required by Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended). This report covers Stage 1 (Test of Likely Significant Effect) of the Assessment of the Implications on European Sites (AIES) process as set out in HD44/09 (HA, 2009).

2.2 Requirements of the Habitats Regulations

2.2.1 The Habitats Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna provides legal protection for habitats and species of European importance. The Directive is transposed into UK law by the Conservation of Habitats and Species Regulations 2010 (hereafter referred to as the 'Habitats Regulations'). Before deciding to undertake or give authorisation for a plan or project the Welsh Government as a determining body and competent authority, must consider under the requirements of Regulation 61 whether the plan or project:

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

b) is not directly connected with or necessary to the management of that site, and in such cases they must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.

2.2.2 Where there is a Likely Significant Effect (LSE), (or such an effect cannot be discounted) and the plan or project is not connected with or necessary to the management of the site then the competent authority must make an 'appropriate assessment' of the implications for that site in view of its conservation objectives.

2.2.3 In the light of the conclusions of the assessment, the competent authority may agree to the plan or project only after having ascertained that the project will not, alone or in-combination with other plans and projects, adversely affect the integrity of the European site. The only exceptions are where there are no alternatives and there are imperative reasons of overriding public interest, in which case compensatory measures must be adopted if the Scheme is to proceed.

2.3 Aims for this document

2.3.1 Therefore, the aims of this document are to provide information on the:

- Identification of which European Sites are in the potential range of influence of the Scheme;
- Identification of the potential of the Scheme to give rise to effects on European Sites;
- Identification of the relevant qualifying interests/interest features of each European Site being considered;
- Identification of the relevant Conservation Objectives of these features and European Sites;
- Identification and characterisation of the potential impacts of the Scheme before mitigation;
- Identification of others plans or projects which may cause effects on the European sites;
- Characterisation of the significance of the potential in-combination effects with other plans and projects; and
- Consideration of effects in relation to Conservation Objectives.

2.4 Location of the proposed project

2.4.1 The Scheme is located on the A487 Fishguard to Bangor Trunk Road which is the principal strategic south to north route along the west coast of Wales. The Scheme is located immediately north of Machynlleth on the boundary between Powys County and Gwynedd County where the A487 crosses the Afon Dyfi (as shown on Figure 1). The Scheme would tie into the existing A487, crossing the Afon Dyfi upstream of the existing road bridge - Pont-ar-Ddyfi and adjacent to the Millennium Cycle Bridge (foot and cycle-bridge 600 m east of Pont-ar-Ddyfi).

2.4.2 Pont-ar-Ddyfi is the first upstream crossing of the Afon Dyfi, approximately 8km west of the next road crossing at Jubilee Bridge, Grofft. The Scheme passes through the predominantly rural landscape of the Dyfi Valley and lies partly within the Snowdonia National Park, the boundary of which extends south of the river encompassing part of the valley floor. The Scheme also lies within the UNESCO Dyfi Biosphere Reserve, an area of terrestrial and coastal/marine ecosystems which is internationally recognized within the framework of UNESCO's Man and the Biosphere Programme.

2.5 Background

2.5.1 A timber bridge crossing the Afon Dyfi was first erected at this location in 1533 which was replaced by a masonry structure around

1681. The present five span masonry bridge was constructed in 1805 and is reputed to have been built on dry land and the river then diverted beneath the finished bridge.

2.5.2 In the last thirty years increased traffic and deterioration of the masonry structure has necessitated structural strengthening works and repairs to keep the bridge operational. In 1948 the bridge was locally 'widened' on the northern side to mitigate vehicle damage due to its narrow width and poor geometry.

2.5.3 There have been several studies into the area to look at operation, suitability, online and off-line improvements and traffic management. A Feasibility Study and a Technical Assessment Report were commissioned in 1996 from RUST Consultants, acting for Mid Wales Trunk Road Agency (MWTRA). In November 2000, Powys County Council acting in their capacity as MWRTA, were directed to review the earlier work and produce a Stage II Technical Appraisal Report and an accompanying Environmental Assessment.

2.5.4 In March 2003 MWTRA prepared the Stage II "A487 Fishguard to Bangor Trunk Road Pont ar Ddyfi Improvement - Technical Appraisal Report." This was supported by an Environmental Statement and concluded that for the trunk road to remain accessible to traffic at all times the recommended option was to construct an offline multi-span viaduct across the floodplain.

2.5.5 Further details of the history of the Scheme development are set out in Chapter 3 (Alternatives Considered) of the Environmental Statement for the Scheme.

2.6 Experience of the Authors of this Report

2.6.1 This report has been authored by Pete Wells. In addition the report has been reviewed and approved by Dr Paul Clack for issue by Arup.

2.6.2 Pete Wells BSc (Hons), MSc, CEnv, MCIEEM is a professional Ecologist with over 15 years of experience in project management, ecological surveys, assessment and the design of mitigation strategies. He is a specialist in ecology and mammal behaviour with experience in both environmental consultancies and statutory bodies and has specialised in undertaking Habitats Regulations Assessments. He was the lead author of the Strategic Habitats Regulations Assessment for the M4 Corridor Around Newport Plan in 2014.

2.6.3 Dr Paul Clack PhD, BSc, CEnv, MCIEEM is an experienced ecologist/ornithologist and project manager with 15 years' post-doctoral experience in ecological consultancy. Paul has completed many ecology inputs for development projects, including baseline

surveys, impacts assessments and mitigation/enhancement schemes. He has been lead author for avian and non-avian chapters within Environmental Statements for projects across the UK and Europe. He also has considerable experience in working on plans and projects that may affect Natura 2000 sites and has produced Habitats Regulations Assessments for a variety of schemes. Paul was also involved in reviewing the Strategic Habitats Regulations Assessment for the M4 Corridor Around Newport Plan in 2014.

2.7 Abbreviations

2.7.1 The following abbreviations are used in this report.

Abbreviation	Expanded terms
AIES	Assessment of Implications on European Sites
CIRIA	Construction Industry Research and Information Association
cSAC	Candidate Special Area of Conservation
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
GIS	Geographical Information System
LDP	Local Development Plan
NMUs	Non-Motorised Users
MWTRA	Mid Wales Trunk Roads Agency
NMWTRA	North and Mid Wales Trunk Roads Agency
NRW	Natural Resources Wales
PCC	Powys County Council
PEU	Plainly Established and Uncontroversial
PPG	Pollution Prevention Guidelines
pSPA	Proposed Special Protection Area
RTP	Regional Transport Plan
SAC	Special Area of Conservation
SIAA	Statement to Inform an Appropriate Assessment
SNP	Snowdonia National Park
SNPA	Snowdonia National Park Authority
SPA	Special Protection Area
TLSE	Test of Likely Significant Effect
TPOs	Transport Planning Objectives
UDP	Unitary Development Plan
WelTAG	Welsh Transport Appraisal Guidance

3 The Scheme

3.1 Why the Scheme is needed

3.1.1 The A487 Fishguard to Bangor Trunk Road is the principal south to north coastal route in Wales. The highway links communities along the west coast and is also a popular tourist route carrying traffic through Pembrokeshire, Ceredigion, Powys and Gwynedd. More locally, the A487 provides links to services, retail, hospitals, education and work opportunities.

3.1.2 The existing A487 trunk road leading northwards from Machynlleth has been subject to increased traffic and repeated flooding. Pont-ar-Ddyfi is a pinch point on the network due to its narrow nature and the safety issues associated with the junction at the northern end. It has sub-standard visibility, is without footways and has poor turning geometry on the right-bank (Gwynedd) side. Existing (2015) Annual Average Daily Traffic (AADT) flows on the bridge are 2,384 in the northbound direction and 2,298 southbound. Heavy vehicle flows account for around 5% of daily traffic in both directions. The structure was not designed to carry the current volume and type of traffic.

3.1.3 The Afon Dyfi is subject to frequent flooding which inundates the A487 trunk road between Pont-ar-Ddyfi and the railway line just north of Machynlleth. As a result the A487 trunk road, between Pont-ar-Ddyfi and the railway line just north of Machynlleth are closed frequently, severing the local communities either side of the river. The profile of the existing road is shown on Figure 2.

3.1.4 Further closures result from accidents on Pont-ar-Ddyfi and associated bridge repairs. During bridge closures, trunk road traffic is required to take a diversion of up to 30 miles. A 10 mile diversion is available along the B4404 however this is not a feasible route option as a minor country road is unsuitable for the traffic flow of Heavy Goods Vehicles.

3.1.5 Local drainage improvements have been carried out over the last fifty years but the fundamental problem of flooding between Machynlleth and Pont-ar-Ddyfi has remained.

3.2 Alternatives Considered

3.2.1 There have been a number of studies looking in to the issue of flooding of the A487 between Machynlleth and Pont-ar-Ddyfi. These have included:

- Feasibility Study and Technical Assessment Report, Powys County Council (1996);

- A487 Fishguard to Bangor Trunk Road; Pont ar Ddyfi Improvement - Technical Appraisal Report (March 2003);
- WelTAG Planning Stage Appraisal (August 2011), which recommended the follow four options to be considered further:
  - New crossing 200-500m upstream
  - New crossing 200-500m downstream
  - Widening & strengthening + flood mitigation + raise A487
  - Widening & strengthening + flood mitigation

Current Studies

3.2.2 A WelTAG Stage 1 Appraisal (2016) has been undertaken, which considered:

- Option 1 New crossing 200m upstream
- Option 2 New crossing 500m upstream
- Option 3 New crossing 200-500m downstream
- Option 4 Widening and strengthening, flood mitigation and raising of A487
- Option 5 Widening and strengthening plus flood mitigation

3.2.3 Option 2 scored the highest in the appraisal against the Welsh Impact Areas, particularly in relation to the impact on the Environment. This option is furthest from the European sites within the Dyfi Estuary.

3.2.4 Following the completion of the WelTAG Stage 1 appraisal, option 2 was taken forward to be assessed at the scheme level (WelTAG Stage 2). This appraisal confirmed the current scheme as the preferred option and supports the findings of the previous DMRB Stage 2 Assessment undertaken by Powys County Council.

Design Alternatives Considered Prior to Publication of Draft Orders

3.2.5 A conceptual design was issued on award of the Early Contractor Involvement contract for the Scheme in June 2015. The main components of the conceptual design included the following:

- The proposed scheme consists of a new viaduct structure to cross the Afon Dyfi approximately 480m upstream of the existing bridge. At the northern end of the scheme the alignment ties into the existing A487 in the area of the completed Ffridd Gate Improvement and the existing A487 would be renumbered as the A493, joining the new A487 alignment via a ghost island ‘tee’ junction. The scheme crosses the Afon Dyfi and floodplain on a structure, connecting via a short embankment to the existing A487 north

of the Cambrian Line Railway Bridge over the A487 on the edge of Machynlleth. The length of the proposed scheme is approximately 1100m with approximately 570m being on viaduct.

- It is intended to de-trunk the existing A487 between the tie in points with the new scheme. Preliminary design indicates the viaduct spans being typically 1No. x 60m over the Afon Dyfi with 2No. x 35m,14No. x 30m and 1No. x 20m spans crossing the floodplain. The viaduct structure is assumed to be carried by single circular columns on piled foundations with the deck structure being continuous steel/concrete construction.
- It is not within the scope of this scheme to solve the separate flooding mechanism below the Cambrian Line Railway Bridge which also interrupts the use of the A487. This will be addressed separately.

3.2.6 There have been a number of changes to the conceptual design prior to submission of the draft Statutory Orders are described below:

- The conceptual design was approximately 1100m long with approximately 570m being on viaduct. The design was reviewed following flood modelling which indicated increases in flooding as a result of the Scheme. The adopted design is approximately 1200m with approximately 720m being on structures.
- The conceptual design had a short embankment to tie into the existing A487, immediately north of the Dyfi Eco Park. The embankment encroached into the floodplain and restricted the conveyance of flow across it. The adopted design removed this by commencing the Scheme immediately north of the existing Cambrian Line Railway Bridge, moving the embankment south away from the flood plain.
- Extended Viaduct - The conceptual design incorporated a river bridge with a span of 60m over the Afon Dyfi with 17 viaduct spans crossing the floodplain. The design was reviewed taking into account the desire to reduce the flooding caused by the Scheme. The adopted design includes a river bridge of 74m over the Afon Dyfi, with a 50m back span adjacent to the main river bridge. The viaduct across the flood plain to the south of the river bridge consists of 18 spans.
- Northern Tie In – in the conceptual design the existing A487 would be realigned slightly to approach the new A487 at near perpendicular. The design was reviewed following consultation with adjacent landowners. The adopted design reconfigures the Ffridd Farm access and includes a cattle underpass in front of the northern abutment to enable the farmer to get their animals from the farm, across the A493 south, under the River Bridge to the fields on the other side

of the realigned A487. This underpass can also be used by animals such as bats, badger and otter.

- Flood protection bunds –The conceptual design included a flood bund along the northern boundary of the Dyfi Eco Park. One of the changes to the conceptual design now incorporates a flood bund along the western verge of the A487 opposite the entrance to the Dyfi Eco Park.
- Lighting - The conceptual design did not incorporate any road lighting as there was no specific requirement for highway lighting. As the southern limit of the Scheme has moved south towards Machynllyth to accommodate the extended viaduct, there is a need to light the southern end of the scheme within the 30mph speed limit to replicate the existing provision.
- Horizontal and Vertical Alignment - The horizontal alignment of the scheme has been adjusted at the southern end of the scheme adjacent to the Dyfi Eco Park to allow the construction of the approach embankment off line of the existing A487 in the field opposite the Dyfi Eco Park entrance.
- Flood Mitigation - The design was reviewed following flood modelling which indicated increases in flooding as a result of the Scheme. The adopted Scheme now incorporates flood mitigation measures (consisting of flood protection wall, improved highway drainage and pumps) to reduce flood risk to the existing Pen-y-Bont residential cottages located adjacent to A493, north-west of Pont-ar-Ddyfi.
- Traffic Calming – The conceptual design did not include for any traffic calming works to A493 after removal of existing A487/ A493 junction north of Pont-ar-Ddyfi. The adopted scheme now incorporates a section of Traffic Calming in order to control traffic and mitigate any increase in traffic speeds, as well as providing improved access for residents and safer Non-Motorised User (NMU) crossing point.
- Railway Bridge Flooding –It was not within the original scope of the Scheme to solve the separate flooding issue which occurs below the Cambrian Line Railway Bridge. It was agreed following comments received at the Public Information Exhibition that the issue needs to be addressed as part of the Scheme. The adopted design now incorporates a new pumped drainage system to be installed adjacent to the existing Cambrian Line Railway Bridge to prevent flooding below the bridge. The pumped drainage system would discharge to the west of the flood bund via the normal highway drainage outfalls.

3.3 Aims of the Scheme

3.3.1 Eight Transport Planning Objectives (TPOs) were identified to be addressed by the Scheme and reported in the WelTAG Planning Stage Report as shown in Table 1.

Table 1 A487 New Dyfi Bridge Transport Planning Objectives

Reference	Transport Planning Objective
TP01	To improve reliability of crossing the Afon Dyfi for people, freight and emergency vehicles on the A487 strategic corridor.
TP02	To improve efficient and reliable accessibility to key services including employment opportunities, healthcare and education.
TP03	To maintain the role of Machynlleth as a vibrant and sustainable local centre.
TP04	To preserve the long-term integrity of Pont-ar-Ddyfi
TP05	To reduce the number and severity of collisions and casualties on the A487 in the study area.
TP06	To ensure that flood risk to third parties is not increased.
TP07	To minimise the impact of transport improvements on the landscape, biodiversity, water resources and heritage.
TP08	To increase the opportunity for efficient, safe and reliable travel by walking and cycling on the A487 corridor within the study area.

3.4 Description of the Scheme

3.4.1 The scheme lies partly within Snowdonia National Park (SNP) and partly within its landscape setting. The receiving environment is highly sensitive. The Dyfi Estuary Special Protection Area, Dyfi Estuary and Cors Fochno Ramsar Site and the Pen Llŷn a'r Sarnau Special Area of Conservation are located approximately 4.6km to the south west. The Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites Special Area of Conservation is approximately 13.3km to the north of the Scheme.

3.4.2 The Scheme consists of a new section of single carriageway road. The typical carriageway width would be 9.3 m (excluding verges), which would consist of two 3.65 m wide lanes, with a 1 m hard strip on either side of the carriageway. In addition, the typical cross section would include 2.5 m grass verges along both sides of the proposed bypass, increasing in width to accommodate forward visibility requirements as required. The General Arrangement and Long Sections are shown on Figures 1 and 2 in Appendix A.

3.4.3 The typical carriageway width would be the same on the proposed structures across the floodplain and river, although with a reduced verge width on the eastern side of the carriageway from 2.5 m to 0.6 m on the viaduct and bridge. The viaduct would accommodate a shared footway/cycleway and associated 1.4m high parapet.

3.4.4 For most of its route, the Scheme would be elevated across a generally flat floodplain and at its highest point (on the river bridge over the Afon Dyfi) it would be some 9m above ground level.

3.4.5 The Scheme would not have road lighting, except at the southern end of the scheme within the 30mph speed limit, reflecting the existing situation. The requirement for the provision of highway lighting on the remainder of the Scheme has been assessed and concluded that there is no specific requirement for highway lighting.

3.4.6 The highway drainage would be predominately provided by a kerb and gully highway drainage system, with combined kerb drainage units provided on the viaduct. The proposed drainage catchments are shown on Figure 3 in Appendix A. The highway drainage systems would discharge at the following three locations described as follows:

- ***Northern Junction and Tie-In*** – This catchment will predominantly use the existing drainage catchment on the existing A487 at the northern tie in with the Scheme. The existing drainage comprises a gulley and piped drainage

network, and outfalls direct to the Afon Dyfi immediately downstream of the Millennium Cycle Bridge (approximately 7.4km upstream of the Pen Llŷn a'r Sarnau SAC boundary, 8km upstream of the SPA boundary and 8.9km upstream of the Ramsar site boundary). There is currently no existing treatment/ attenuation or isolation device for this outfall. It is proposed to install a petrol interceptor and isolation device (pen stock gate valve or similar) upstream of the outfall. This will help remove contaminants and provides a means by which spillages can be isolated.

- ***Southern Tie-In*** – the existing highway at the railway bridge at the southern limit of the Scheme will be adapted to take drainage from the southern embankment and entrance to the Dyfi Eco Park. This will be discharged via an existing culvert under the railway embankment. It is assumed that the culvert connects to a network of ditches to the south of the railway. These also receive surface water and storm overflows from Machynlleth. The Machynlleth Sewage Treatment Works are also assumed to discharge in to the network of ditches. This watercourse flows in a south-westerly direction for approximately 2.3km before joining the Afon Dyfi 3.6km upstream of the Pen Llŷn a'r Sarnau SAC boundary.
- ***Viaduct and Existing A487*** – The viaduct catchment will capture water from the road surface via a kerb drainage system to the southern abutment. The drainage system will then discharge in to the existing ditch to the east of the existing A487. This ditch will be re-profiled to flow from south to north (rather than north to south) to an existing culvert under the existing A48. A new ditch will be dug from the culvert to the Afon Dyfi on the western side of the existing A487. A petrol interceptor and isolation device (pen stock gate valve or similar) will be included within the pipe network prior to being discharged to the ditch. This will provide treatment and a means of short term isolation even during a flooding event. Further treatment may be provided by ditch vegetation, and further means of isolation by an isolation device (stop logs or similar) located upstream of the culvert under the existing A487. The ditch from the outfall to the Afon Dyfi is approximately 420m long and the discharge into the Afon Dyfi is approximately 7km upstream of the Pen Llŷn a'r Sarnau SAC boundary.

3.4.7 The existing A487 north of Afon Dyfi, between Pont-ar-Ddyfi and the new A487, would be de-trunked and renumbered as the A493 and will join the new A487 alignment via a ghost island T-junction (i.e. a painted traffic island to indicate that vehicles should not enter).

3.4.8 A section of traffic calming would be introduced, by constructing build-outs on the A493 immediately north of Pont-ar-Ddyfi near Pen-y-Bont Cottages. Give Way lines would create a priority single lane requiring westbound traffic to give priority to opposing eastbound traffic. The build outs would provide a raised footway along the front of existing Pen-y-Bont Cottages, with a safe Non-Motorised User crossing point.

3.4.9 The existing A487 south of Pont-ar-Ddyfi would be de-trunked and a no-through route formed by installing a line of bollards on both the north and south side of Pont-ar-Ddyfi. Access to the section of de-trunked A487 south of the river would be provided from the new southern T-junction located opposite to the Dyfi Eco Park.

3.4.10 The Scheme would introduce restrictions to the use of Pont-ar-Ddyfi, by means of a Traffic Regulation Order, restricting use to Non-Motorised Users (NMUs) and emergency access for authorised vehicles (subject to weight restriction) during times of flood only. Fixed and de-mountable bollards would be used to control vehicular access onto Pont ar Ddyfi. These would be carefully selected in agreement between the landscape architect and the heritage consultant in consultation with Cadw to ensure their design (scale, colour and materials) complements the fabric and historic setting of Pont ar Ddyfi and nearby dwellings.

3.4.11 In addition to the new section of highway, a flood bund will be created along the northern boundary of the Dyfi Eco Park and from the prosed highway embankment to the railway line on the western side of the Scheme opposite the entrance to the Dyfi Eco Park. There will also be small scale drainage works to alleviate flooding at the residential properties to the north of the existing Pont-ar-Ddyfi. Landtake, Resources, Emissions and Waste Products.

3.4.12 The footprint of the scheme is approximatey 102,000m² (10.2ha) within the Compulsory Purchase Order boundary. However where possible the footprint of construction activities will be kept as small as possible and field boundaries will be retained on the boundaries of areas used as lay-down areas.

3.4.13 The types and provisional estimated quantities of materials required for the construction and phase of the Scheme are listed in Table 1 below.

Table 1: Summary of the material resources associated with the construction phase of the proposed Scheme

Project Activity	**Material resources generated/required for the project**	**Quantities of material resources generated/required**	**Additional information on material resources**
Earthworks	Excavated material	North of the river: 16,650 m^3 South of the river: 300 m^3	Total cut material = 16,950 m^3
	Placed material	North of the river: 2,250 m^3 South of the river (including flood bunds): 18,100 m^3	Total fill material = 20,350 m^3
	Any excess material required	Approx. 3,400 m^3	Sourced from local supplier where possible
	Any material replacing the invasive plant species and associated removed material	Exact quantities unknown	Sourced from local supplier where possible.
Site construction	Concrete	6,465 m^3	Sourced from local supplier where possible.
	Steel reinforcement	1,220 tonnes	Sourced from local supplier where possible.
	Metal parapet (1.4m high)	1.5km length	Sourced from local supplier where possible.
	Verge fill	675 m^3	Sourced from local supplier where possible.
	Waterproofing spray	To cover an area of 9000 m^2	Sourced from local supplier where possible.
	Silane impregnant	To cover an area of 1,800 m^2	Sourced from local supplier where possible.
	Carriageway surfacing	To cover an area of 1,800 m^3	Sourced from local supplier where possible.
	(Painted) Structural steel	1,750 tonnes	Sourced from local supplier where possible.

Project Activity	Material resources generated/required for the project	Quantities of material resources generated/required	Additional information on material resources
	Paint	TBC	Sourced from local supplier where possible.
	Bearings	50	Sourced from local supplier where possible.
	Expansion joints	35 m length	Sourced from local supplier where possible.
	Drideck (or similar)	To cover a length of 1.5 km	Sourced from local supplier where possible.
	Envirodeck (or similar)	To cover a length of 1.5 km	Sourced from local supplier where possible.
	Gravel / crushed stone	5,000 m^3	For the temporary laydown areas, haul road and piling mats.

3.4.14 During construction, it is proposed that all materials arising from construction would be re-used on site in accordance with the waste hierarchy defined within the Waste Framework Directive.

3.4.15 The types and provisional estimated quantities of waste arisings associated with the construction operational phase of the Scheme are listed in Table 2.

Table 2: Summary of the waste arisings associated with the construction phase of the Scheme

Project Activity	Waste arisings from the project	Quantities of waste arisings	Conversion in tonnes* (where applicable)	Additional information on waste arisings
Earthworks	Invasive non-native species (INNS) including Japanese knotweed and Indian balsam.	Exact quantities not known. Locations are indicated in Volume 2 Figures 9.4, 9.5, 9.6 and 9.7	n/a	Indian balsam is along field boundaries and ditches. Japanese knotweed is widespread throughout the Study Area; along the Afon Dyfi banks, within woodland areas to the north of the river and within hedgerows and treelines in the western area, at the boundary of the Dyfi Eco Park and in the north-eastern areas
	Soil	Exact quantities not known.	n/a	Surplus topsoil will be generated throughout construction, including the cut and fill, and the strip for the laydown areas, haul road and piling mats.
Demolition	Metals	0.5 tonnes	n/a	Iron and steel (lighting columns).
	Mixed construction and demolition wastes	53.5 tonnes	n/a	Fencing, road signage, gates, walls
Site construction	Surplus concrete	40m³	50.8 tonnes	Surplus of pours. Disposed of off-site.
	Packaging domestic waste (general waste from compound area and welfare set-up)	180 tonnes	n/a	Total over construction period (2 skips per month)
	Liquid waste from septic tank	TBC	n/a	Tanker to be emptied.

Project Activity	Waste arisings from the project	Quantities of waste arisings	Conversion in tonnes* (where applicable)	Additional information on waste arisings
	Crushed stone (material imported for temporary launch platform)	3200 to 6400m^3	4000 to 8000 tonnes	
**Conversion factors for each material sourced from Appendix 9 of Wales Construction and Demolition Waste Generation Survey 2012 to allow for calculation of total waste in tonnage.*				

3.5 Construction Methodology

3.5.1 This section details the main construction activities that are expected to take place during enabling works and construction of the proposed single carriageway, junctions, bridge and viaduct, and proposed flood bunds (collectively the Scheme).

3.5.2 For the purpose of this Statement assumptions have been made on construction activities based upon the team's experience and input from the Contractor. It is not anticipated that these will change during the detailed design phase.

Programme

3.5.3 The start date for the construction phase would depend upon a number of factors including the successful completion of the Statutory Processes into making the Orders to construct the Scheme, the availability of Welsh Government funding and the formal signing of the contract to construct the works. It is currently anticipated that the construction activities for the Scheme would commence in 2017, subject to any potential Public Inquiry, and this has informed this Statement.

3.5.4 For the purpose of this Statement the Proposed Scheme Opening and Design Years have been taken as 2019 and 2034 respectively.

3.5.5 The construction programme would be finalised by the main contractor in advance of the works. The duration of the works is currently estimated to require a construction period of 25 months, including advance works/vegetation clearance/utility diversions, archaeological testing and de-trunking of the existing road. However, depending on the final earthworks strategy this could increase or reduce slightly. Following construction there will be a 36 month environmental aftercare period for monitoring and maintenance.

Sequence of Construction Activities

3.5.6 The construction activities for the Scheme would be typical of a major road scheme and consist of the following:

- Advance/preparatory works likely to be undertaken prior to construction;
- Site establishment and vegetation clearance;
- Main construction works involved in the scheme drainage, earthworks, and creation of a flood bund at the sourthern end of the Scheme;
- Main viaduct and bridge structure construction;

- Road works and other associated structures;
- Localised flood protection measures at properties north of the existing Pont-ar-Dyfi; and
- Final tie-ins and soft landscape works.

3.5.7 Works will be undertaken throughout the construction area as there is a need to reuse material from the north of the Scheme in the embankment and bunds in the south of the Scheme

3.5.8 Pre-works would be undertaken at the start of the consrtuction stage. The initial phase of earthworks would be the excavation associated with the flood alleviation measures and the northern junction, allowing a realignment of the A487, and generating material for the southern approach embankment and the flood bunds, refer to Figure 1 Scheme General Arrangement.

3.5.9 The southern approach embankment would then be constructed, and the temporary platform/embankment to allow the erection and push launch of the main viaduct.

3.5.10 The floodplain viaduct and main river bridge would then be constructed from both the north and south of the river.

Key Construction Activities

3.5.11 ***Advance/Preparatory Works*** - There are a number of major services that are impacted by the Scheme, including electricity, telecoms, gas pipeline and water supplies. During the early phases of the construction works, and potentially before any major construction works the diversion/protection of the various utilities would be undertaken where possible. Other diversions works may follow aligned with construction phasing. Pre-construction ecological checks would be undertaken prior to site clearance.

3.5.12 ***Archaeological Investigations*** - Advanced archaeological surveys and watching briefs would be undertaken in the early stages of the project, through a supervised topsoil strip and/or trial trenching.

3.5.13 ***Site Clearance*** - The initial activities following site establishment would be fencing (including ecological fencing as required), site clearance, the installation of pre-earthworks drainage and topsoil strip under archaeological supervision where identified as required.

3.5.14 ***Earthworks*** - Following the topsoil strip the major earthworks can begin. Where possible earthworks material would be derived from on-site (i.e. re-use of onsite cut for fill sections), although some higher quality material may be imported to form

the base for the carriageway (capping/sub-base) and backfill to the proposed structures.

3.5.15 ***Drainage*** - Pollution prevention measures would be implemented to ensure that land and rivers are not contaminated. A Surface Water Management Plan would be developed and temporary settlement ponds and cut-off ditches would be designed into the works and installed before the bulk earthworks and piling were undertaken. Where possible the permanent drainage attenuation ponds would be installed early and used in the construction phase.

3.5.16 ***Floodplain Viaduct*** - The structural works for the viaduct would commence with the installation of a temporary piling platform/haul road to allow the installation of the piles, followed by the pier construction. The piling and pier construction would be undertaken south to north. Once the initial piles and piers are complete the focus of the bridge works would be on the erection of the viaduct deck from the southern abutment. The southern spans on the right hand bend would the lifted in from ground level. Thereafter the pre-cast bridge deck units will be assembled and 'pushed' (using a method known as push launch) from the completed sections to extend the viaduct northwards towards the Afon Dyfi. of the viaduct will The push launch method has the following advantages:

- Minimise disturbance to the surroundings including the sensitive areas such as the Afon Dyfi and areas of mature woodland;
- Reduce the risk of potential environmental incident – silt pollution/fuel spills etc by minimising works within the floodplain.

3.5.17 ***Main River Bridge*** - The main river bridge works would be undertaken in parallel with the viaduct works, starting with the installation of the piles associated with the northern abutment. The piers at the southern end of the main span and back spans would be constructed in parallel with the viaduct piles/piers. Once complete the main span beams would be lifted into place from the north of the river, with back span beams lifted in from a temporary platform on the south of the river. The lifting of the bridge beams would be followed by completion of the bridge deck and installation of the parapets.

3.5.18 ***Highways and Surfacing Works*** - On completion of the viaduct and bridge the final highways works, surfacing, barrier, etc. would be installed and the road opened. At which point other works associated with the de-trunking would be completed.

Site Compounds, Working Hours and Construction Equipment

3.5.19 The location of the main construction compound will determined during the detailed design stage, however it will not be within the floodplain. Lay down areas and crane pads will be required within the floodplain, and a satellite compound and lay down area will be located at the northern end of the Scheme. These areas are shown on Figure 1. The main site compound would be lit at night for security purposes; the satellite compounds may require lighting for security purposes depending on their location and size. Where lighting is required this would be restricted to light the compound area only without light spill to adjacent areas of vegetation.

3.5.20 Stockpile areas for topsoil would be located in the immediate vicinity of the earthworks but outside of the floodplain.

3.5.21 The working day would vary between the seasons. However, it would typically be Monday – Friday 7am to 7pm in the summer months and 7am to 5pm in the winter. Weekend or night work would be required in some instances, typically for works on or adjacent to existing highways. These instances would be kept to a minimum and require agreement with Welsh Government beforehand. Working hours will be restricted in the vicinity of the Afon Dyfi.

3.5.22 In terms of construction plant and equipment, the site clearance phase of the works is likely to involve use of chainsaws and excavators. The bulk earthworks would be constructed using articulated dump trucks, excavators up to 35T capacity, dozers and rollers. The new structures would be constructed using cranes, telescopic boom lifts, piling rigs and telescopic forklifts. Task lighting at structure locations during the winter months only, and other locations where required, would also be provided.

Traffic Management and Construction Routes

3.5.23 The existing A487 road carries significant volumes of vehicles throughout the day and night, however because the majority of the Scheme is being constructed offline, conflict with this traffic would be limited. When work is required online, a series of traffic management measures would be implemented including:

- Early construction of realigned A487 at southern and northern ends to move traffic away from construction works and facilitate construction of bridge,
- Single way working of traffic in each direction maintained at all times, and

- Speed restriction in work areas for the safety of road users and the construction workforce. These restrictions would only be introduced when the works commence and would remain until a specific section was complete.

3.5.24 The existing A487 would serve as the main access to the construction site for construction and workforce movements. All haul routes would be internal and access points to the site would be via the existing A487. It is envisaged that the Scheme could generate up to approximately 10 total workforce trips (to and from site) per day, and approximately 15 total construction vehicle trips (to and from site) per day.

Environmental Design

3.5.25 Similar to the design features integrated into the operation Scheme described above, the environment team have influenced the design and management of the construction phase to ensure the risk of effects on the environment and European Sites as a result of the construction phase is minimised. These mitigation measures are plainly established and uncontroversial and are considered to be an integral part of the construction phase. They are described below.

- the location, number and layout of construction compounds, laydown areas, haul roads,
- the approach to push launching of the viaduct section of the scheme; and
- the overall phasing of the works,

3.5.26 Any potential impacts are to be controlled and managed using good construction practice as set out in the Construction Environmental Management Plan (CEMP), as described below and detailed in Chapter 17 of the Environmental Statement. A pre-CEMP is included in Volume 3 Appendix 17.1 of the ES.

Site set-up, clearance and reinstatement

3.5.27 Fencing around compounds would be standard 2m high Heras-type security fencing, but fitted with an olive green netting to minimise its visual prominence and to heavily filter views into the low-level construction activities and stockpiles within the compounds.

3.5.28 Topsoil displaced by the Scheme or temporarily removed to accommodate the construction works would be handled and stored on site outside of the floodplain and in accordance with *BS 3882:2015 Specification for topsoil, Annex A; Recommendations for stripping, handling and preparing topsoil.*

3.5.29 Once construction is complete, hard standings and elements associated with compounds, haul roads crane pads or other temporary installations would be completely removed from site and the ground made good, topsoil replaced, cultivated and re-seeded with an appropriate lowland meadow grass mix to reinstate its existing use and condition.

Vegetation clearance

3.5.30 Vegetation clearance would be undertaken with great care to remove the minimum necessary and to protect and retain adjacent vegetation. Trees to be retained would be protected with fencing in accordance with British Standard BS 5837:2012 Trees in relation to design, demolition and construction and as shown on the Tree Protection Plan (TPP) in the arboricultural report. These works would be undertaken outside of the bird nesting season (March to September inclusive) and would be supervised by a suitably qualified Environmental Clerk of Works.

Lighting

3.5.31 Site lighting would be required during working hours and for general security during the construction phase. SNP is designated as a Dark Skies Reserve. The Scheme lies within this designation and entirely within an area classified as Intrinsically Dark (Environmental Zone E1, Institute of Lighting Professionals). There would be two type of lighting required on site during the construction phase, construction task lighting and security lighting.

3.5.32 Security lighting would be limited to construction compounds and lay down areas where plant and materials are left overnight. This would be minimised and not located near to the river corridor. Such lighting would also be designed to not shine on riparian vegetation or the water surface of the Afon Dyfi.

3.5.33 Construction task lighting would be limited to the winter months when it is dark for a limited period at the beginning or end of the working day. This would be intermittent and would be dynamic and change location and intensity as the construction actives demand. There would be restrictions on working hours in the vicinity of the Afon Dyfi and northern extent of the Scheme to avoid night working thus avoid the need for any task lighting along the dark river corridor.

3.5.34 Where it is necessary to use security and construction task lighting, this would be low level and fully cut-off or “fully shielded” in order to minimise adverse light pollution effects on the protected night time environment.

3.5.35 The existing street lighting at the southern end of the Scheme will be replicated on the proposed alignment with street lighting limited to within the 30mph zone. The junction at the northern end of the Scheme does not require street lighting. Signage proposed within the Scheme will be unlit with the exception of the speed limit signs on the approach to Machynlleth.

Summary of Mitigation included within the Scheme

3.5.36 Mitigation measures considered in this assessment are a fundamental part of the Scheme such as the landscape design and the inclusion of petrol interceptors and isolation devices within the drainage design, over and above the measures required in accordance with HD45/09.

3.5.37 In addition where measures have been included as part of the Scheme Design, these have also been considered within the assessment. Mitigation measures that may be required for protected species would be included within the Scheme to ensure legal compliance.

Construction Environmental Management Plan

3.5.38 As part of the Environmental Impact Assessment process a draft Construction Environmental Management Plan (CEMP) has been prepared and is included within the Environmental Statement for the Scheme.

Long term management

3.5.39 The Project Team would carry out environmental monitoring, aftercare and management for the three year Aftercare Period following completion of the works. This would be undertaken in accordance with an agreed Environmental, Landscape and Ecology, Monitoring, Aftercare and Management Plan.

3.5.40 During the Aftercare Period, the Project Team would review the effectiveness of the environmental mitigation against their intended function as identified within the Environmental Statement and this Statement and would provide any remedial actions if required.

3.5.41 At the completion of this three year Aftercare Period, the management of the soft estate and environmental mitigation measures would be transferred to the North and Mid Wales Trunk Road Agent (NMWTRA). The Project Team would prepare a ten year Handover Environmental Management Plan (HEMP), which would set out on-going maintenance, management and monitoring actions.

3.6 Description of the Study Area

3.6.1 The Study Area used for gathering baseline ecological information from survey work includes an area extending up to 500m from the extent of the proposed construction work. This area is predominantly grazed pasture on the floodplain of the Afon Dyfi along with areas of broad leaved woodland and pasture on the south facing slopes north of the river.

3.6.2 The Dyfi Estuary Special Protection Area, Dyfi Estuary and Cors Fochno Ramsar Site Pen Llŷn a'r Sarnau Special Area of Conservation are located approximately 3.8km to the south west of the Study Area. The Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites Special Area of Conservation is approximately 12.7km to the north of the Scheme.

3.6.3 The area to the north-east of the Study Area (north of the Millennium Cycle Bridge over the Afon Dyfi) comprises areas of improved and poor semi-improved grassland, grazed by sheep. Parallel to the A487 is an area of stone outcrops, mapped as basic inland cliff, and bracken (*Pteridium aquilinum*) slopes. There is an area of broad-leaved woodland on the north-western boundary bordering the river containing species such as sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), alder (*Alnus glutinosa*), oak (*Quercus sp.*), crack willow (*Salix fragilis*) and goat willow (*Salix caprea*). Japanese knotweed (*Fallopia japonica*) and Indian balsam (*Impatiens glandulifera*) are present within the understorey.

3.6.4 The Afon Dyfi intersects the Study Area and is bordered by areas of broad-leaved woodland, scattered scrub, improved and poor-semi-improved grassland and shingle beaches. Japanese knotweed and Indian balsam are widespread along the course, mainly throughout the woodland area on the northern bank.

3.6.5 The area to the south of the Millennium Cycle Bridge and the Afon Dyfi consists of improved and poor semi-improved grassland on the floodplain of the river. This are is subject to heavy grazing and contains areas of marshy grassland and flush within semi-improved and improved fields. Fields within the centre of the Study Area are bordered by fence lines with scattered broad-leaved trees and scattered scrub, and defunct species-rich hedgerows.

3.6.6 The fields on the western boundary of the Study Area are bordered by intact species-rich hedgerows, running along both sides of the A487.

3.6.7 There are a number of ponds and ditches throughout the Study Area, located at field boundaries within hedgerows and fence-lines with trees. There is a canalised roadside ditch running

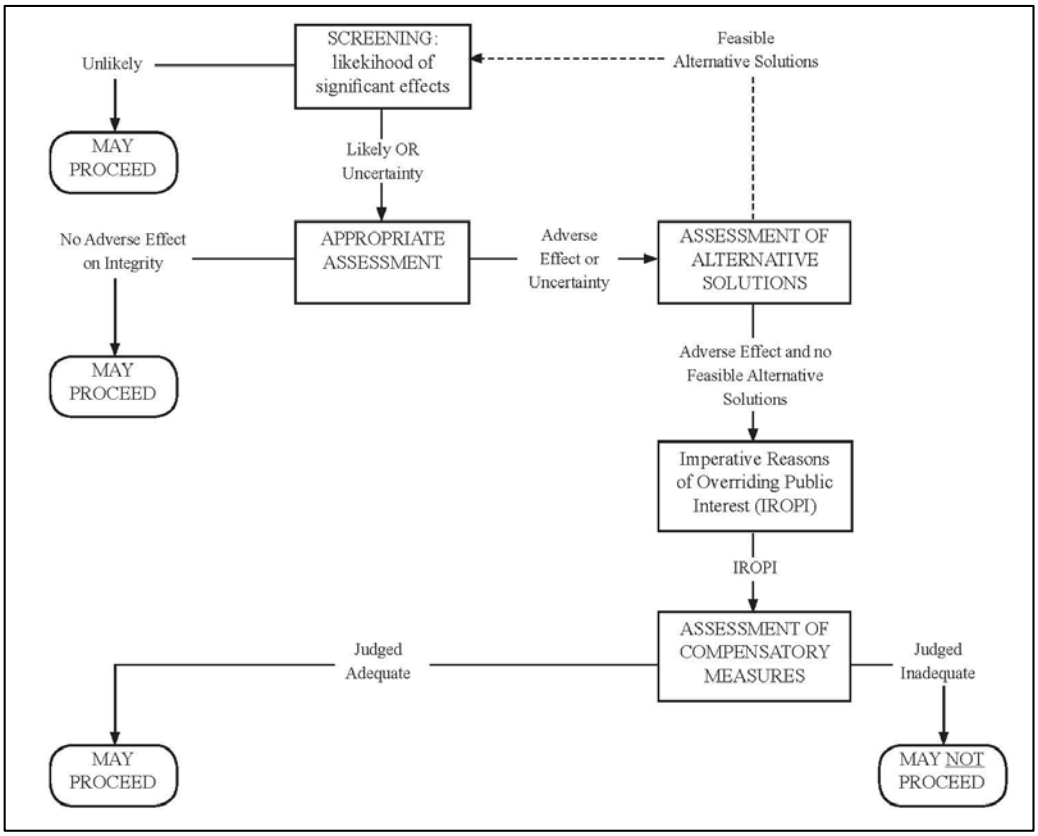
along the A487 on the western site boundary, parallel to a hedgerow.

4 Methodology

4.1.1 All plans and projects should identify any potential impacts on European Sites early in the plan-making process and then seek to alter the plan or project to avoid them or introduce mitigation measures to the point where no significant effects remain. The 'Competent Authority' shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of a European site or sites in accordance with the requirements of the Habitats Regulations (Regulation 61(5)). Regulation 61(3) requires the Competent Authority to consult with the Statutory Nature Conservation Body (Natural Resources Wales) and have regard to any representations made by that body.

4.1.2 European Sites include Special Areas of Conservation (SACs), candidate SACs (cSACs), Offshore Marine SACs and Special Protection Areas (SPAs). However it is government policy in England and Wales to also include Wetlands of International Importance (Ramsar sites), potential SPAs (pSPAs) and possible Ramsar sites as European Sites.

4.1.3 For highway schemes the consideration of projects under the requirements of the Habitats Regulations is known as the Assessment of Implications on European Sites (AIES) but is equivalent to the consideration of other projects or plans, comprising a screening stage (i.e. consideration of likely significant effects) and an Appropriate Assessment stage (consideration of effects in relation to the conservation objectives). Box 1 overleaf shows an overview of the AIES process as provided within the Design Manual for Roads and Bridges Vol. 11, Section 4 HD44/09: Assessment of Implications (of Highways and/or Roads Projects) on European Sites (including Appropriate Assessment).



Box 1: Flow diagram showing the AIES process taken from HD44/09

4.2 Policy and Guidance

4.2.1 The consideration of The Scheme in relation to the Habitats Regulations has been informed by a range of guidance and policy documents including:

- Design Manual for Road and Bridges (DMRB) HD 44/09. Assessment of implications (of Highways and/or Roads Projects) on European Sites (including Appropriate Assessment) (HA, 2009);
- The Habitats Regulations Handbook (Tyldesley & Chapman, The Habitats Regulations Handbook, 2013), and subsequent updates;
- Assessing Projects under the Habitats Directive: Guidance for Competent Authorities (Tyldesley D. , 2011)

4.3 Evidence Base

4.3.1 The following websites were used to gather information on the European protected sites:

- Joint Nature Conservation Committee (JNCC, 2016);
- Natural Resources Wales (NRW) (NRW, 2016).

4.3.2 Core Site Management Plans published by NRW were used to gather information on European protected sites. These documents provide the main elements of NRW's management plan for protected sites and sets out what needs to be achieved on the sites, the results of monitoring and advice on the actions required. The Geographical Information Systems (GIS) datasets for European sites used were downloaded from NRW to ensure all relevant European sites and their updated boundaries were taken into consideration.

4.3.3 A desk study has been undertaken to review records of species which are features of designated sites considered within this document. These have included records of otters, bats and birds from both Cofnod (the north Wales Environmental Records Centre) and the Biological Information Service (BIS) which covers mid Wales. In addition records for lesser horseshoe bats have also been sought from the National Biodiversity Network (NBN) interactive map website.

4.3.4 A comprehensive suite of ecological surveys have been undertaken to provide evidence for this assessment and were undertaken as part of the Environmental Impact Assessment (EIA) process.

4.3.5 Specific surveys relevant to the European sites have been undertaken for:

- Wintering birds, aimed at determining the presence or likely absence of Greenland white-fronted geese (*Anser albifrons flavirostris*) in the vicinity of The Scheme;
- Bats, including assessment of potential roosts, transect surveys and static activity monitoring to determine the presence and level of activity of lesser horseshoe bats; and
- Otters, aimed at determining the presence of active holts and the level of activity on the Afon Dyfi and other water bodies.

4.3.6 Lesser horseshoe bats were recorded by static detectors on a hedge within floodplain in August (1 pass over two nights) and on the northern bank of the Afon Dyfi on several occasions in September 2015, April 2016 and June 2016. No lesser horseshoe bats were recorded during walked transects.

4.3.7 A confirmed otter holt was identified approximately 400m upstream of the proposed crossing of the Afon Dyfi on the north bank of the Afon Dyfi near to the confluence of the Afon Dulas. Camera monitoring of this feature, a hole approximately halfway up the river bank, showed it to be being used by a single adult otter on a regular basis. Potential resting places were also recorded immediately downstream of the retaining wall supporting the existing A487 on the north bank (approximately 60m from the proposed crossing) and on the Afon Dulas. Camera monitoring of the feature near the retaining wall, overhanging tree roots, revealed no use by otters over a period of one month. It is therefore considered unlikely that this is being used as a resting place by otter but it has potential to be used.

4.4 Assessment Methodology

4.4.1 This section provides the applicable methodologies and assumptions for the consideration of the Scheme with regard to the requirements of the Habitats Regulations.

4.4.2 The assessment process has been based on that set out in HD44/09 (HA, 2009) and the Habitats Regulations Handbook (Tyldesley & Chapman, 2013) . The consideration of The Scheme was undertaken in the following step by step process.

Identifying sites

4.4.3 The first step of the process was to identify all the European sites within the consideration of the assessment. Certain species which are part of the designated features of some European sites are not restricted to the defined boundaries of the site but can be highly mobile with ranges well outside the defined area of the sites.

4.4.4 HD44/09 sets out the following consideration zones for the identification of European Sites for inclusion in the assessment where the project is:

- Within any SAC, SPA or Ramsar Site;
- Within 2km of any SAC, SPA or Ramsar Site;
- Within 30km of any SAC where bats are one of the qualifying interests; or
- Crossing or adjacent to, upstream or downstream of watercourses designated as SAC.

4.4.5 In line with HD44/09 professional judgement has been exercised when considering the effect pathways on mobile species which occupy land outside of the designated site

boundary but which are nonetheless, qualifying interests of the sites.

4.4.6 For the purpose of simplicity and openness a 30km buffer around The Scheme has been used to identify European Sites, which have then been scoped out if no pathways exist to link potential impacts from The Scheme (source) to features of European Sites (receptors).

4.4.7 The sites which need to be considered for assessment in terms of air quality effects are those within very close proximity (normally within 200m) of the affected road network as set out in HA207/07 (HA, 2007).

Understanding European Site features and conservation objectives

4.4.8 Conservation objectives of each interest feature of each European Site potentially affected were acquired and examined. In Wales, conservation objectives are considered to consist of the vision and performance indicators stated in the relevant Core Management Plan available from Natural Resources Wales's website. For each of the sites the relevant qualifying interests were also collated and examined.

Identification of plans or projects considered for in- combination effects

4.4.9 It is a requirement of the Habitat Regulations to examine the potential for a plan or project to have a significant effect either alone or in combination with other plans and projects. It is therefore necessary to identify those other plans and projects which may give rise to in-combination effects with The Scheme.

4.4.10 To inform this process, plans and projects which have a spatial context and contain plans or proposals most likely to have in-combination effects, were identified from the following locations:

- Welsh Government – strategies, plans and guidance;
- Local Authority/National Plan Authorities – LDP/UDP;
- Statutory Environment Bodies – Management Plans;
- Regional Authorities – Regional Transport Plans (RTP)[1];
- Powys Local Development Plan (LDP) 2011-2026; and
- Eryri Local Development Plan (2007 - 2022) adopted by the Snowdonia National Park Authority.

[1] The Regional Transport Plan is due to be superseded by the Mid Wales Joint Local Transport Plan 2015 – 2020 once it is adopted.

4.4.11 In addition to the in-combination effects of other plans and projects, other elements considered with this assessment include:

- Developments and other projects which are currently under construction; and
- Proposed developments which are currently under consideration with the local planning authority or other determining bodies.

4.4.12 When considering in-combination effects in the assessments for each site, the potential impact of the measure on the feature is the key consideration. A plan or project could have an effect on water quality which can alter the nutrient balance on a site/feature without causing any potential effects to air quality, but such an effect could still be significant when considered in-combination with air quality impacts resulting from another plan or project.

Identification of the potential impacts of The Scheme

4.4.13 The construction and operation of The Scheme has the potential to give rise to the following impacts on European Sites:

- Habitat loss and/or fragmentation (including foraging areas) including interruption of flight lines and restrictions to species movements;
- Loss of resting/roosting sites;
- Air quality emissions and changes to atmospheric deposition;
- Changes in water quality and quantity;
- Changes in hydrological conditions;
- Changes to structure/composition of the habitat;
- Noise and vibration disturbance to species;
- Visual and lighting disturbance to species;
- Physical restrictions to the movement of species; and
- Mortality or injury of species as a result of collision with moving vehicles.

4.4.14 This list has formed the basis for considering the potential for effects on the European Sites on the basis of identifying the sources or impacts and the pathways that could link those sources to the features of the site (receptors).

4.4.15 The consideration of the potential for impacts has also been informed by the conservation objectives for the features of the European Sites identified. In particular details of the

vulnerability of features to particular potentially influencing factors (such as the vulnerability of certain habitats to increases in nitrogen deposition) were used to identify the likelihood of impacts affecting features of the sites.

Consideration of the significance of the potential effects

4.4.16 The significance of the potential effects was assessed taking in to account plainly established uncontroversial (PEU) mitigation measures, and any other mitigation measures that are part of the Scheme Design such as timing of works.

4.4.17 In the assessment professional judgement has been applied using the following criteria, as often insufficient information about the elements and interests is available:

- The vulnerability/sensitivity of the receiving environment/features of interest;
- When the risk of effects are likely to occur (e.g. construction and/or operation);
- The likely geographical extent of the effects; and
- Likelihood of significant effects (e.g. those above negligible in magnitude) occurring based on previous experience with similar elements, where available.

4.4.18 The assessment of the likelihood of significant effects has been made of the Scheme on its own and in-combination with other plans and projects.

4.5 The Use of Professional Judgement

4.5.1 Professional judgement was used in the carrying out of this work where specific guidance was not available, and in the interpretation of results. Where there was insufficient information regarding the likelihood of qualifying interests being present, or of the risk of impacts, the assessment used the precautionary principle to inform the judgement. The precautionary principle has been applied to ensure that any assessment errs on the side of caution, without being overly cautious. This principle means that the conservation objectives should prevail where there is uncertainty or that harmful effects will be assumed in the absence of evidence to the contrary.

4.5.2 The approach has been to identify risks on the basis of the precautionary principle. This principle means that the conservation objectives should prevail where there is uncertainty or that significant or adverse effects will be assumed in the absence of evidence to the contrary.

5 Identification of European Sites

5.1.1 Twenty-one European Sites have been identified within the 30km search area around The Scheme. These comprise:

- One Ramsar Site;
- Five Special Protection Areas; and
- Fifteen Special Areas of Conservation.

5.1.2 The European Sites, their features and the distance of the sites from The Scheme are shown in Table 3 below and on Figure 4.

Table 3: European Sites within 30km of the Scheme

Site	Distance	Qualifying Features
Pen Lln a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	4.3km	1110 Sandbanks which are slightly covered by seawater all the time
		1130 Estuaries
		1150 Coastal lagoons
		1160 Large shallow inlets and bays
		1170 Reefs
		1140 Mudflats and sandflats not covered by seawater at low tide
		1310 *Salicornia* and other annuals colonizing mud and sand
		1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
		8330 Submerged or partially submerged sea caves
		1349 Bottlenose dolphin
		1355 Otter
		1364 Grey seal
Dyfi Estuary / Aber Dyfi SPA	5km	A395 Greenland white-fronted goose (wintering)
Cors Fochno and Dyfi Ramsar	6km	7110 Active raised bogs
		7120 Degraded raised bogs still capable of natural regeneration
		7150 Depressions on peat substrates of the *Rhynchosporion*
Cadair Idris SAC	6.6km	3130 Oligotrophic to mesotrophic standing waters with vegetation
		8110 Siliceous scree of the montane to snow levels
		8210 Calcareous rocky slopes with chasmophytic vegetation
		8220 Siliceous rocky slopes with chasmophytic vegetation

Site	Distance	Qualifying Features
		4010 Northern Atlantic wet heaths with *Erica tetralix*
		4030 European dry heaths
		6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils
		6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
		7130 Blanket bogs
		7230 Alkaline fens
		91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles
		1065 Marsh fritillary butterfly
		1393 Slender green feather-moss
Coed Cwm Einion SAC	8.3km	9180 *Tilio-Acerion* forests of slopes, screes and ravines
Craig yr Aderyn SPA	10.9km	A346 Chough (summer and winter)
Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites SAC	13.2km	91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles
		91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alno incanae*, *Salicion albae*)
		3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
		4010 Northern Atlantic wet heaths with *Erica tetralix*
		4030 European dry heaths
		9180 *Tilio-Acerion* forests of slopes, screes and ravines
		91D0 Bog woodland
		1303 Lesser horseshoe bat

Site	Distance	Qualifying Features
Cors Fochno SAC	13.8km	7110 Active raised bogs
		7120 Degraded raised bogs still capable of natural regeneration
		7150 Depressions on peat substrates of the *Rhynchosporion*
Afon Eden - Cors Goch Trawsfynydd SAC	17.2km	7110 Active raised bogs
		1029 Freshwater pearl mussel
		1831 Floating water-plantain
		1106 Atlantic salmon
		1355 Otter
Berwyn SPA	18.7km	A082 Hen Harrier (breeding)
		A098 Merlin (breeding)
		A103 Peregrine (breeding)
		A074 Red kite (breeding)
Berwyn a Mynyddoedd de Clwyd / Berwyn and South Clwyd Mountains SAC	18.7km	4030 European dry heaths
		7130 Blanket bogs
		6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates
		7140 Transition mires and quaking bogs
		8120 Calcareous and calcshist screes of the montane to alpine levels
		8210 Calcareous rocky slopes with chasmophytic vegetation
Coedydd Llawr-y-glyn SAC	19.8km	91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles
Ellenydd - Mallaen SPA	20km	A098 Merlin (breeding)
		A074 Red kite (breeding)

Site	Distance	Qualifying Features
		A103 Peregrine (breeding)
Coedydd a Cheunant Rheidol/Rheidol Woods and Gorge SAC	20.5km	91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles
River Wye/Afon Gwy (Wales) SAC	21km	3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
		7140 Transition mires and quaking bogs
		1092 White-clawed (or Atlantic stream) crayfish
		1095 Sea lamprey
		1096 Brook lamprey
		1099 River lamprey
		1103 Twaite shad
		1106 Atlantic salmon
		1163 Bullhead
		1355 Otter
		1102 Allis shad
Migneint - Arenig - Dduallt SPA	22.4km	A082 Hen Harrier (breeding)
		A098 Merlin (breeding)
		A103 Peregrine (breeding)
Migneint - Arenig - Dduallt SAC	22.4km	4030 European dry heaths
		7130 Blanket bogs
		3130 Oligotrophic to mesotrophic standing waters with vegetation

Site	Distance	Qualifying Features
		3160 Natural dystrophic lakes and ponds
		4010 Northern Atlantic wet heaths with *Erica tetralix*
		91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles
Rhinog SAC	23.8km	4030 European dry heaths
		91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles
		3130 Oligotrophic to mesotrophic standing waters with vegetation
		4010 Northern Atlantic wet heaths with *Erica tetralix*
		4060 Alpine and Boreal Heaths
		7130 Blanket bogs
		7150 Depressions on peat substrates of the *Rhynchosporion*
		1831 Floating water-plantain
Ellenydd SAC	24.8km	6130 Calaminarian grasslands of the *Violetalioa calaminariae*
		7130 Blanket bogs
		3130 Oligotrophic to mesotrophic standing waters with vegetation
		4030 European dry heaths
		1831 Floating water-plantain
Morfa Harlech a Morfa Dyffryn SAC	25.9km	2110 Embryonic shifting dunes
		2120 Shifting dunes along the shoreline with *Ammophilla arenaria* (white dunes)
		2170 Dunes with *Salix repens* ssp. a*rgentea* (*Salicion arenariae*)
		2190 Humid dune slacks
		1395 Petalwort

Site	Distance	Qualifying Features
Grogwynion SAC	29.1km	6130 Calaminarian grasslands of the *Violetalioa calaminariae*
		4030 European dry heaths

5.1.3 The Conservation Objectives for these sites were reviewed from the Core Management Plans available on the Natural Resources Wales website. Objectives for features being considered within the assessment are provided in Section 8 below.

6 Identification of In-Combination Projects

6.1.1 Following consultation with the Snowdonia National Park Authority and Powys County Council and searches of their planning websites, (including that of Ceredigion Council) no major developments were identified within the following categories:

- development under construction;
- application(s) permitted but which are not yet implemented; and
- submitted applications not yet determined, and which, if permitted, would affect relevant features of European Designated Sites considered within this document.

6.1.2 Further to this there are no potential in-combination developments identified in the adopted development plans:

- The Powys Unitary Development Plan 2001-2016,adopted by Powys County Council on March 1st 2010;
- The Eryri Local Development Plan 2007-2022, adopted by the Snowdonia National Park Authority on July 13th 2011;
- The Ceredigion Location Development Plan 2007-2022, adopted by Ceredigion County Council on April 25th 2013.

NRW's forest management plans could be a source of sediment to the Afon Dyfi. The Habitats Regulations Assessment undertaken for the Dyfi Forest Resource Plan concluded that although there was the potential for effects on the Pen Llŷn a'r Sarnau SAC and Dyfi Estuary SPA, these would not be significant. The effects considered regard potential changes in water quality in particular acidification in relation to the Afon Dulas North failing under the Water Framework Directive for pH levels

7 Consultation

7.1.1 Since commencement of detailed development of the Scheme for the purposes of EIA/SIAA and environmental surveys in 2015/16, liaison meetings have been held with Natural Resources Wales, with other meetings to discuss particular aspects of the Scheme as required.

7.1.2 This SIAA report has also been submitted to NRW and Local Planning Authorities (Powys and Snowdonia National Park Authority) for consultation as part of the overall public consultation on the Environmental Statement.

8 Consideration of the Significance of Potential Effects – Screening Stage

8.1.1 The following section and tables set out the Test of Likely Significance of Effects occurring as a result of the implementation of The Scheme. This has been undertaken in a series of steps documented in the tables below.

8.1.2 The first step has been to consider if there are pathways that would link the potential impacts of The Scheme to the features of the European Sites and therefore whether Sites could be excluded from consideration if no pathways are present.

Table 4: Consideration of European Sites which are linked to The Scheme

Site	Distance	Qualifying Features	Pathways	Comments
Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	4.3km	1110 Sandbanks which are slightly covered by seawater all the time	No pathway for effect	Sufficient separation distance based on maps within the Regulation 33 Package (CCW, 2009)[2]
		1130 Estuaries	Potential for effects as identified in Section 4.4 above	Situated downstream of proposed new crossing of the Afon Dyfi
		1150 Coastal lagoons	No pathway for effect	Sufficient separation distance based on maps within the Regulation 33 Package (CCW, 2009)
		1160 Large shallow inlets and bays		
		1170 Reefs		
		1140 Mudflats and sandflats not covered by seawater at low tide	Potential for effects as identified in Section 4.4 above	Situated downstream of proposed new crossing of the Afon Dyfi
		1310 *Salicornia* and other annuals colonizing mud and sand	Potential for effects as identified in Section 4.4 above	Situated downstream of proposed new crossing of the Afon Dyfi
		1330 Atlantic salt meadows (*Glauco-*	Potential for effects as identified in Section 4.4	Situated downstream of proposed new crossing of the Afon Dyfi

[2] The Regulation 33 Package is a document published by CCW (now NRW) documenting the features of Marine SACs, their conservation objectives and management actions.

Site	Distance	Qualifying Features	Pathways	Comments
		Puccinellietalia maritimae)	above	
		8330 Submerged or partially submerged sea caves	No pathway for effect	Sufficient separation distance
		1349 Bottlenose dolphin	Potential for effects as identified in Section 4.4 above	Dolphins normally feed over the Sarnau reefs and off the mouths of estuaries
		1355 Otter	Potential for effects as identified in Section 4.4 above	Otters sighted between Pont-ar-Dyfi and Millennium Cycle Bridge during surveys. An active holt has been identified 400m upstream of the proposed crossing. Other features with potential to be used by otters have also been located downstream of the proposed crossing.
		1364 Grey seal	Potential for effects as identified in Section 4.4 above	Although the seal population is largely centred around the north Wales coast and Bardsey Island they are a wide ranging species and may forage throughout the SAC boundary.
Dyfi Estuary / Aber Dyfi SPA	5km	A395 Greenland white-fronted goose (wintering)	Potential for effects as identified in Section 4.4 above	Potential for disturbance if using areas near the proposed scheme
Cors Fochno and Dyfi Ramsar	6km	7110 Active raised bogs	No pathway for effects	Although the estuary is included within the designation, the features of the site are limited to bog habitats within Cors Fochno (CCW, 2011).
		7120 Degraded raised bogs still capable of	No pathway for effects	

Site	Distance	Qualifying Features	Pathways	Comments
		natural regeneration		
		7150 Depressions on peat substrates of the *Rhynchosporion*	No pathway for effects	
Cadair Idris SAC	6.6km	3130 Oligotrophic to mesotrophic standing waters with vegetation	No pathway for effect	Sufficient separation distance
		8110 Siliceous scree of the montane to snow levels		
		8210 Calcareous rocky slopes with chasmophytic vegetation		
		8220 Siliceous rocky slopes with chasmophytic vegetation		
		4010 Northern Atlantic wet heaths with *Erica tetralix*		
		4030 European dry heaths		
		6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils		

Site	Distance	Qualifying Features	Pathways	Comments
		6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels		
		7130 Blanket bogs		
		7230 Alkaline fens		
		91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles		
		1065 Marsh fritillary butterfly		
		1393 Slender green feather-moss		
Coed Cwm Einion SAC	8.3km	9180 *Tilio-Acerion* forests of slopes, screes and ravines	No pathway for effect	Sufficient separation distance
Craig yr Aderyn SPA	10.9km	A346 Chough (summer and winter)	No potential for interaction	Birds have been known to move up to 8km between roost sites (CCW, 2008a).
Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites	13.2km	91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles	No pathway for effect	Sufficient separation distance

Site	Distance	Qualifying Features	Pathways	Comments
SAC		91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alno incanae*, *Salicion albae*)	No pathway for effect	Sufficient separation distance
		3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	No pathway for effect	Sufficient separation distance and different catchments
		4010 Northern Atlantic wet heaths with *Erica tetralix*	No pathway for effect	Sufficient separation distance
		4030 European dry heaths	No pathway for effect	Sufficient separation distance
		9180 *Tilio-Acerion* forests of slopes, screes and ravines	No pathway for effect	Sufficient separation distance
		91D0 Bog woodland	No pathway for effect	Sufficient separation distance
		1303 Lesser horseshoe bat	Potential for effects as identified in Section 4.4 above	Taking a precautionary approach, lesser horseshoe bats within the area of the Scheme could interact with the population within the SAC through a network of roosts present between the Scheme and Minffordd to the north.
Cors Fochno SAC	13.8km	7110 Active raised bogs	No pathway for effect	The mire habitats within Cors Fochno are

Site	Distance	Qualifying Features	Pathways	Comments
		7120 Degraded raised bogs still capable of natural regeneration		predominantly rainwater fed (CCW, 2011).
		7150 Depressions on peat substrates of the *Rhynchosporion*		
Afon Eden - Cors Goch Trawsfynydd SAC	17.2km	7110 Active raised bogs	No pathway for effect	Different catchments and separation distance. The Afon Eden is a tributary on the northern side of the Afon Mawddach situated between Llyn Trawsfynydd and Dolgellau. While otters are known to move between catchment areas depending on the territories, the separation distance is considered sufficient that it is very unlikely for otters present on the Afon Dyfi to be the same animals using the Afon Eden.
		1029 Freshwater pearl mussel		
		1831 Floating water-plantain		
		1106 Atlantic salmon		
		1355 Otter		
Berwyn SPA	18.7km	A082 Hen Harrier (breeding)	No potential for interaction	Studies have shown that males tend to range up to 9km from nest sites with females having smaller ranges (Arroyo, Leckie, Amar, McCluskie, & Redpath, 2014)
		A098 Merlin (breeding)	No potential for interaction	Studies have shown maximum foraging ranges from the nest of 4km (Rebecca, Cosnette, Duncan, Picozzi, & Catt, 1990)
		A103 Peregrine (breeding)	No potential for interaction	Core foraging distance of 2km during breeding season with maximum recorded distance of 18km

Site	Distance	Qualifying Features	Pathways	Comments
				(SNH, 2013)
		A074 Red kite (breeding)	No potential for interaction	Core range of 4km, with maximum range of up to 6km (SNH, 2013)
Berwyn a Mynyddoedd de Clwyd / Berwyn and South Clwyd Mountains SAC	18.7km	4030 European dry heaths	No pathway for effect	Sufficient separation distance
		7130 Blanket bogs		
		6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates		
		7140 Transition mires and quaking bogs		
		8120 Calcareous and calcshist screes of the montane to alpine levels		
		8210 Calcareous rocky slopes with chasmophytic vegetation		
Coedydd Llawr-y-glyn SAC	19.8km	91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles	No pathway for effect	Sufficient separation distance

Site	Distance	Qualifying Features	Pathways	Comments
Ellenydd - Mallaen SPA	20km	A098 Merlin (breeding)	No potential for interaction	Studies have shown maximum foraging ranges from the nest of 4km (Rebecca, Cosnette, Duncan, Picozzi, & Catt, 1990)
		A074 Red kite (breeding)	No potential for interaction	Core range of 4km, with maximum range of up to 6km (SNH, 2013)
Coedydd a Cheunant Rheidol/Rheidol Woods and Gorge SAC	20.5km	91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles	No pathway for effect	Sufficient separation distance
River Wye/Afon Gwy (Wales) SAC	21km	3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	No pathway for effect/No potential for interaction	Sufficient separation distance and different catchments. Whilst otter are known to move between catchments during dispersal of young and depending on territorial areas, the separation between the Afon Dyfi within the Study Area and the headwaters of the Afon Gwy mean it is considered very unlikely that otters present within the Study Area are associated with the population of otters within this SAC.
		7140 Transition mires and quaking bogs		
		1092 White-clawed (or Atlantic stream) crayfish		
		1095 Sea lamprey		
		1096 Brook lamprey		
		1099 River lamprey		
		1103 Twaite shad		

Site	Distance	Qualifying Features	Pathways	Comments
		1106 Atlantic salmon		
		1163 Bullhead		
		1355 Otter		
		1102 Allis shad		
Migneint - Arenig - Dduallt SPA	22.4km	A082 Hen Harrier (breeding)	No potential for interaction	Studies have shown that males tend to range up to 9km from nest sites with females having smaller ranges (Arroyo, Leckie, Amar, McCluskie, & Redpath, 2014)
		A098 Merlin (breeding)	No potential for interaction	Studies have shown maximum foraging ranges from the nest of 4km (Rebecca, Cosnette, Duncan, Picozzi, & Catt, 1990)
		A103 Peregrine (breeding)	No potential for interaction	Core foraging distance of 2km during breeding season with maximum recorded distance of 18km (SNH, 2013)
Migneint - Arenig - Dduallt SAC	22.4km	4030 European dry heaths	No pathway for effect	Sufficient separation distance
		7130 Blanket bogs		
		3130 Oligotrophic to mesotrophic standing waters with vegetation		
		3160 Natural dystrophic lakes and ponds		

Site	Distance	Qualifying Features	Pathways	Comments
		4010 Northern Atlantic wet heaths with *Erica tetralix*		
		91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles		
Rhinog SAC	23.8km	4030 European dry heaths	No pathway for effect	Sufficient separation distance
		91A0 Old Sessile oak woods with *Ilex* and *Blechnum* in the British Isles		
		3130 Oligotrophic to mesotrophic standing waters with vegetation		
		4010 Northern Atlantic wet heaths with *Erica tetralix*		
		4060 Alpine and Boreal Heaths		
		7130 Blanket bogs		
		7150 Depressions on peat substrates of the *Rhynchosporion*		

Site	Distance	Qualifying Features	Pathways	Comments
		1831 Floating water-plantain		
Ellenydd SAC	24.8km	6130 Calaminarian grasslands of the *Violetalioa calaminariae*	No pathway for effect	Sufficient separation distance
		7130 Blanket bogs		
		3130 Oligotrophic to mesotrophic standing waters with vegetation		
		4030 European dry heaths		
		1831 Floating water-plantain		
Morfa Harlech a Morfa Dyffryn SAC	25.9km	2110 Embryonic shifting dunes	No pathway for effect	Sufficient separation distance
		2120 Shifting dunes along the shoreline with *Ammophilla arenaria* (white dunes)		
		2170 Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)		
		2190 Humid dune slacks		

Site	Distance	Qualifying Features	Pathways	Comments
		1395 Petalwort		
Grogwynion SAC	29.1km	6130 Calaminarian grasslands of the *Violetalioa calaminariae*	No pathway for effect	Sufficient separation distance
		4030 European dry heaths		

8.1.3 The pre-screening exercise set out in Table 3 results in three sites being considered further within the scope of the AIES. These are the Dyfi Estuary / Aber Dyfi SPA, Pen Llyn a'r Sarnau / Pen Lleyn and the Sarnau SAC and Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites SAC, albeit for certain features.

8.1.4 Further details of the assessment in the form of matrix worksheets for those sites scoped in to the assessment are provided in Appendix B.

8.2 Test of Likely Significant Effect (TLSE)

8.2.1 The TLSE is made in light of the conservation objectives for each of the sites and features in the following sections.

8.2.2 Consideration of the TSLE has included mitigation measures which are plainly established and uncontroversial including those aimed at maintaining existing hydrological connections and protecting water quality and quantity.

8.2.3 Construction would be carried out in accordance with guidance outlined within CIRIA best practice guidance and the Environment Agency (EA) Pollution Prevention Guidelines (PPGs)[3] such as:

- PPG1 General Guide to the Prevention of Pollution;
- PPG5 Works and Maintenance in or near water;
- PPG6 Working at Construction and Demolition Sites.

Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC

Estuarine Habitat Features

8.2.4 NRW's vision for the Pen Llŷn a'r Sarnau SAC taken from the Regulation 33 Package is for:

- *"a high quality marine and coastal environment which is healthy, productive and biologically diverse, supporting resilient marine ecosystems and communities. The special habitat and species features of the SAC will be maintained and, where necessary, restored so that they will be able to sustain themselves in the long-term as part of naturally functioning ecosystems. The diversity of the wildlife habitats and species in the SAC will not be degraded."*

[3] Whilst it is acknowledge that the Pollution Prevention Guidelines have been withdrawn, until replacement guidance is available these are considered to be relevant and applicable to the construction of the scheme and are considered to represent the industry standard.

8.2.5 In relation to the estuaries feature vision is for:

- "*each of the three estuaries of the SAC will continue to be shallow, bar-built drying estuaries supporting a mosaic of habitats and associated wildlife that reflects the transition from the estuarine to terrestrial habitats. The estuaries will support good quality saltmarsh transitions to other habitats such as shingle, sand dune, peat mire, brackish and freshwater marsh, reed swamp, bog and woodland. The sediments of the estuaries will continue to comprise a high proportion of sandy to muddy sediments, and the sediment type and biological communities associated with them will reflect a gradient from more exposed and saline conditions at the mouth of each estuary to more sheltered freshwater-influenced communities in their landward reaches. The structure and characteristics of each estuary will be determined by unhindered geomorphological and biological processes, including sediment transport, erosion and accretion and the influence of flood events and by appropriate management of the surrounding catchments."*

8.2.6 The Regulation 33 information for the Pen Llyn a'r Sarnau SAC (CCW, 2009) states the following objectives for the habitat features (set out in Table 3 above) of the SAC:

- the overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing;
- the physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded;
- the presence, abundance, condition and diversity of typical species are such that habitat quality is not degraded.

8.2.7 The potential for indirect effects on habitats within the Dyfi Estuary part of the Pen Llyn a'r Sarnau SAC is similar in nature to that described for the foraging habitat of the white-fronted geese outlined above. Given the measures outlined above, and set out in the draft CEMP, it is considered that the Scheme alone will not result in a significant effect on the habitat features of this site.

Marine Mammal Species Features

8.2.8 The vision for the SAC is that it

"will continue to provide a productive and supportive marine area for grey seals. The population of grey seals frequenting the SAC will form and important component of a larger southwest UK population of grey seals. Grey seals will continue to be widespread throughout the SAC predominantly in areas of open coast and sea."

8.2.9 And that it

"will continue to provide a productive and supportive marine area for bottlenose dolphin. Bottlenose dolphin will continue to be widespread within the waters of the SAC and those frequenting the SAC will reflect a healthy population structure including immature and adult male and female dolphins."

8.2.10 The species features will be considered to be in favourable condition if:

- The population is maintaining itself on a long-term basis as a viable component of its natural habitat;
- The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future;
- The presence, abundance, condition and diversity of habitats and species required to support these species is such that the distribution, abundance and population dynamics of the species within the site and population beyond the site are stable or increasing.

8.2.11 Dolphins are very unlikely to move beyond the tidal limits of the Dyfi Estuary which is located approximately 3.7km downstream of the existing Pont-ar-Ddyfi. There have been no records or dolphins reported to the local records centres. There are several sections on the non-tidal river between the estuary and the Scheme which are shallow and are unlikely to allow dolphin to moving further upstream.

8.2.12 There are no records of seals in the search area used for the desk study, but some anecdotal records for seals in the vicinity of the bridge but none could be found within datasets available. It is therefore considered that seals do not make regular use of the Afon Dyfi in the vicinity of the Scheme due to the absence of reported records.

8.2.13 The potential disturbance of a seal within the river during any construction activities, is not considered to have a discernable effect on the population of seals either within the SAC or the wider Cardigan Bay area as the effect would be on a small number of animals if they were present. It is therefore considered that the Scheme will not give rise to a significant effect on the marine species features of the Pen Llyn a'r Sarnau SAC.

Otter

8.2.14 The conservation objectives stated for grey seal and bottlenose dolphin also apply to otter.

8.2.15 Although not within the SAC, the otters present on the Afon Dyfi, observed during surveys along with two probable resting places within the study area, are likely to contribute to the SAC otter population as the range of the animals present could extend down to the tidal estuary which is located within the SAC boundary.

8.2.16 The construction of the Scheme is likely to result in the temporary disturbance of any otter using the area of overhanging tree roots immediately downstream of the existing retaining wall to the west of the proposed river crossing (approximately 60m from the proposed crossing). While otters have not been recorded using this feature, it has the potential to be used in the future and is therefore considered within this assessment. The holt located upstream of the proposed crossing will not be subject to disturbance from the construction activities.

8.2.17 The disturbance of otters on the Afon Dyfi in the vicinity of the Scheme from construction activities, may temporarily affect the localised distribution and movement of otters within that stretch of the river. However restrictions on night working (include 1 hour before sunset and after sunrise), as set out in the Draft CEMP which are required due to the proximity to residential properties, will mean that the nocturnal movement of otter is not restricted.

8.2.18 No operational effects on otter have been identified as there will be a large area of floodplain available for otters moving along the river corridor during high flow conditions. Furthermore during flood events when the river bursts its banks otters will be able to use the livestock underpass in front of the north abutment to safely pass beneath the Scheme. The design of the Scheme means that it is highly unlikely that otters will cross the highway.

8.2.19 It is therefore considered that although there will be temporary localised effects on otters during construction, the measures included within the Scheme and the large size of the SAC and otter population mean that the Scheme is not considered likely to give rise to significant effects on the otter feature of the SAC.

Dyfi Estuary / Aber Dyfi SPA

Conservation Objectives and Current Conservation Status: White-Fronted Goose

8.2.20 The Core Management Plan for the Dyfi Estuary states that the site would be considered to be in a favourable conservation status, where all of the following conditions are satisfied:

- The Dyfi wintering population attains national importance level (i.e.1% of the national (UK) population), annually;
- Winter mortality levels are <1% annually;
- Juvenile / sub-adult birds comprise > 5% of the wintering population annually;
- All site-specific factors affecting the achievement of these conditions (e.g. avoidable disturbance), are under control.

8.2.21 Indicators for the feature include:

- Population size (lower limit 209 geese equivalent to 1% of the UK population level);
- Winter survival/mortality rate (lower limit 98% winter survival rate);
- Proportion of juvenile geese to adults (lower limit of 5% of the flock being juvenile or sub-adult birds).

8.2.22 The white-fronted goose population within the SPA is currently considered to be in unfavourable condition and is declining mainly as a result of population pressures outside the UK.

Consideration

8.2.23 No white-fronted geese have been recorded using the areas of the floodplain within the vicinity of the proposed construction activities during the surveys conducted between October 2015 and March 2016. No records of white-fronted geese were present within the dataset provided by Cofnod in response to data searches.

8.2.24 As geese are not using the areas surrounding the Scheme, there is no risk or potential for disturbance effects, and the Scheme is not considered likely to have a significant effect on this feature in term of disturbance.

8.2.25 Although there are no works requried within the river channel, there is however the potential for effects from water quality changes on the habitats within the SPA and adjoining areas that the geese use for foraging. The risk of pollution entering the Afon Dyfi from the construction works is prevented in line with good construction practice, as a detailed Construction Environmental Management Plan will be produced in line with the pre-CEMP (included within the Environmental Statement for the Scheme) and agreed with relevant stakeholders prior to construction. This includes the following plainly established and uncontroversial measures which are considered as part of the Scheme and Construction design:

- Strict adherence to Pollution Prevention Guidelines and CIRIA best practice;

- Silt protection measures around all excavations;
- All plant will be sourced from a trusted reputable company and will come with spill kits which site personnel will be trained to use;
- All storage containers would remain within the site compound outside of the floodplain, and be appropriately bunded to prevent any spillages or leaks.
- No storage of materials or refuelling operations will be permitted outside the site compound.
- Early warning system to alert work force to rising river levels, along with monitoring of weather forecasts to predict potential flood events and initiate measures to reduce risks of sediment release.

8.2.26 In addition to these measures during the construction phase the drainage design for the Scheme includes isolation devices on all pipe outfalls and petrol interceptors for the two drainage catchments that outfall directly to the Afon Dyfi.

8.2.27 In light of these measures it is considered unlikely that pollution will enter the river either during the construction or operation phase. Similarly the risk of sediment-laden run-off entering the river is considered to be low except in exceptional rainfall events. During these events the river is likely to have a high sediment burden through natural processes and run-off from other areas.

8.2.28 It is therefore considered that The Scheme on its own, will not give rise to significant effects on the Dyfi Estuary SPA.

Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites SAC

Conservation Objectives and Current Conservation Status: Lesser Horseshoe Bat

8.2.29 The Core Management Plan for the Meirionydd Oakwoods and Bat Sites SAC (CCW, 2008b) states that the lesser horseshoe bat population of the site would be considered to be in a favourable conservation status, where all of the following conditions are satisfied:

- The population of lesser horseshoe bats should be maintained at its current size and encouraged where possible to increase;
- There are sufficient breeding roosts (buildings, structures and trees) and hibernation roosts (mines and buildings) of appropriate quality;

- Foraging or feeding habitat in the SAC and surrounding countryside, including grasslands and some gardens, is of appropriate quality, extent and connectivity across the range;
- The range of the population within the SAC/Gwynedd is stable or increasing;
- All factors affecting the achievement of these conditions are under control.

8.2.30 Indicators for the feature include:

- Population size (expected to be within the normal range for the roosts counted and in line with current trends);
- Roost sites (should be maintained and where possible enhanced, free from disturbance, with well-connected flight lines. Roads should have closed canopy crossings without street lighting);
- Foraging habitat (no loss of habitat or decline in its quality)
- Range (known roost sites within the SAC should be continue to be used).

8.2.31 The lesser horseshoe bat population within the SAC is currently considered to be in favourable condition.

Consideration

8.2.32 Although lesser horseshoe bats are a mobile species, the core range around maternity sites is 4 - 5km, with movement of up to 11km between summer and winter roosts (Catherine Bickmore Associates, 2003). It is therefore likely that the lesser horseshoe bats recorded during the surveys were associated with the maternity roosts present at Plas Llwyn-Gwern to the north of the Scheme. However a network of roosts exists to the north and there is therefore the potential for bats from this colony to interact with and support bats within the SAC designated population.

8.2.33 Construction will lead to removal of vegetation within the construction footprint, most notably hedgerows and trees on the northern bank of the Afon Dyfi. The area of vegetation to be removed will be kept as small as possible, and the landscape proposals which for an intrinsic part of the Scheme will include a mixture of plant heights when planted to recreate the vegetation on either side of the Scheme. During the construction phase there will be restrictions on night working in the vicinity of the river corridor and any lighting of compounds or laydown areas will be restricted to avoid light spill to adjacent vegetation.

8.2.34 Despite the PEU measures outlined above, the potential for effects on lesser horseshoe bats, through habitat fragmentation,

cannot be excluded. However given the distance from the SAC roost sites, it is considered that any effect would not be discernable compared to natural fluctuations in population levels within the SAC designated roosts. Furthermore this impact would not restrict the ability of the SAC to achieve the conservation objectives for the lesser horseshoe bat feature. It is therefore concluded that although there is the potential for an effect from the Scheme alone, this effect would not be significant.

9 In-Combination Assessment

9.1.1 As stated above in Section 5, with the exception of NRW's forest management plans, there are no other projects within the vicinity of the Scheme which could potentially give rise to in combination effects. Those projects which have been identified, comprising proposed residential development within Machynlleth, have been considered and there are no discernable pathways to give rise to in-combination effects.

9.1.2 It has been identified that NRW's forest management plans could be a source of sediment to the Afon Dyfi when felling operations give rise to areas of bare ground at risk of erosion. However the principle effect highlighted in relation to the forest management plans was that of acidification. The construction and operation of the proposed Scheme would not give rise to any acidification of the Afon Dyfi and therefore there is no potential for interaction between these plans and the Scheme to give rise to in-combination effects.

9.1.3 In relation to the potential for effects on lesser horseshoe bats, the rotational felling of trees within the NRW forest areas have the potential to affect bat flight lines. Although lesser horseshoes are unlikely to foraging within coniferous woodland, they may use it to move between roost sites and foraging areas. However it is likely that sufficient fringes of vegetation would be left at the edge of forest coops such that lesser horseshoe bats would still be able to move through the landscape. Therefore although there is the potential for an in-combination effect between the NRW forest management plans and the Scheme, this is not considered to be significant within the SAC population.

10 Monitoring Proposals

10.1.1 During the construction phase monitoring will be undertaken including the monitoring of bat activity using static detectors and, otter activity using trail cameras. Daily inspections of water course outfalls will also be undertaken to monitor for any potential water pollution and identify preventative actions.

11 Conclusions

11.1.1 The proposed Scheme has the potential to give rise to minor effects on the Dyfi Estuary SPA and the Pen Llyn a'r Sarnau SAC in terms of localised sediment run-off and disturbance to otters, these will be controlled or eliminated either by measures included within the Scheme design, as set out in Section 3, or by plainly established and uncontroversial construction practices.

11.1.2 The proposed Scheme also has the potential to give rise to minor effects on the Meirionydd Oakwoods and Bat Sites SAC through the fragmentation of habitat caused by severing flight lines. However any effect would be very small and not discernable from natural fluctuations in the population level within the SAC designed roosts.

11.1.3 With the exception of the NRW forest management plans, no additional plans or projects were identified with the potential to incur in-combination effects with the Scheme. Considering effects of the Scheme in-combination with the forest management plans, the assessment predicts the likelihood of no significant effect in terms of water quality.

11.1.4 NRW's forest management operations could also affect the flight lines of lesser horseshoe bats, however due to the poor quality of coniferous woodland as foraging habitat for bats and the presence of other vegetation corridors it is considered that any in-combination effect between the Scheme and forest management on lesser horseshoe bats would not be significant.

11.1.5 Consequently, it is concluded that there is the likelihood of no significant effects, either alone or in-combination with other plans and projects, resulting from the Scheme. This has been concluded based on the information provided which shows that progress towards achieving the relevant conservation objectives of the qualifying features will not be interrupted or delayed. The Scheme will also not disrupt the factors which help maintain favourable condition and interfere with the balance, distribution and density of key indicator species of the favourable condition of these European sites.

11.1.6 DMRB HD44/09 guidance (Highways Agency, 2009) recommends that, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010, answers to the following questions should be provided (based on the information presented) when concluding a SIAA. These are addressed in turn here:

a. *Is the proposal directly connected with or necessary to site management for nature conservation?*

b. The Scheme is neither connected with nor necessary to site management for any of the European sites considered within this document.

c. *Is the proposal likely to have a significant effect on the features of the site of European Importance, alone or in combination with other plans and projects?*

11.1.7 The Screening Stage concluded that although there is the potential for effects on lesser horseshoe bats, these are not considered to be significant. It is therefore not necessary for an Appropriate Assessment to be carried out for the Scheme.

11.1.8 Therefore, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010, it is considered that there is a likelihood of no significant effects on the features European sites considered within this SIAA either alone or in-combination with other plans and projects.

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Appendix A

Scheme Design Drawings

Appendix B

Screening Stage

Project Name:	**A487 New Dyfi Bridge**	
European Site under consideration:	Dyfi Estuary SPA	
Date:	Author:	Verified
22nd April 2015	Pete Wells	Paul Clack
Description of Project		
Size and scale (road type and probable traffic volume)	Approximately 1200m single carriageway road to replace the existing of the Afon Dyfi and its floodplain. 725m of the scheme is on a viaduct and bridge structure. The scheme also includes the creation of a flood protection bund around the existing Dyfi Eco Park and a pumped drainage scheme to address issues of flooding at the railway overbridge on the northern side of Machynlleth.	
Land-take	The total area of the scheme footprint including crane pads and laydown areas is 10.2ha	
Distance from the European Site or key features of the site (from edge of the project assessment corridor)	The scheme is located approximately 4.3km upstream of the Dyfi Estuary SPA boundary but is hydraulically connected via the Afon Dyfi.	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	All materials required for the construction of the Scheme (including concrete, steel and imported fill/topsoil) will be sourced from appropriate suppliers within the local/regional area. These will not be sourced from within or near to the Dyfi Estuary SPA. The suppliers of materials will be determined during the detailed design stage.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The proposed scheme replaces the existing road across the floodplain and Afon Dyfi. Emissions in terms of highways drainage and air quality emissions are largely unchanged. There is the potential for sediment run-off during construction in the event of heavy rainfall and flood events however this will be avoided using PEU measures. The inclusion of interceptors and isolation devices within the drainage design will result in better protection of the Afon Dyfi from pollutants during the Operation of the Scheme.	
Excavation requirements (e.g. impacts of local hydrogeology)	Excavations will be required for pile caps for the viaduct piers and at the northern abutment these will be in excess of 4km from the Dyfi Estuary SPA.	
Transportation requirements	It is envisaged that the Scheme could generate up to approximately 10 total workforce trips (to and from site) per day, and approximately 15 total construction vehicle trips (to and from site) per day. None of these trips will be undertaken close to the Dyfi Estuary SPA.	
Duration of construction, operation,	The duration of the works is currently estimated to require a construction period of approximately 25 months, including advance works/vegetation clearance/utility diversions, archaeological testing, and de-trunking of the existing road.	
Other		
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:		
Nature of proposals	Pollution prevention measures including sediment management and early flood warning system	

Project Name:	**A487 New Dyfi Bridge**
Location	Within the construction areas
Evidence for effectiveness	Plainly established good construction practice as recommended by organisations such as CIRIA and the Environment Agency/Natural Resources Wales.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Implementation of an agreed Construction Environmental Management Plan. CPO to purchase land for measures included in the Scheme design.
Characteristics of European Site A brief description of the European Site should be produced, including information on:	
Name of European Site and its EU code	Dyfi Estuary / Aber Dyfi Special Protection Area UK9020284
Location and distance of the European Site from the proposed works	The Dyfi Estuary SPA is located approximately 4.3km to the west of the proposed scheme, comprising the tidal estuary or the Afon Dyfi and adjacent areas of floodplain and grazing marsh
European Site size	2056.5ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SPA is designated for the wintering population of Greenland white-fronted geese (*Anser albifrons flavirostris*) which comprises 1% of the GB population (5-year peak mean for 1993/4 – 1997/8)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The current condition of the feature (February 2008) is declining and the conservation status is unfavourable. A general decline in Greenland white-front populations has taken place in the last decade. Worldwide, numbers have declined from a high of 35,600 in 1999/2000 to an estimated 24,895 in 2006. This decline is reflected in the Dyfi wintering flock, in which wintering numbers have declined steadily from 167 in 1998/99 to less than 103 in the last three winters (2005-6 to 2007-8). The decline is also mirrored at other sites such as in SW Scotland and at Wexford. The principal issue relating to the status of the wintering Greenland white-fronted geese at Dyfi involves lack of population recruitment.
European Site conservation objectives – where these are readily available	The feature is considered to be in a favourable conservation status, where all of the following conditions are satisfied: • The Dyfi wintering population attains national importance level (ie.1% of the national (UK) population), annually. • Winter mortality levels are 5% of the wintering population annually. • All site-specific factors affecting the achievement of these conditions (eg. avoidable disturbance), are under control
Assessment Criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
Impacts are considered to be the potential disturbance of white-fronted geese out with the SPA boundary and the potential for indirect impacts from changes in water quality affecting supporting habitats within the SPA.	
Initial Assessment The key characteristics of the site and the details of the European	

Project Name:	**A487 New Dyfi Bridge**
Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	There is no direct impact on habitats within the SPA. There is the potential for pollution and/or sediment run-off entering the Afon Dyfi however this will be controlled by implementation of pollution control measures and planning of works to reduce risk of sediment release during flood events. Furthermore any sediment or pollution entering the Afon Dyfi at the location of the scheme will be subject to substantial dilution within the watercourse before entering the SPA boundary.
Disturbance to key species	The biological records search undertaken reported no records of white-fronted geese within the search area (5km) around the Scheme. Surveys undertaken between October 2015 and March 2016 for wintering birds did not record any white-fronted geese within the Study Area. As geese are not present with the vicinity of the Scheme there is no risk of disturbance to this species.
Habitat or species fragmentation	No impacts predicted
Reduction in species density	No impacts predicted
Changes in key indicators of conservation value (water quality, etc)	There is the potential for pollution and/or sediment run-off entering the Afon Dyfi however this will be controlled by implementation of pollution control measures and planning of works to reduce risk of sediment release during flood events. Furthermore any sediment or pollution entering the Afon Dyfi at the location of the scheme will be subject to substantial dilution within the watercourse before entering the SPA boundary.
Climate change	The potential implications of climate change including potential increased or more regular flooding, and/or sea level rise are likely to have an effect on the Dyfi Estuary SPA and geese populations. The Scheme has been designed to take in to account an allowance of 30% increase in flood depth from climate change.
Describe any likely impacts on the European Site as a whole in terms of	
Interference with the key relationships that define the structure of the site	No impacts are predicted
Interference with key relationships that define the function of the site	There is the potential for pollution and/or sediment run-off entering the Afon Dyfi which could affect support habitats for the geese population. However this will be controlled by implementation of pollution control measures and planning of works to reduce risk of sediment release during flood events. Furthermore any sediment or pollution entering the Afon Dyfi at the location of the scheme will be subject to substantial dilution within the watercourse before entering the SPA boundary.
Indicate the significance as a result of the identification of impacts set out above in terms of	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species	Not significant

Project Name:	**A487 New Dyfi Bridge**
fragmentation	
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Change to key elements of the site (e.g. water quality, hydrological regime etc)	The possible changes in water quality taking into account the implementation of pollution prevention measures and dilution are not considered likely to have a significant effect within the SPA.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
None	
Outcome of screening stage (delete as appropriate).	Not Likely to be Significant Effects
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES

Project Name:	**A487 New Dyfi Bridge**	
European Site under consideration:	Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	
Date:	Author:	Verified
22nd April 2015	Pete Wells	Paul Clack
Description of Project		
Size and scale (road type and probable traffic volume)	Approximately 1200m single carriageway road to replace the existing of the Afon Dyfi and its floodplain. 725m of the scheme is on a viaduct and bridge structure. The scheme also includes the creation of a flood protection bund around the existing Dyfi Eco Park and a pumped drainage scheme to address issues of flooding at the railway overbridge on the northern side of Machynlleth.	
Land-take	The total area of the scheme footprint including crane pads and laydown areas is 10.2ha	
Distance from the European Site or key features of the site (from edge of the project assessment corridor)	The scheme is located approximately 4.3km upstream of the Dyfi Estuary SPA boundary but is hydraulically connected via the Afon Dyfi.	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	All materials required for the construction of the Scheme (including concrete, steel and imported fill/topsoil) will be sourced from appropriate suppliers within the local/regional area. These will not be sourced from within or near to the Dyfi Estuary SPA. The suppliers of materials will be determined during the detailed design stage.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The proposed scheme replaces the existing road across the floodplain and Afon Dyfi. Emissions in terms of highways drainage and air quality emissions are largely unchanged. There is the potential for sediment run-off during construction in the event of heavy rainfall and flood events however this will be avoided using PEU measures. The inclusion of interceptors and isolation devices within the drainage design will result in better protection of the Afon Dyfi from pollutants during the Operation of the Scheme..	
Excavation requirements (e.g. impacts of local hydrogeology)	Excavations will be required for pile caps for the viaduct piers and at the northern abutment. These will be in excess of 4km from the SAC.	
Transportation requirements	It is envisaged that the Scheme could generate up to approximately 10 total workforce trips (to and from site) per day, and approximately 15 total construction vehicle trips (to and from site) per day. None of these trips will be undertaken close to the SAC.	
Duration of construction, operation,	The duration of the works is currently estimated to require a construction period of approximately 25 months, including advance works/vegetation clearance/utility diversions, archaeological testing, and de-trunking of the existing road.	

Project Name:	**A487 New Dyfi Bridge**
Other	
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Pollution prevention measures including sediment management and early flood warning system
Location	Within the construction areas
Evidence for effectiveness	Plainly established good construction practice as recommended by organisations such as CIRIA and the Environment Agency/Natural Resources Wales.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Implementation of an agreed Construction Environmental Management Plan. CPO to purchase land for measures included in the Scheme design.
Characteristics of European Site A brief description of the European Site should be produced, including information on:	
Name of European Site and its EU code	Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC UK0013117
Location and distance of the European Site from the proposed works	The Pen Llyn a'r Sarnau SAC is located on the west Wales coast extending from Clarach 2.5km north of Aberystwyth, to Porth Dinllaen on the north coast of the Llyn Peninsula, and includes the three major estuaries of the Afon Dyfi, Afon Mawddach and Afon Glaslyn.
European Site size	146,010.52ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	1110 Sandbanks which are slightly covered by seawater all the time 1130 Estuaries 1150 Coastal lagoons 1160 Large shallow inlets and bays 1170 Reefs 1140 Mudflats and sandflats not covered by seawater at low tide 1310 Salicornia and other annuals colonizing mud and sand 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) 8330 Submerged or partially submerged sea caves 1349 Bottlenose dolphin 1355 Otter 1364 Grey seal
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The range of different habitat types within each of the SAC's features is extremely wide and marine habitats and species populations are inherently dynamic. The range and scale of both natural and anthropogenic stressors on the marine habitats and species within the SAC are also very large. Human activities have the potential to impose stresses on each habitat's structure

Project Name:	**A487 New Dyfi Bridge**
	and function in many ways that result in acute, chronic or permanent impacts at different spatial scales. Species populations may also be affected at many levels e.g. physiological, genetic, single organism, population and groups of species.
European Site conservation objectives – where these are readily available	Habitat Features: The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing. The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded. Important elements include: - geology - sedimentology - geomorphology - hydrography and meteorology - water and sediment chemistry - biological interactions. The presence, abundance, condition and diversity of typical species are such that habitat quality is not degraded. Important elements include: - species richness - population structure and dynamics - physiological heath - reproductive capacity - recruitment - mobility - range Species Features: The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements are population size, structure, production, and condition of the species within the site. The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future. The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include; - Distribution - Extent - Structure - function and quality of habitat - prey availability and quality
Assessment Criteria Describe the individual elements of the project (either alone or in combination with	

Project Name:	**A487 New Dyfi Bridge**
other plans or projects) likely to give rise to impacts on the European Site.	
Impacts are considered to be the potential disturbance of otter out with the SAC boundary and the potential for indirect impacts from changes in water quality affecting habitats within the SAC.	
Initial Assessment The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	There is no direct impact on habitats within the SAC. There is the potential for pollution and/or sediment run-off entering the Afon Dyfi however this will be controlled by implementation of pollution control measures and planning of works to reduce risk of sediment release during flood events. Furthermore any sediment or pollution entering the Afon Dyfi at the location of the Scheme will be subject to substantial dilution within the watercourse before entering the SAC boundary.
Disturbance to key species	The construction of the scheme has the potential to disturb otters present on the Afon Dyfi. A potential resting place for otters has been identified approximately 60m from the proposed scheme. Monitoring has not found evidence of this feature being actively used.
Habitat or species fragmentation	The scheme is considered unlikely to cause fragmentation of the otter population as night working will be restricted in the vicinity of the river corridor. Once in operation the Scheme is not predicted to give rise to fragmentation as otter will be able to pass across the floodplain beneath the viaduct structure or use the livestock underpass on the northern abutment in extreme flood events.
Reduction in species density	The Scheme is not predicted to affect species diversity within the SAC for the reasons set out above.
Changes in key indicators of conservation value (water quality, etc)	There is the potential for pollution and/or sediment run-off entering the Afon Dyfi however this will be controlled by implementation of pollution control measures and planning of works to reduce risk of sediment release during flood events. Furthermore any sediment or pollution entering the Afon Dyfi at the location of the scheme will be subject to substantial dilution within the watercourse before entering the SAC boundary.
Climate change	The potential implications of climate change including potential increased or more regular flooding, and/or sea level rise are likely to have an effect on the habitats within the SAC. The Scheme has been designed to take in to account an allowance of 30% increase in flood depth from climate change.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts are predicted
Interference with key relationships that define the	There is the potential for pollution and/or sediment run-off entering the Afon Dyfi which could affect habitats

Project Name:	**A487 New Dyfi Bridge**
function of the site	within the SAC. However this will be controlled by implementation of pollution control measures and planning of works to reduce risk of sediment release during flood events. Furthermore any sediment or pollution entering the Afon Dyfi at the location of the scheme will be subject to substantial dilution within the watercourse before entering the SAC boundary.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Not significant
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Change to key elements of the site (e.g. water quality, hydrological regime etc)	The possible changes in water quality taking into account the implementation of pollution prevention measures and dilution are not considered likely to have a significant effect within the SPA.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
None	
Outcome of screening stage (delete as appropriate).	Significant Effects are Likely/ Sufficient Uncertainty Remains/ Not Likely to be Significant Effects
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES

Project Name:	**A487 New Dyfi Bridge**	
European Site under consideration:	Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites SAC	
Date:	Author:	Verified
22nd August 2016	Pete Wells	Paul Clack
Description of Project		
Size and scale (road type and probable traffic volume)	Approximately 1200m single carriageway road to replace the existing of the Afon Dyfi and its floodplain. 725m of the scheme is on a viaduct and bridge structure. The scheme also includes the creation of a flood protection bund around the existing Dyfi Eco Park and a pumped drainage scheme to address issues of flooding at the railway overbridge on the northern side of Machynlleth.	
Land-take	The total area of the scheme footprint including crane pads and laydown areas is 10.2ha	
Distance from the European Site or key features of the site (from edge of the project assessment corridor)	The scheme is located approximately 13.2km from the SAC boundary.	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	All materials required for the construction of the Scheme (including concrete, steel and imported fill/topsoil) will be sourced from appropriate suppliers within the local/regional area. These will not be sourced from within or near to the SAC. The suppliers of materials will be determined during the detailed design stage.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The proposed scheme replaces the existing road across the floodplain and Afon Dyfi. Emissions in terms of highways drainage and air quality emissions are largely unchanged. There is the potential for sediment run-off during construction in the event of heavy rainfall and flood events however this will be avoided using PEU measures. The inclusion of interceptors and isolation devices within the drainage design will result in better protection of the Afon Dyfi from pollutants during the Operation of the Scheme.	
Excavation requirements (e.g. impacts of local hydrogeology)	Excavations will be required for pile caps for the viaduct piers and at the northern abutment. These will be in excess of 13km from the SAC	
Transportation requirements	It is envisaged that the Scheme could generate up to approximately 10 total workforce trips (to and from site) per day, and approximately 15 total construction vehicle trips (to and from site) per day. Although some construction deliveries will need to come in to the northern side of the Afon Dyfi via the A487, these will use main roads and not require any amendments to road alignments.	
Duration of construction, operation,	The duration of the works is currently estimated to require a construction period of approximately 25 months, including advance works/vegetation clearance/utility diversions, archaeological testing, and	

Project Name:	**A487 New Dyfi Bridge**
	de-trunking of the existing road.
Other	
Description of avoidance and/or mitigation measures Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Pollution prevention measures including sediment management and early flood warning system
Location	Within the construction areas
Evidence for effectiveness	Plainly established good construction practice as recommended by organisations such as CIRIA and the Environment Agency/Natural Resources Wales.
Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)	Implementation of an agreed Construction Environmental Management Plan. CPO to purchase land for measures included in the Scheme design.
Characteristics of European Site A brief description of the European Site should be produced, including information on:	
Name of European Site and its EU code	Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionydd Oakwoods and Bat Sites SAC UK0014789
Location and distance of the European Site from the proposed works	The SAC is located approximately 13.2km north from the Scheme
European Site size	1832.55ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	91A0 Old Sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alno incanae, Salicion albae) 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation 4010 Northern Atlantic wet heaths with Erica tetralix 4030 European dry heaths 9180 Tilio-Acerion forests of slopes, screes and ravines 91D0 Bog woodland 1303 Lesser horseshoe bat
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Habitats that are key features of the SAC are vulnerable to changes in drainage, grazing regime, woodland management practices, spread of invasive plant species and increased visitor pressure. The lesser horseshoe bats are vulnerable to loss of roost sites, increased disturbance and loss of foraging habitat.
European Site conservation objectives – where these are readily available	The conservation objectives for the lesser horseshoe bat feature are: 1. The population of lesser horseshoe bats should be maintained at its current size and encouraged where possible to increase. 2. There are sufficient breeding roosts (buildings, structures and trees) and hibernation roosts

Project Name:	**A487 New Dyfi Bridge**
	(mines and buildings) of appropriate quality. The other types of roost such as night, transitional, leks and swarming sites, should also be maintained as our knowledge of these often significant roosts improves. 3. Foraging or feeding habitat in the SAC and surrounding countryside, including grasslands and some gardens, is of appropriate quality, extent and connectivity across the range. 4. The range of the population within the SAC/Gwynedd is stable or increasing. 5. All factors affecting the achievement of these conditions are under control.
Assessment Criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
Impacts are considered to be the potential disturbance of lesser horseshoe bat out with the SAC boundary.	
Initial Assessment The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	There is no direct impact on habitats within the SAC.
Disturbance to key species	The construction of the scheme has the potential to disturb lesser horseshoe bats present on and around the Afon Dyfi, however given the distance of the SAC from the Scheme these are unlikely to be animals associated with the SAC population.
Habitat or species fragmentation	The scheme is considered unlikely to cause fragmentation of the lesser horseshoe bat population as night working will be restricted in the vicinity of the river corridor. Once in operation the Scheme is not predicted to give rise to fragmentation as landscaping measures will become established and no adverse lighting effects are predicted.
Reduction in species density	The Scheme is not predicted to affect species diversity within the SAC for the reasons set out above.
Changes in key indicators of conservation value (water quality, etc)	None are expected to the single mobile qualifying feature of the SAC (lesser horseshoe bats).
Climate change	The potential implications of climate change including potential increased or more regular flooding, and/or sea level rise are likely to have an effect on the species within the SAC. The Scheme has been designed to take in to account an allowance of 30% increase in flood depth from climate change. The inclusion of landscape planting around the northern abutment will ensure that lesser horseshoe bat flight lines are maintained beneath the structure.
Describe any likely impacts on the European Site as a whole in terms of:	

Project Name:	**A487 New Dyfi Bridge**
Interference with the key relationships that define the structure of the site	No impacts are predicted
Interference with key relationships that define the function of the site	None are expected to the single mobile qualifying feature of the SAC (lesser horseshoe bats).
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Not significant
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Change to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
None	
Outcome of screening stage (delete as appropriate).	~~Significant Effects are Likely/ Sufficient Uncertainty Remains/~~ Not Likely to be Significant Effects
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	YES