Llywodraeth Cymru
Welsh Government

A55(T) Chester to Bangor Trunk Road: Abergwyngregyn to Tai'r Meibion Improvement

ENVIRONMENTAL STATEMENT
VOLUME 2: TECHNICAL APPENDIX E
ASSESSMENT OF IMPLICATIONS ON EUROPEAN SITES REPORT

YGC

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A55(T) Abergwyngregyn to Tai'r Meibion Improvement

ASSESSMENT OF IMPLICATIONS ON EUROPEAN SITES

STATEMENT TO INFORM APPROPRIATE ASSESSMENT

STAGE 1 SCREENING OF LIKELY SIGNIFICANT EFFECTS REPORT

APRIL 2017

YGC

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Contents

Executive Summary

This report presents the findings of a Stage 1 Assessment of Implications on European Sites (AIES) undertaken to consider the effects of the proposed A55(T) Abergwyngregyn to Tai'r Meibion Improvement upon the Menai Strait and Conwy Bay SAC, Traeth Lafan SPA, Coedydd Aber SAC, Snowdonia SAC, Afon Gwyrfai a Llyn Cwellyn SAC, Gwydyr Forest Mines SAC, Meirionnydd Oakwoods and Bat Sites SAC and Glynllifon SAC. The Welsh Ministers are the Competent Authority for this project.

The proposal is located in Gwynedd on the A55(T) between Abergwyngregyn to the east and Tan y Lon, near Bangor, to the west from NGR 262194, 371253 to 265109, 372670 (see Appendix, Figure 1). The Scheme includes the on-line widening of a 2.2km length of dual carriageway trunk road to current standards with hard strips and a new central concrete vehicle containment barrier. A new 1.6km county road will join the Tal y Bont interchange (Junction 12) with the Wig Crossing Cottages access road and a Private Means of Access (PMA)/Non-motorised User route (NMU) from this point to the Abergwyngregyn interchange (Junction 13). A new farm access track would be directed through the fields to the south-east of Tai'r Meibion. An 860m length of the unclassified Roman Road south of Tai'r Meibion would be widened to a 4.8m wide carriageway to accommodate agricultural vehicles. The Scheme also includes an advance works phase to excavate a 1.6km long open cut-off channel located in fields to the south of the A55(T) road from the east of Tai'r Meibion Farm to the eastern extent of the scheme (see Appendix, Figures 2.1 to 2.7). These are works which would have had to be carried out, subject to landowner agreement, irrespective of whether the Scheme proceeds but have been included in the AIES of the Scheme.

Two European protected sites which lie within 2km of the proposal were scoped out of the assessment (Coedydd Aber SAC and the Snowdonia SAC) due to a lack of Qualifying Features likely to be affected by the proposals and there being a lack of potential pollution pathways from the proposals to these sites.

The scope of the assessment was refined to the following six European sites and their qualifying features:

Menai Strait and Conwy Bay SAC

- 1110 Sandbanks which are slightly covered by sea water all the time
- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1170 Reefs
- 1160 Large shallow inlets and bays
- 8330 Submerged or partially submerged sea caves

Traeth Lafan SPA

- A130 Eurasian Oystercatcher (*Haematopus ostralegus*)
- A160 Eurasian Curlew (*Numenius arquata*)
- A005 Great Crested Grebe (*Podiceps cristatus*)

Afon Gwyrfai a Llyn Cwellyn SAC

- 1355 Otter (*Lutra lutra*)

Gwydyr Forest Mines SAC, Meirionnydd and Oakwoods and Bat Sites SAC & Glynllifon SAC

- 1303 Lesser horseshoe bat (*Rhinolophus hipposideros*)

In summary, the A55(T) Abergwyngregyn to Tai'r Meibion Improvement project is neither connected with nor necessary to site management for any of the European sites considered within this document. The A55(T) Abergwyngregyn to Tai'r Meibion Improvement AIES Stage 1: Screening concluded, in consideration of plainly established and uncontroversial mitigation and design

measures, that Likely Significant Effects (LSE's) could be ruled out on the qualifying features of the following European sites (summarised in Section 6 of this SIAA) and is considered to provide conservation benefits compared to the existing situation.

The proposals will not create significant effects, assuming the implementation of the mitigation measures outlined in Section 10.1 to 10.3 of this SIAA, the proposals will not adversely affect the conservation objectives nor delay or interrupt progress towards achieving these. As detailed within this assessment, the implementation of the mitigation measures outlined within this SIAA will ensure that the proposals will not adversely affect the integrity of the sites beyond reasonable scientific doubt.

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

1.0 Introduction and Purpose of the Report

1.1 Purpose and Scope of the Report

This report has been prepared to provide information to the Welsh Ministers ("the Competent Authority") with a draft Statement to Inform an Appropriate Assessment (SIAA) of the implications of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement on European Sites as required by Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended) (the 'Habitats Regulations'). Prior to the production of this draft SIAA, Natural Resources Wales (NRW), North and Mid Wales Trunk Road Agent (NMWTRA) and Gwynedd Council (GC) were consulted on a draft Screening Assessment AIES (YGC, July 2016).

The objectives of this report are to:

- Provide information on the ecological interests of the European Sites;
- Assess the likely nature and scale of any impacts on the European sites, along with other relevant projects in the same area.

1.2 Justification for the Project

The A55(T) Chester to Bangor Trunk Road is an important strategic transport route in North Wales forming a link between the ferry port of Holyhead and the motorway system in Cheshire and Merseyside. It also serves numerous settlements along the North Wales Coast, providing a route for commercial, tourist and local traffic.

Under the United Nations Agreement of 1975 on international traffic arteries, the A55(T) forms part of the 5,320km Euroroute E22 between Holyhead, Wales and Ishim, Russia. The route is of international importance for commercial vehicles travelling through Continental Europe and the United Kingdom, and the continuing improvement of the highway network is hence vital for the ongoing economic development and social well-being of the area.

This section of the A55(T) is now around 45 years old and the vertical alignment, although originally designed to standards current at the time, does not comply with the present-day standards to which the adjacent sections have been built. The existing forward visibility distances are significantly below current requirements and the central reserve gaps, private entrances, field accesses and junction with the county road are often used by slow-moving vehicles, which is a detriment to the free and safe flow of through traffic on the A55(T). The Scheme would aim to address these deficiencies.

In July and November 2012 and December 2015, there was severe flooding on the A55(T) when culverts upstream became blocked and water flowed across the fields and onto the highway, causing partial and/or total closure of the A55(T). There are many other instances when one westbound lane has been closed due to flooding. Improvements are therefore required to alleviate this problem and ensure future resilience to flooding.

Further detail on the background of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement, including further context and history, is provided in the A55(T) Chester to Bangor Trunk Road: Abergwyngregyn to Tai'r Meibion Improvement Environmental Statement (YGC, 2016).

1.3 Legislation

The 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'). Regulation 61 of the Habitats Regulations requires the competent authority, to consider whether the plan or project:

- is likely to have a significant effect on a European site (either alone or in combination with other plans or projects);
- is not directly connected with or necessary to the management of that site.

The guidance provided in Welsh Government's Interim Advice Note 116/08 Nature conservation in relation to bats and the guidance provided in the European Commission's Managing Natura 2000 Sites has been followed during the process of identifying and assessing the significance of Likely Significant Effects.

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.

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.

This SIAA report sets out a summary of the AIES Stage 1: Screening Report (Welsh Government, 2015; see Section 4.5.2 of this report) and describes the Stage 2: Appropriate Assessment of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement on European sites, with specific consideration of effects in relation to the conservation objectives of the features of European sites where a LSE has been identified in Stage 1.

1.4 Use of Guidance

This report addresses the Screening stage following the guidance provided in *HD 44/09: Assessment of Implications (of Highways and/or Roads Projects) on European sites (including Appropriate Assessment)*, David Tyldesley Associates' 2011 '*Assessing Projects under the Habitats Directive. Guidance for Competent Authorities* and the European Commission's 2000 '*Managing Natura 2000 Sites'* and the provisions of Article 6 of the 'Habitats' Directive 92/43/CEE.

2.0 Background to the Proposals

2.1 Aims and Goals

The overall aim of the Scheme is to improve safety standards and resilience to flooding and potential traffic growth along this section of the A55(T). The overarching scheme objectives for the Scheme are therefore as follows:

- improving the standards of a strategically important highway to ensure that it provides efficient future connectivity between communities and economic hubs;
- alleviating flooding issues to ensure ongoing transport connectivity and resilience to climate change;
- improving pedestrian and cycling access connections to provide alternative, healthier forms of travel;
- enhancing biodiversity and future connectivity for wildlife at the locality, and;
- considering the aims of sustainable development within the design, construction and operation of the Scheme.

The Scheme will involve improving the vertical alignment of the A55(T) to the required standard in order to achieve the required stopping sight distance (SSD). This will be achieved mainly through new construction but, where possible, re-surfacing will be carried out. The detailed design will be finalised following statutory approval of the proposals. The assessment has therefore been based on the current design outlined in section 2.2: Scheme Overview. It is understood that any significant changes to the current design would require further consultation with the Statutory Environmental Bodies.

2.2 Scheme Overview

The Welsh Government has statutory powers and responsibility for the maintenance and improvement of the A55(T). The section of the A55(T) between Tai'r Meibion and Abergwyngregyn was one of the first to be improved to dual carriageway standards in the late 1960's and does not comply with current highway standards. The document 'Driving Wales Forward' (The Welsh Office, 1998) identified the A55(T) as part of the core network in Wales and recognised a lack of safe turning arrangements between Tal-y-Bont and Abergwyngregyn.

When the issue of re-construction of the highway pavement initially arose the work was to be undertaken under the Welsh Government's Major Maintenance Programme. However, as the scheme was being developed it was decided that a full upgrade was required to bring the section up to the same standards as the remainder of the A55(T). The scheme was listed as a repair and upgrade scheme in Annex 2 of the Welsh Government's Trunk Road Forward Programme in 2002 and moved to Phase 2 ("could be ready to start by April 2010") in the 2004 supplement (Welsh Assembly Government, 2004).

An ES, SIAA and draft Orders for the Scheme were published in July 2008, but under the 2008 Reprioritisation of the Trunk Road Forward Programme the scheme was moved to Phase 3 ('*unlikely to be ready to start before April 2014*') and the draft Orders were withdrawn in 2009.

The Scheme has since been identified within the Welsh Government's National Transport Finance Plan 2015[1] (NTFP) to be implemented in the short term in order to address journey time reliability and improve network resilience. Therefore, the previously-published design has been reviewed against the current standards and objectives, and new draft Orders are to be published along with an ES and this SIAA.

[1] National Transport Finance Plan – Welsh Government, 2015

The location of the Scheme is presented on Figure 1a below and is shown in Figure 1 located in the Appendix of this report. The location of the proposal in relation to European Protected sites within 2km of the proposal is provided on Figure 3 of the Appendix. The nearest European protected sites to the Scheme are the Menai Strait and Conwy Bay SAC and Traeth Lafan SPA that are situated approximately 410m to the north at their closest. The location of the proposal in relation to European Protected sites within 25km and 30km with otter and Lesser Horseshoe bat as mobile species Qualifying Features respectively is shown on Figure 4 of the Appendix. The nearest European protected site with otter as mobile feature is the Afon Gwyrfai a Llyn Cwellyn SAC situated approximately 15km to the southwest. The nearest European protected site with Lesser Horseshoe bat as mobile feature is the Gwydyr Forest Mines SAC situated approximately 15km to the southwest. The General Arrangement of the proposal and a plan showing Water Features are shown in Figures 2.1 – 2.7 and 5 respectively of the Appendix of this report.

Figure 1a: General location of A55(T) Abergwyngregyn to Tai'r Meibion Improvement proposal (shown by bold red line).

The Scheme has been designed in accordance with the Government's Design Manual for Roads and Bridges (DMRB). The DMRB is a comprehensive manual which incorporates current Standards and Advice Notes relating to Trunk Roads. The design speed of 120kph (75mph), which is the normal design speed for dual carriageways, would match that of the adjacent sections.

The key design objectives to improve safety standards along this section of the A55(T) are:

1. Adding 1m wide hardstrips and improving the vertical alignment to improve forward visibility and hence safety;
2. Closing central reserve gaps, private entrances, field accesses and a junction with a county road and providing suitable alternative means of access for the properties affected in order to improve safety;
3. Reducing the risk of flooding of the carriageway by improving the drainage system;
4. Improving provision for non-motorised users, primarily by segregation from trunk road traffic.

The Scheme involves on-line improvements to a relatively straight section of dual carriageway and as such there are no viable alternative horizontal alignments. The western extent of the improvement section commences opposite Tai'r Meibion farm and continues eastwards to terminate approximately 300m south-west of the Abergwyngregyn interchange eastbound slip road

(Junction 13). Advance works commenced within the scheme footprint during February 2017 to improve network resilience to flood risk. These are works which would have been carried out, subject to landowner agreement, irrespective of whether the Scheme proceeds.

The length of the improvement is approximately 2.2km and consists of dual 7.3m wide two-lane carriageways with minimum 1.0m wide hard strips each side and a 2.5m wide verge beyond, giving at least 3.5m of relatively flat area beyond the edge of carriageway. A new concrete safety barrier is to be constructed within the central reserve. The central reserve would be 2.5m wide and hard-surfaced which combined with the 1.0m hardstrips on each side, gives an area totalling 4.5m in width.

The Scheme would involve improving the vertical alignment of the A55(T) to the required standard in order to achieve the required stopping sight distance (SSD). This would be achieved mainly through new construction but, where possible, re-surfacing would be carried out.

The proposed vertical alignment of each carriageway differs from the existing due to the need to comply with current design standards. Each carriageway would therefore have varying levels, in order to minimise the extent of works required and to keep within the level variation limit that can be accommodated by the proposed concrete barrier in the central reserve.

On the eastbound carriageway the points where the new carriageway level would differ most from the existing carriageway level are:

- approximately 0.5m above it in the vicinity of the Tai'r Meibion cattle underpass;
- approximately 0.8m above it just west of Wig Farm;
- slightly more than 1m above it just east of Wig Farm cattle underpass;
- approximately 1m above it at Bryn Meddyg;
- slightly less than 1m above it just west of The Old School.

On the westbound carriageway the greatest variations would be:

- approximately 0.6m above at the Tai'r Meibion cattle underpass;
- approximately 0.7m above just west of Wig Farm;
- approximately 0.8m above just east of Wig Farm cattle underpass;
- approximately 0.6m above at Bryn Meddyg;
- approximately 0.6m above just west of The Old School.

There are also some locations where the new carriageway level may be below the existing carriageway, but in general these are less than 0.5m differences. The changes to the carriageway level and addition of hardstrips would result in some modest variation of the existing earthworks slopes, generally involving no more than an extra 2m in width of the highway footprint. The construction of the drainage channel and bund to the south of the existing road would require additional land take, but not result in significant earthworks, with the bund being a maximum of 1m above existing ground level.

The central reserve gaps as well as almost all existing direct accesses onto the A55(T) over the scheme length would be stopped up, as would the county road junction to Wig Crossing Cottages, thus eliminating all vehicular accesses onto the eastbound carriageway. To accommodate this, a new county road and Private Means of Access would be constructed parallel to the eastbound carriageway, to provide safer access to the fields and properties located north of the A55(T).

The new county road (4.8m in width) would commence at the junction with Tal-y-Bont road (Junction 12) and continue for approximately 1.6km in an easterly direction parallel with the A55(T) eastbound carriageway and connect at a new junction with the existing county road to Wig Crossing Cottages. A new Private Means of Access (4.8m in width) would provide vehicular access from this

point to Wig farm and from there a new NMU route would continue east to Junction 13. The NMU route would be incorporated within the new county road and PMA to provide an access link for non-motorised travellers along the whole of the northern side of the A55(T) between Junctions 12 and 13. Where it is separate from the county road/PMA, it would generally be 2.5m wide, but narrowing to around 2m at a pinch point alongside the buildings of Pentre Aber farm.

A new combined direct access for Y Glyn Farm and the Bryn Meddyg properties onto the westbound A55(T) is proposed, with a link road to the Bryn Meddyg properties; this would provide a safer alternative to the current situation by providing a more gradual exit lane and better visibility on entering the A55(T).

To the south of the A55(T), the unclassified Roman (Henffordd) Road would be widened over a length of approximately 860m from the access to Tai'r Meibion farm to approximately 180m west of the settlement of Crymlyn. Over this length a 4.8m carriageway width would be provided to enable access for agricultural vehicles. A new agricultural track would be provided to maintain access for Wig farmland between Roman Road (Henffordd) and the Wig underpass.

A new footway is proposed between Tan yr Allt cottages and Llain y Ffwlbart to improve pedestrian access to the local bus service. This would have a 2m width from Tan yr Allt to the existing A55(T) overbridge. From the overbridge to Llain y Ffwlbart the width would be 1.8m. The new footway would be approximately 870m in length.

An advance works phase of the Scheme will also excavate a 1.6km long open cut-off channel located in fields to the south of the A55(T) road, that runs from east of Tai'r Meibion Farm to the eastern extent of the scheme, in order to alleviate flooding issues on the A55(T) by intercepting surface water runoff and overland flows during periods of heavy precipitation.

Structures

The existing cattle underpasses at Tai'r Meibion farm and Wig farm (each measuring internally 2.7m wide x 2.4m high) would be retained and extended 12m to the north and 2m to the south and 6m to the north and 2m to the south respectively, and the waterproofing renewed. These structures provide a valuable passage underneath the A55(T) for livestock and small agricultural vehicles, as well as wildlife including bats. The cattle underpasses would also be available as new links in the public footpaths underneath the A55(T).

A new culvert is proposed for the Afon Wig measuring internally 3m wide x 1.6m high; this culvert would incorporate a 500mm wide mammal shelf on each side.

Verges and kerbs

The northern and southern A55(T) verges would be 2.5m wide and grassed. The southern verge width would vary to provide the required visibility splay at the new junction for Glyn Farm and the Bryn Meddyg properties.

On the A55(T) kerbs would only be provided at the new junction on the westbound carriageway and at the cattle underpasses. Both the new county road along the north side of the A55(T) and the widened Roman Road (Henffordd) would have kerbs on both sides to protect the grass verges from being damaged.

Lighting, Signs and Roadside Features

There would be a small number of associated road signs for the new westbound junction and other minor items. A concrete safety barrier without a drainage channel would be erected along the central reserve to prevent vehicles crossing onto the opposite carriageway. Steel safety barriers would be erected at selected locations in the verges on the approaches to the cattle underpasses, between the new county road and A55(T), and by other small structures such as culvert headwalls

and traffic management communication cabinets. A Variable Message Sign (VMS) is proposed adjacent to the westbound carriageway opposite the site of Wig Bach. No new lighting is envisaged and there would be no gantries, camera posts, or other 'controlled highway' infrastructure installed. A single lighting column at the entrance to Bryn Meddyg would be replaced by a new unit to current specifications.

Drainage

The proposed drainage extends over a length of approximately 3.2km from the Tal-y-Bont interchange (Junction 12) to the stream adjacent to Pentre Aber Farm. Eight minor watercourses and two field drainage features are crossed, each being currently culverted/piped under the A55(T) (see Figures 2.1 and 5, Appendix).

There is a differentiation between the design of the highway drainage and the design of the culverts that carry watercourses under the highway. The highway drainage is for a 1 in 5 year storm event (plus 30% to allow for climate change), but the cross culverts are designed to cater for a 1 in 100 year storm event (plus 30% to allow for climate change), both in accordance with current DMRB guidance.

The proposed drainage design is explained in the ES Chapter 2, Section 2.3, but specific issues relating to streams crossed by the Scheme are summarised as follows:

Stream 1 would be used as at present and also to drain the new county road. Baffle weirs, battering of banks and brush matting to the downstream channel banks would be incorporated. Upstream of the A55(T) the existing trash screen will be replaced with an improved structure to allow safer access for routine maintenance and inspection.

Stream 2 would be used to discharge runoff from the new county road. The existing 1050mm diameter pipe culvert beneath the A55(T) would be extended to carry the stream beneath the new county road. A drain would be piped directly into the existing culvert to discharge runoff from the kerb and gully system.

Stream 3 would be used to discharge runoff from the new county road. The existing 1050mm diameter concrete culvert would be extended to the north to pass under the new county road. A new headwall would be constructed on the eastern side of the watercourse to discharge piped runoff from the kerb and gully system on the new county road.

Stream 4 would be used to discharge runoff from the kerb and gully system, which would discharge via a proposed pipe into an existing chamber on the line of the existing culvert.

Stream 4 would also be used, as at present, to carry runoff from the Scheme over a length of 300m by a filter drain in the northern verge, and by a system of surface water channels and carrier drains in the southern verge. The Scheme would drain into Stream 4, via both the proposed system of surface water channels and filter drains and by direct connection of the existing land drainage immediately east of Tai'r Meibion Farm into the existing culvert beneath the Scheme. The existing culvert would be extended to the north to accommodate the new county road and to the south to accommodate the increased overall width of the highway.

For most of the length of the Scheme surface water runoff from the fields on the southern side would be collected via the bund and channel system and directed into stream 4.

Stream 5 (Afon Wig) would be used, as at present, to discharge runoff from the Scheme for a 260m section via a filter drain in the northern verge, and by a system of surface water channels and filter drains in the southern verge. The existing culvert would be replaced by a much larger structure to

accommodate 100 year plus climate change flows. In addition, runoff from the adjacent fields on the southern side of the Scheme would drain into Stream 5 via a bund and channel system.

Stream 6 would be used, as at present, to discharge runoff from the Scheme for a 740m section via the proposed filter drain in the northern verge, and by a system of surface water channels and filter drains in the southern verge. To the east and west of Stream 6, the filter drains and filter pipe system would combine to outfall into a detention pond at the site of Wig Bach (Grid Reference: 263975, 372173, see Figure 2.5, Volume 1a) to prevent flooding from the large catchment area of rural runoff from the south of the Scheme. The existing culvert would be extended north and south. In addition, runoff from the adjacent fields on the southern side of the Scheme would drain into Stream 6 via a bund and channel system.

Stream 7 would be used, as at present, to discharge runoff from the Scheme for a 400m section, via the proposed filter drains in the northern verge, and by a system of surface water channels and filter drains in the southern verge. The filter drain to the west of Stream 7 would connect directly into the existing culvert. The filter drain to the east of Stream 7 would connect into an existing chamber. In addition, runoff from the adjacent fields on the southern side of the Scheme would drain into Stream 7 via a bund and channel system.

Stream 8 would be used, as at present, to discharge runoff from the Scheme over a 300m section via the proposed filter drain in the northern verge, and by a system of surface water channels and filter drains in the southern verge. The existing culvert would be upsized from a 300mm to a 1200mm diameter pipe and extended north beneath the NMU route. Stream 8 would also collect runoff from the fields on the southern side of the Scheme, via the proposed system of surface water channels and carrier drains.

There would be a new installation of a 450mm diameter pipe across the field between the A55(T) and Roman Road just west of The Old School, tying into Stream 8; land drains would also feed into this pipe.

Stream 8 will therefore receive increased water volumes once the proposed works have been completed; the current flows within the river are low. These increased water volumes will increase water velocities which will be managed through energy dissipation; the inclusion of a weir at the outfall will significantly reduce the velocity of the increased volumes. The lining of 200m of the stream will further reduce erosion rates that are currently occurring here and will stop any further erosion occurring from the increased water volume.

2.3 Construction works and activities that could affect the Protected Sites

2.3.1 Buildability

Subject to the proposals satisfying the statutory approvals process, the commitments made within this report, the ES and in response to any objections/representations would be incorporated into an Environmental Commitments Register (ECR) that would form part of the contract documents. A project team consisting of a principal designer and main contractor would then be appointed to complete the detailed design and construction of the scheme. The detailed design stage would involve, finalising the proposals based on the principles established within the ES, obtaining statutory environmental permits/consents and ongoing liaison with the statutory environmental bodies. However, the design and location of mitigation and habitat enhancement measures such as two dry mammal pipes at streams 2 and 6 and dry mammal shelves on the enlarged Afon Wig culvert at stream 5 would be incorporated into the design requirements and tender submission details and the subsequent construction Contract Documents.

The duties placed upon the appointed project team would be to establish and maintain a Construction Environmental Management Plan (CEMP) to manage and record the delivery of the commitments made within this report and the ES and recorded in the ECR.

For the advance and main construction works periods, approximately 9.1ha of land would be temporarily required outside of the highway boundary and approximately 5.7ha taken permanently. Any agricultural land and associated boundary features taken on a temporary basis during the construction period would be reinstated on completion.

The land required for construction of the scheme is to be acquired by compulsory purchase. The Compulsory Purchase Order, if confirmed, will include all permanent and temporary land acquisition required for construction of the scheme. The works to excavate the open cut-off channel commenced in February 2017 and will be completed in summer 2017. It is anticipated that the main construction work would commence in the winter/spring of 2017/18 and be completed by the winter/spring of 2019/20, taking 18 to 24 months to complete.

2.3.2 Phasing of Works[2]

Advance works

Advance works commenced within the scheme footprint in February 2017 to improve network resilience to flood risk. These are works which would have been carried out, subject to landowner agreement, irrespective of whether the Scheme proceeds but have been included in the AIES of the Scheme. The advance works include:

1. Excavating the drainage channel and associated bund along the south side of the A55(T), and linking the channel to existing watercourses.
2. The site clearance necessary for that work.
3. Providing new fencing between the east side of the Tai'r Meibion cattle creep and the eastern end of the scheme at the boundary with The Old School.
4. Translocating/planting a new hedge along this same length.
5. Construction of the diverge and merge tapers for the new access to Y Glyn Farm (but not construction of the link to Bryn Meddyg), associated drainage, kerbing and a strip of carriageway construction to link it with the existing carriageway.
6. Installing a new 1200mm diameter pipe under the A55(T) for Stream 8.
7. Installing a new 450mm diameter pipe across the field between the A55(T) and Roman Road just west of The Old School, tying in to the pipe for Stream 8. Land drains would also feed into this pipe.
8. Lining Stream 8 downstream for approximately 200m as far as the existing culvert under the main access track to the farm's fields, and installing weirs at the discharge outfall to reduce erosion.

Main works

Phase 1 *(estimated commencement: winter 2017/18, estimated duration: six months)*

The initial phase of the main works would commence with the widening of Roman Road (Henffordd) and associated hedgerow translocation. Alternative access would be created along the north of the A55(T) to Wig Farm and Wig Crossing Cottages via the new county road/PMA, the new access track for Wig farm would be constructed, most of the utilities diversions carried out and the cattle underpasses and drainage culverts/pipes extended to the north. During this phase the existing traffic arrangement would be maintained with 2 lanes of traffic in each direction. A temporary speed limit may be applied.

[2] The phasing of works is based on the current understanding of how the works are most likely to be constructed. The final phasing of works will be subject to confirmation at the detailed design stage once a main contractor has been appointed.

Phase 2 *(estimated duration: three months)*
Phase 2 involves the widening of the existing carriageway utilising the verges adjacent to lane 1 in both directions, and following the existing profile of the carriageway. Activities carried out during this phase would be work to extend existing cattle underpasses and culverts/pipes to the south and a proportion of the accommodation works to the residential/commercial properties affected, plus construction of part of the new culvert for Afon Wig. During this phase two narrow lanes of traffic would generally be maintained in each direction. A temporary speed limit would be applied.

Phase 3 *(estimated duration: four months)*
Phase 3 involves the construction of the middle section of the new road. Activities undertaken during this phase would be the construction of the concrete central reserve barrier, together with temporary and permanent drainage works and construction of the central section of the new Afon Wig culvert. During this phase two narrow lanes of traffic would generally be maintained in each direction, utilising the temporary widening undertaken during Phase 2. A temporary speed limit would be applied.

Phase 4 *(estimated duration: three months)*
Phase 4 involves the construction of the permanent lane 1 and verges for each carriageway. Activities undertaken during this stage would involve completion of the permanent works, together with the removal of any temporary works. During this phase two narrow lanes of traffic would generally be maintained in each direction. A temporary speed limit would be applied.

Phase 5 *(estimated duration: two months)*
Phase 5 involves completion of the remaining works such as installation of the VMS, and possibly the improvement of the lay-by west of Tai'r Meibion, although the contractor may choose to build the lay-by during Phase 1. During this phase two standard width lanes of traffic would generally be maintained in each direction, with a temporary speed limit for at least part of this period.

A summary of the advance and main works and the potential impacts and associated proposed mitigation measures is provided in Table 1: *Summary of Advance and Main Works Potential Impacts and Mitigation Measures.*

2.3.3 Site Preparation
The construction phase would commence with marking out and fencing off the areas within which any construction is to occur, and any areas which are to be protected from construction activities. This would include land required for the carriageway, new County road/PMA/NMU route, verges, embankments and cuttings, and areas of essential mitigation, and would also include the contractor's compound and any other temporary working areas.

Within these areas vegetation, largely consisting of improved agricultural pasture and hedgerows, would be cleared and suitable material stripped and stored as necessary for re-use during construction. Site clearance would include the removal of any woody vegetation within the footprint of the Scheme, including the temporary site compound and any haul routes.

No vegetation clearance would be carried out in close proximity to any European Protected Site as the nearest part of the proposal is located approximately 410m from the closest of these sites.

2.3.4 A55(T) Highway Carriageway and Tai'r Meibion and Wig Farm Underpasses
The paved area of the A55(T) will be widened by approximately 2m and will include the addition of a concrete central reserve barrier and incorporate the extension of the existing Tai'r Meibion and Wig farm underpasses. The proposed works will therefore necessitate the reinstatement of all hedgerows affected throughout the length of the proposal.

2.3.5 Earthworks

During the earthworks operation, a number of temporary topsoil/subsoil storage areas would be required. These areas would be utilised for the duration of the contract. Topsoil removal would be subject to ecological supervision and certification, where required. In particular, this would include those areas in close proximity to the watercourses which flow into Menai Strait and Conwy Bay SAC and Traeth Lafan SPA, which are at risk from receiving increased sedimentation from earthworks activities.

2.3.6 In-channel Watercourse Works

Work to existing culverts and outfalls will be required in order to improve the existing drainage system. This will involve working in, over and adjacent to many of the small watercourses that currently flow into Menai Strait and Conwy Bay SAC and Traeth Lafan SPA. A plan showing the water features in the vicinity of the proposal is provided on Figure 5 of the Appendix of this report.

2.3.7 Drainage

The proposed highway drainage consists of a filter drain in the northern verge, together with a system of surface water channels and filter drains in the southern verge. These would discharge into existing watercourses as at present either through new outfalls, through modifications to existing headwalls, or through direct connections into existing culverts restricted to a third of the value of current discharge using flow control devices.

Permeable conveyance systems like filter drains move runoff water slowly towards a receiving stream allowing storage, filtering and some loss of runoff water through evaporation and infiltration before the discharge point. Filter drains comprise a trench, filled with gravel, possibly wrapped in a geotextile membrane, into which runoff water is led, either directly from the drained surface or via a pipe system. The gravel in the filter drain provides some filtering of the runoff, trapping sediment, organic matter and oil residues that can be broken down by bacterial action through time. Runoff velocity is slowed, and storage of runoff is also provided. Infiltration of stored water through the membrane can also occur and some filter drains need not lead to a stream at all. Filter drains have been reported to be effective at the removal of total suspended solids (85%), total lead (83%), total zinc (81%) and oil (estimated around 70%), on an annual basis (CIRIA, 2000).

Proposed surface water channels along the highway boundary on the southern (westbound) side of the Scheme would collect runoff from the surrounding fields. A raised bund would be used to divert overland flow to the nearest watercourse, preventing it from flowing on to the highway. At Tai'r Meibion farm the existing land drains would connect into the proposed highway drains.

The surface water runoff from the new county road on the northern side of the Scheme would be collected by gullies along the kerb line, into a new carrier drain system discharging into the nearest watercourse; these are designed to a 1 in 1 year storm and tested to a 1 in 5 year storm event, as required by the DMRB. Discharge would be restricted to a third of the hard surface runoff. Runoff from the NMU route on the northern side of the Scheme would be discharged using over-the-edge drainage.

The surface water runoff from the proposed access track to the Bryn Meddyg properties would be directed, by gullies along the kerb line, into a new carrier drain system discharging into Stream 7 adjacent to the westbound carriageway. Runoff from the NMU route on the north side of the Scheme would be discharged using over-the-edge drainage.

Although the pollution risk is below the applicable threshold for requiring pollution control measures to be provided, pollution control points for accidental spillages would be installed at the outfalls of each watercourse, providing an opportunity for an enhancement measure as part of the scheme. Subject to agreement with NRW at detailed design, such pollution control measures would

typically include a chamber and isolation valve that would cut off flows from the highway, and can be remotely triggered to close in a few seconds. It is expected that the unit would be stand-alone, with solar and battery power operation so that it would not be vulnerable to power outages. The device would effectively protect downstream areas from fuel chemicals or milk spillages.

Due to the network having to accommodate runoff from a large catchment area from the fields to the south oversized carrier pipes and a detention pond on the site of Wig Bach (Grid Reference: 264021, 372157) would be used. The pond would typically comprise an inlet structure, fore bay, vegetative treatment for pollution control, detention storage, lined wet area, and outlet control structure. Together with flow control devices on the outfalls these would accommodate a reduced discharge rate which would discharge in to the nearest watercourse adjacent to the eastbound carriageway. The pond would be equipped with skim plates and flow controls which would operate on the same principles as oil separators (subject to agreement with NRW at detailed design). Emergency shut-off valves and bypasses would be provided upstream of critical discharge locations to enable the pond to be isolated from receiving watercourses in the event of an accidental spillage.

The cattle underpasses would require improved drainage systems to allow movement of livestock and agricultural machinery. Drainage from the farm underpasses will not discharge directly into watercourses, but will be filtered through/over adjacent ground. The drainage will be directed away from watercourses as slurry from the underpasses may cause significant pollution to the streams; the slurry would build up over time as animal effluent mixes with rainwater to create a liquid mix. The drainage design for the cattle underpasses would therefore be confirmed during the detailed design stage, with agreement from NRW. The new farm accesses are considered not to affect the current effluent management requirements of the farms. The movement of livestock would not be altered significantly. Any changes to this at the detailed design stage would be assessed and evaluated in consultation with NRW.

As part of routine operational maintenance de-icing salts will be applied (as at present) and have the potential to enter the watercourses and affect the water quality. DMRB Volume 4, Section 2, Part 1 HA 103/06 recommends where the use of de-icing salt is likely to be very frequent and the dilution of runoff by receiving waters is low, flow should be diverted to infiltration facilities with groundwater protection or ponds. In this case, the use of de-icing salt is not currently considered to be very frequent and is not expected to change significantly in the future. Furthermore, the proposed new drainage design would provide improved infiltration via SuDS in the form of grass filter strips and a detention pond before surface runoff enters downstream watercourses.

2.3.8 Resource Requirements

There will not be any resources required from the Menai Strait and Conwy Bay SAC, Traeth Lafan SPA, Coedydd Aber SAC, Snowdonia SAC, Afon Gwyrfai a Llyn Cwellyn SAC, Gwydyr Forest Mines SAC, Meirionnydd Oakwoods and Bat Sites SAC and the Glynllifon SAC for the construction of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme.

2.3.9 Waste Products

The proposal poses a low risk of contamination to the Menai Strait and Conwy Bay SAC via runoff from storage of earth piles, spillages of chemicals and concrete entering the watercourse during the advance and main works construction phases. This is especially important as there are eight watercourses which cross the scheme and lead into the SAC. The proposal also poses a low risk of contamination to the Traeth Lafan SPA via runoff from storage of earth piles, spillages of chemicals and concrete entering the watercourse during the advance and main works construction phases.

The proposal does not pose a risk of contamination from emissions to the Coedydd Aber SAC, Snowdonia SAC, Afon Gwyrfai a Llyn Cwellyn SAC, Gwydyr Forest Mines SAC, Meirionnydd Oakwoods and Bat Sites SAC and the Glynllifon SAC due to there being no hydrological links or

pathways from the proposal to the protected sites and the significant distances of over 15km away from the proposals.

Construction waste associated with the Scheme will be generated from surplus materials which are likely to arise from two sources:

- Existing site materials *e.g.* concrete from demolition of existing structures, excavation of material from earthworks.
- Materials brought on to site but not used for the original purpose *e.g.* damages, off cuts

Surplus materials and waste will also be associated with the production, movement, transport, processing and disposal of arisings from the site of the Scheme. Surplus unsuitable material would be transported by road vehicles to a licensed disposal site. All acceptable waste material would be disposed of at a suitable location away from the site.

2.3.10 Existing Utilities and Other Services

The Scheme would affect apparatus owned by BT, Power Systems (Electricity), Traffic Wales (Fibre Optic Cable), Dŵr Cymru (Water) and Wales and West Utilities (Gas). Subject to the results of ongoing consultation and site surveys by the relevant third parties, the apparatus would be diverted within the scheme footprint during the construction phase as follows (this work would be managed by the main contractor):

- BT cables at the western end of the scheme would be diverted to run under the new county road, while at the eastern end the existing chambers would be modified.
- Power Systems have overhead cables in the area. Any diversionary works would require relocation of poles.
- Traffic Wales ducts in the southern verge would be moved across slightly and still be in the southern verge.
- Welsh Water have a main running east from Tai'r Meibion to opposite the site of Wig Bach, along the existing southern highway boundary. A new main would be placed under the new county road/PMA as far as Wig farm.
- WWU have a high pressure gas main which would require a protective slab over it where it passes under Roman Road (Henffordd), and also where it crosses under the A55(T) and proposed NMU route east of the site of Wig Bach. A protective slab may also be required to be installed over it where the Wig access track crosses it.

3.0 European Protected Sites Potentially Affected by the Proposals

HD 44/09 recommends that consideration should be given to any European Site within 2km of a project boundary, and 30km of a project boundary where Lesser Horseshoe Bats are a feature of the site. In addition, it is considered good practice to consider any Special Areas of Conservation (SACs) within 25km of a project where otters are noted as a Qualifying Feature. The European Sites which meet these criteria are listed in Table 1. A plan showing the International Sites within 2km of the proposal and a plan showing the International Sites within 25km and 30km of the proposal with otter and Lesser Horseshoe bat as qualifying features is provided in Figure 3 and Figure 4 respectively of the Appendix of this report.

From the desk-based study, it was found that there were three SACs (Menai Strait and Conwy Bay, Coedydd Aber and Snowdonia) and one Special Protected Area (SPA) (Traeth Lafan) within 2km of the proposal. There is one SAC with otter as a mobile species Qualifying Feature within 25km of the site (Afon Gwyrfai a Llyn Cwellyn 15km to the south west) and three SAC's with Lesser Horseshoe bat as a mobile species Qualifying Feature within 30km of the proposals (Glynllifon, Gwydyr Forest Mines and Meirionnydd Oakwoods and Bat Sites); see Table 1.

Table 1: **European Sites within 2km of the Scheme and those with otter and Lesser Horseshoe bat as mobile species Qualifying Features within 25km and 30km respectively.**

European Site	Mobile Species Qualifying Features	Distance from Proposal
Menai Strait and Conwy Bay SAC	None	410m north
Traeth Lafan SPA	Oystercatcher, Eurasian Curlew, Great Crested Grebe	410m north
Coedydd Aber SAC	None	635m southeast
Snowdonia SAC	None	1.2km south
Afon Gwyrfai a Llyn Cwellyn SAC	Otter	15km southwest
Gwydyr Forest Mines SAC	Lesser Horseshoe bat	15km southeast
Meirionnydd Oakwoods and Bat Sites SAC	Lesser Horseshoe bat	17km southeast
Glynllifon SAC	Lesser Horseshoe bat	19km south

3.1 Menai Strait and Conwy Bay SAC

The Menai Strait and Conwy Bay SAC is located within 2km of the proposal (410m to the north at its closest).

Relevant Qualifying Features

- 1110 Sandbanks which are slightly covered by sea water all the time
- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1170 Reefs
- 1160 Large shallow inlets and bays
- 8330 Submerged or partially submerged sea caves

The following information is taken from the Joint Nature Conservation Committee website and describes the Qualifying Features of the SAC.

Annex I habitats that are a primary reason for selection of this site

- 1110 Sandbanks which are slightly covered by sea water all the time

Menai Strait and Conwy Bay between mainland Wales and Anglesey includes the Four Fathom Banks complex, which is a relatively rare type of subtidal sandbank in Wales, in that it is comparatively large, and is fairly sheltered from wave action but situated in an area of open coast. The sandbanks vary from stable muddy sands in areas that experience weak tidal streams to relatively clean well-sorted and rippled sand in the outer area of the bank where tidal streams are stronger. In very shallow waters, particularly in the inner shore areas, relatively species-rich sandy communities are dominated by polychaetes such as *Spio filicornis*. In some years when numbers of bivalves are high, internationally important flocks of common scoter *Melanitta nigra* have been observed to congregate in the area of the Four Fathom Banks complex to feed.

- 1140 Mudflats and sandflats not covered by seawater at low tide

The intertidal mudflats and sandflats of the Menai Strait and Conwy Bay on the north Wales coast include Traeth Lafan, the shores of the Menai Strait, and the Foryd estuary. Traeth Lafan is an example of an almost fully marine extensive mud and sandflat that experiences a broad range of wave exposure, providing a range of sediment types with typical associated communities. For

example, the shrimps *Haustorius arenarius* and *Bathyporeia sarsi* are found in mobile clean sand, whilst bivalves such as the cockle *Cerastoderma edule*, the gaper *Mya arenaria* and Baltic tellin *Macoma balthica* are common in more sheltered fine and muddy sand. The sand-mason worm *Lanice conchilega* is found in more tide-swept areas. The mixed sediment shores between Beaumaris and Lleiniog are highly productive shores that are rich in animal and plant species. These shores include a nationally important biotope that is rare in the UK. The nationally scarce dwarf eelgrass *Zostera noltei* is also found at this site.

- 1170 Reefs

The reefs of the Menai Strait and Conwy Bay between mainland Wales and Anglesey include the tidal rapids of the Menai Strait, and limestone reefs along the south-east Anglesey coast and around Puffin Island and the Great and Little Ormes. The environmental conditions of the Menai Strait are unusual. The water is relatively turbid, containing a relatively high level of suspended material, and although the area is largely sheltered from wave action tidal streams are strong, reaching up to 8 knots (4 m s^{-1}) in places during spring tides. As a result, the rocky reefs of the Strait are dominated by a diverse and unusual mixture of animals that feed mainly by filtering their food from the seawater. For example, colonies of sponges, such as the breadcrumb sponge *Halichondria panicea*, grow to unusually large sizes, with single colonies covering areas of over 1 m^2. The limestone reefs are home to several species that bore into rock, and some limestone specialists are restricted to this relatively rare habitat. Species include the rock-boring sponge *Cliona celata,* piddocks *Hiatella arctica*, polychaete worms *Polydora* sp., and acorn worms *Phoronis hippocrepia*.

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site

- 1160 Large shallow inlets and bays

Large shallow inlets and bays vary widely in habitat and species diversity according to their geographic location, size, shape, form and geology. There is considerable variation between hard (rock) and soft (sediment) coasts. The degree of wave exposure is a critical factor in determining habitat and species diversity, affecting communities both on the shore and in the sublittoral zone. The range of plants and animals associated with this habitat type is therefore very wide. The issue of site size is also important, as larger sites tend to encompass the greatest variety of constituent habitats and have the greatest potential for maintenance of ecosystem integrity.

Intertidal rock communities may be dominated by wracks *Fucus* spp., particularly in more sheltered locations. Extensive beds of mussels *Mytilus edulis* may be present on mixed substrates. Sediment shores vary widely, depending on the degree of exposure. Very exposed conditions may result in shingle beaches, whilst less-exposed shores may consist of clean sand, and in sheltered conditions shores may consist of fine sand and mud. Very exposed sediment shores are generally unable to support animal populations. On less-exposed shores, communities of crustaceans and polychaete worms develop, while shores of fine sand and mud are characterised by polychaete and bivalve communities and beds of eelgrass *Zostera* spp. In the sheltered conditions of Scottish fjards, loose-lying mats of green algae and the unattached wrack *Ascophyllum nodosum ecad mackaii* may occur.

In the sublittoral zone, more exposed rocky coasts support forests of kelp *Laminaria hyperborea*, with forests of sugar kelp *L. saccharina* occurring in more sheltered conditions. Communities of ephemeral algae and maerl (including *Phymatolithon calcareum* and *Lithothamnion corallioides*) may be present on wave-exposed or tide-swept coasts, whilst sheltered shallow sediments may be covered by communities of filamentous red and brown algae, by loose-lying mats of algae, or by beds of eelgrass *Zostera marina*.

Animal-dominated rocky communities in the sublittoral zone also vary according to local conditions of wave exposure and tidal streams. On more wave-exposed coasts, soft corals, anemones, sponges, sea-fans, featherstars and hydroids may be dominant, whilst more sheltered coasts support different species of sponges, hydroids, brachiopods and solitary ascidians. A particular feature of rias and fjards is the presence of sublittoral rock in conditions of strong tidal flow but negligible or no wave action. Particular growth forms of sponges and ascidians, as well as specific biotopes, occur in these unusual conditions. In tide-swept areas communities of hydroid and bryozoan turfs or beds of brittlestars may be dominant. Beds of horse mussel *Modiolus modiolus* characterise some seabeds. Animal-dominated sediment communities range from gravels and coarse sands dominated by burrowing sea cucumbers, large bivalves and heart-urchins, through finer sediments supporting communities of polychaetes and small bivalves, to fine muds with beds of sea-pens, large burrowing crustaceans and bottom-dwelling fish.

- 8330 Submerged or partially submerged sea caves

Sea cave communities vary considerably depending on the structure and extent of the cave system, their degree of submergence and of exposure to sand scour and wave-surge, and their geology. Caves are typically colonised by encrusting animal species but may also support shade-tolerant seaweeds near their entrances. Physical conditions, such as inclination, wave surge, scour and shade, change rapidly from cave entrance to the inner parts of a cave, and this often leads to a marked gradation in the communities present.

A high proportion of caves are in the intertidal or in shallow water. Caves on the shore and in the shallow sublittoral zone are frequently subject to conditions of strong wave surge and tend to have floors of coarse sediment, cobbles and boulders. These materials are often highly mobile and scour the cave walls. Caves that are subject to strong wave surge are characterised by communities of mussels *Mytilus edulis*, barnacles *Balanus crenatus*, cushion sponges, encrusting bryozoans and colonial ascidians, depending on the degree of water movement and scour at particular points in the cave system.

Caves that occur in deeper water are subject to less water movement from the surrounding sea, and silt may accumulate on the cave floor. The sponges *Dercitus bucklandi* and *Thymosia guernei*, the soft coral *Parerythropodium corallioides*, solitary ascidians, bryozoans and sessile larvae of jellyfish are characteristic of deeper cave systems. These caves, particularly where they are small, provide shelter for crabs, lobsters *Homarus gammarus*, crawfish *Palinurus elephas*, and fish such as leopard-spotted goby *Thorogobius ephippiatus*.

The type of rock in which the cave is formed has an important influence on its shape and qualities as a substrate for plants and animals. In chalk caves in south-east England bands of microscopic algae occur, including *Chrysophyceae* and *Pilinia maritima* that are highly specific to this habitat type.

Menai Strait and Conwy Bay SAC Conservation Objectives
SAC Vision
CCW's long term vision for the Menai Strait and Conwy Bay Special Area of Conservation (SAC) is for it to be a healthy, productive and biologically diverse maritime area, supporting resilient marine ecosystems and communities. The intertidal mudflats and sandflats feature should continue to comprise an array of sediment habitats and their associated biological communities, ranging from wave-exposed sands, through to sheltered muds and tide-swept muddy gravels. In many areas, such as at Traeth Lafan and around the mouth of the Conwy Estuary, the feature will comprise a dynamic mosaic of sediment types, with associated communities, whilst other intertidal sediments, such as sheltered areas in the Menai Strait are expected to have more temporal and spatial stability. On the extreme lower shore in the western Menai Strait and Conwy Bay, dynamism is expected between the intertidal mudflat and sandflat and the subtidal sandbank features, depending on the prevailing

physical conditions. For further information on Traeth Lafan, refer also to the 'Vision Statement' for the Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI). Intertidal mud and sandflat habitats and communities which are currently impacted by activities such as bait digging and the use of vehicles on the shore, would be expected to improve in quality and become more diverse under appropriate management. As water quality in the area continues to improve, dwarf eelgrass *Zostera noltei* beds are expected to expand their range and distribution within the site. Other habitats and communities associated with this feature are expected to either maintain their condition or improve. While the commercial mussel fisheries continue to operate at the eastern and western ends of the Menai Strait, as well as in the Conwy Estuary, intertidal mud and sandflat feature in these areas will continue to be present in a modified state. There is currently no requirement for restoration of these areas of intertidal mudflat and sandflat. The reef feature should continue to comprise a variety of habitats and their associated biological communities, occurring on hard substrate of different types throughout the site. Substrate types range from limestone and clay habitats, through to areas of tide-swept sublittoral hard substrata, including boulders and bedrock. Some areas of reef feature, such as intertidal boulder habitats are expected to improve in quality and become more diverse under appropriate management. Other areas will be expected to either maintain their condition or improve. The subtidal sandbanks feature should continue to comprise mobile or highly mobile sediment habitats and their associated communities. On the extreme lower shore in the western Menai Strait and Conwy Bay, dynamism is expected between the subtidal sandbank and the intertidal mudflat and sandflat features, depending on the prevailing physical conditions. In addition, sandbanks in Conwy Bay and Red Wharf Bay are expected to continue to be part of the dynamic mosaic of shallow sublittoral coastal sediments within the two bays and may also fluctuate according to prevailing physical conditions. The large shallow bay feature should continue to comprise a variety of sediment and hard substrate habitats and their associated biological communities, subject to a wide range of physical conditions, from the wave-sheltered, tide-swept conditions at the eastern end of the Menai Strait through to the more open coast, wave-exposed conditions in Conwy Bay. The subtidal sediments within the embayment should comprise a dynamic mosaic of sediment types, with associated communities which may display considerable temporal and spatial variation, influenced by prevailing physical conditions. Areas of enriched muddy sand in Red Wharf Bay and Conwy Bay are expected to persist, whilst the large shallow bay is expected to continue to be an important feeding and breeding area for a variety of fish species. Certain habitats and communities within the large shallow bay (many of which are part of other habitat features) are expected to improve in quality and become more diverse under appropriate management. Other areas will be expected to either maintain their condition or improve. The sea caves feature should continue to comprise intertidal and subtidal caves, clefts, crevices and tunnels in the limestone substrate around the Great and Little Ormes and the north-east coast of Anglesey. The health and quality of the five SAC habitat features are inter-related and may also depend on the state of other non-feature marine habitats within the site, as well as structural and functional components of the marine ecosystem. The Menai Strait and Conwy Bay supports a vibrant coastal economy, with a variety of commercial and recreational activities dependent on the area, many of which in turn rely on the long-term health and quality of the marine environment. CCW's vision for the SAC and its features cannot be achieved without the help and co-operation of those who use the maritime area in and around the site.

Performance Indicators

A1. Number of wintering oystercatchers

A2. The extent of intertidal flats and the broad-scale spatial distribution of their constituent sediment and community types are maintained.

A3. The abundance and distribution of cockles => 15mm are maintained at levels sufficient to support the population at 4,000 individuals.

F1. Disturbance of roosting or feeding oystercatcher is not significant.

F2. High tide roost sites do not deteriorate in habitat quality and suitability for birds.

3.2 Traeth Lafan SPA

The Traeth Lafan SPA is located within 2km of the proposal (410m to the north at is closest).

Relevant Qualifying Features

- A130 Eurasian Oystercatcher (*Haematopus ostralegus*)
- A160 Eurasian Curlew (*Numenius arquata*)
- A005 Great Crested Grebe (*Podiceps cristatus*)

The following information is taken from the Joint Nature Conservation Committee website and describes the Qualifying Features of the SPA.

Annex I birds and regularly occurring migratory birds not listed on Annex I

- A130 Eurasian Oystercatcher (*Haematopus ostralegus*)

4,931 individuals represent at least 0.5% of the wintering European and Northern/Western African population and 1.4% of the GB population (5 year peak mean from 1991/92 to 1995/96). In severe winter weather Traeth Lafan SPA also serves as a refuge area for Oystercatchers *H. ostralegus* displaced from the Dee estuary on the Cheshire/Flintshire borders.

- A160 Eurasian Curlew (*Numenius arquata*)

1,232 individuals represent at least 1.1% of the GB population (5 year peak mean from 1991/92 to 1995/96).

- A005 Great Crested Grebe (*Podiceps cristatus*)

336 individuals (% of the GB population currently unknown and no count period specified).

Traeth Lafan SPA Conservation Objectives
SPA Vision

Traeth Lafan should consist of a quiet and relatively undisturbed area of sandflats and mudflats where shellfish and invertebrate populations are self-maintaining and sufficient to support good numbers of a range of over wintering migratory birds, particularly waders with nationally important numbers of oystercatcher. Other species of wader should occur along the shore including curlew, ringed plover, dunlin, knot, bar-tailed godwit, redshank and small numbers of greenshank. Turnstone should generally occur along the rockier sections of the coastline. Significant numbers of ducks should be present, especially shelduck, mallard, wigeon and teal where fresh water enters the site, such as at Aber Ogwen.

In late summer and early autumn, the inshore waters of the site should support large numbers of great crested grebe that gather to moult. During the winter, a range of divers, grebes and other ducks will be found, especially off Llanfairfechan including, red-throated diver, Slovenian grebe, the occasional black necked grebe, red-breasted merganser, goldeneye, and common scoter. The site should comprise a variety of marine sediment habitats on the shore between low and high tide that reflect the range of wave action across the site and the influence of freshwater from the Afon Ogwen. The lower shore should consist mainly of clean mobile sands and gravels, supporting marine worms, shrimps and bivalves. Further away from the lower shore, where wave exposure is less, the shore should become muddier, with lugworm and cockle beds. The upper shore is characterised by muddy sediments with bivalves and ragworm. Dwarf eelgrass beds should persist on the upper shore at Aber and near Porth Penrhyn, and are an important marine habitat in their own right.

The vision for the Oystercatcher (*Haematopus ostralegus*) feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

1. The 5 year mean peak of the number of wintering oystercatchers is at least 4,000.
2. The abundance and distribution of cockles of 15mm or larger and other suitable food are maintained at levels sufficient to support the population with a 5 year mean peak of 4,000 individuals.
3. Oystercatchers are not disturbed in ways that prevent them spending enough time feeding for survival.
4. Roost sites, including high tide roost sites, remain suitable for oystercatchers to roost undisturbed.
5. The management and control of activities or operations likely to adversely affect the oystercatchers, is appropriate for maintaining the feature in favourable condition and is secure in the long term.

Performance Indicators
A1. Number of wintering oystercatchers.
A2. The extent of intertidal flats and the broad-scale spatial distribution of their constituent sediment and community types are maintained.
A3. The abundance and distribution of cockles => 15mm are maintained at levels sufficient to support the population at 4,000 individuals.
F1. Disturbance of roosting or feeding oystercatcher is not significant.
F2. High tide roost sites do not deteriorate in habitat quality and suitability for birds.

3.3 Coedydd Aber SAC

Of those SACs within 2km of the scheme, Coedydd Aber SAC (635m to the southeast) is designated due to certain habitats and floral species being present as Qualifying Features, but have no mobile species as Qualifying Features.

Coedydd Aber SAC Conservation Objectives
SAC Vision
The vision for the Old sessile oak woods with Ilex and Blechnum in the British Isles feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The woodland is maintained as far as possible by natural processes.
• The location of open glades or gaps varies over time.
• Trees and shrubs are locally native, and neither beech nor conifers are dominant anywhere in the canopy or understorey.
• Trees and shrubs of a wide range of ages and sizes are present.
• Tree seedlings are plentiful throughout the site and where occurring in open glades develop into viable saplings.
• Field and ground layers are a patchwork of various vegetation communities characteristic of local soil and humidity conditions.
• There are abundant dead and dying trees (with holes and hollows, rot columns, torn off limbs and rotten branches) with associated dead wood dependent species present.
• Humidity levels are high enough to favour the presence of ferns, mosses and liverworts.
• The woodland continues to support populations of birds and mammals.
• All factors affecting the achievement of these conditions are under control.

The vision for the Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno – Padion, Alnion incanae, Salicion albae*) feature is for it to be in favourable conservation status, where all of the following conditions are satisfied:
• The woodland is maintained as far as possible by natural processes.
• The trees and shrubs will be locally native broadleaved species with alder dominating the canopy.
• The sparse shrub layer will comprise a scattering of hazel, willow and rowan.
• Seedlings will be relatively sparse throughout the site with only a few native seedlings from non-self-coppicing trees developing into saplings.

• The majority of regeneration will be from the base of the alders by means of self-coppicing.
• There will be abundant dead and dying trees with holes and hollows, rot columns, torn off limbs and rotten branches throughout the woodland. Dead wood, both standing and fallen, will be retained to provide habitats for other species.
• Veteran trees will be favoured during any silvicultural management because they support a wide variety of species, including lichens. Old forest lichen species will be found throughout the sites, especially on well-lit trees around woodland edges and glades.
• All factors affecting the achievement of these conditions are under control.

Performance Indicators
A1. Extent
A2. Distribution
A3. Structure and processes
A4. Regeneration
A5. Composition
A6. Quality Indicators
F1. Livestock grazing
F2. Invasive species
F2. Water quality
F3. Water quantity

3.4 Snowdonia SAC

Of those SACs within 2km of the scheme, Snowdonia SAC (1.2km to the south) is designated due to certain habitats and floral species being present as Qualifying Features, but have no mobile species as Qualifying Features.

Snowdonia SAC Conservation Objectives
SAC Vision
The vision for the Siliceous alpine and boreal grasslands feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The high summits of the Carneddau (Carnedd Dafydd, Pen yr Ole Wen, Carnedd Llewelyn, Garnedd Uchaf, Yr Aryg, Foel Grach, Llwytmor, Drosgl, Foel Fras, Pen Llythrig y Wrach and Pen yr Helgi Ddu) the Glyderau (Y Garn, Glyder Fach, Glyder Fawr, Elidir Fach, Carnedd y Ffiliast and Mynydd Perfedd), should each support summit heath vegetation which does not show signs of heavy modification by grazing and/or heavy trampling.
• There should be no further loss of summit heath on Yr Wyddfa. The extent of the habitat at Crib y Ddysgl and Garnedd Uchaf should be retained as an absolute minimum and there should be no loss of quality.
• The vegetation should be dominated by species typical of species of summit heath such as *Racomitrium lanuginosum* (woolly hair moss), *Carex bigelowii* (stiff sedge), shrubs dwarfed by the high altitude conditions such as *Vaccinium myrtillus* (bilberry) and *Salix herbacea*, lichens and montane bryophytes.
• Grasses should not comprise a significant proportion of the vegetation.
• The habitat should grade into montane heath at its lower level.
• All factors affecting the achievement of these conditions are under control.

The vision for the Alpine and Boreal Heaths feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• Alpine and Boreal heath habitat should cover considerable areas of the Eryri SAC at high altitudes i.e. from about 600m upwards, though it may extend below this in particularly exposed areas.
• It should grade into summit heath on the high summits and ridges, and into dry heath at its lower end.

• This vegetation should be dominated by dwarf shrubs, typically stunted by the high altitude conditions, such as cowberry (*Vaccinium vitis idea*), bilberry (*Vaccinium myrtillus*) and mountain crowberry (*Empetrum hermaphroditum*), prostrate ling (*Calluna vulgaris*) and in some stands dwarf juniper (*Juniperus communis ssp. nana.*). Other montane species such as wooley hair moss (*Racomitrium lanuginosum*) and other montane bryophytes and lichens should be present.
• Although some grasses, particularly sheep's fescue, will be present, they should not be at high cover.
• In the long term we expect existing habitat to be retained and to improve in quality in its current locations, and also to expand into other suitable localities where the habitat now exists in a degraded state.

The vision for the Hydrophilous tall herb communities of plains and of the montane to alpine levels feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The area of tall herb ledge must be stable, or increasing in the long term. There will be no loss of tall herb ledge vegetation and the feature will occur in all management units in which it currently occurs
• Tall herb ledge vegetation will develop on ledges and on damp calcareous grassland below cliffs where the potential exists but expansion is currently prevented by grazing.
• Tall herb vegetation will consist of a number of flowering plant species such as Lady's mantle *Alchemilla* spp., Meadowsweet *Filipendula vulgaris*, Globeflower *Trollius europaeus*, Welsh poppy *Meconopsis cambrica*, Devilsbit scabious *Succisa pratensis*, Ox-eye daisy *Leucanthemum vulgare*, Wild Angelica *Angelica sylvestris*, Roseroot *Sedum rosea*, Lesser meadow rue *Thalictrum minus* and Common valerian *Valeriana officinalis.*
• The flowering plants will be ungrazed and able to mature and set seed freely.

The vision for the Calcareous rocky slopes with chasmophytic vegetation feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The feature must be stable or increasing in the long term. There will be no loss of calcareous chasmophytic vegetation and it will continue to occur in all of management units in which it currently occurs.
• The feature must continue to support a range of arctic alpine plant populations.
• The plants will be ungrazed and able to mature and set seed freely, or non-flowering plants reproduce by propagules or vegetative means.
• The feature will not be inhibited by invasive non-native plant species.
The vision for the Alpine and subalpine calcareous grasslands feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• This habitat should remain in its current locations although there may be some shifts in its extent.
• The feature should continue to support the characteristic plants including arctic alpine plant species.
• The only acceptable losses of this habitat should be due to succession to other valuable montane communities such as tall herb ledge vegetation.

The vision for the Siliceous rocky slopes with chasmophytic vegetation feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• This habitat should support a range of bryophytes and ferns in suitable crevices on acid rocks.
• The feature should not be damaged by grazing.
• It should be widespread on suitable moist acidic rock crevices on each massif.

The vision for the Siliceous scree of the montane to snow levels feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

• The naturally mobile scree on each massif will have open vegetation on or among the boulders, with *Cryptogramma crispa*, *Deschampsia flexuosa*, *Festuca ovina*, *Galium saxatile*, *Huperzia selago* and an extensive and varied bryophyte flora.
• There will not be excessive disturbance to the as a result of human or animal activity.

The vision for the Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the Isoëto-Nanojuncetea feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• Each of the lakes has a macrophyte flora which includes some of the characteristic species such as *Littorella uniflora*, *Lobelia dortmanna*, *Isoetes lacustris*, *Myriophorum alterniflorum*, *Juncus bulbosus*, *Potamogeton* species and *Subularia aquatic.*
• The lakes which have not been dammed for use as reservoirs retain a natural profile.
• All of the lakes show a characteristic vegetation zonation from the shore to the deeper water.
• Water quality of each lake is within parameters which are suitable to support the characteristic flora and fauna.

The vision for the North Atlantic wet heaths with Erica tetralix feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The feature must be stable or increasing in the long term.
• The habitat will typically comprise *Erica tetralix* and *Calluna vulgaris* and mosses on a wet peaty substrate with a range of small flowering plants such as bog asphodel *Narthecium ossifragum*, milkwort *Polygala serpyllifolia*, Common butterwort *Pinguicula vulgaris*, small sedges and round leaved sundew *Drosera rotundifolia*.

The vision for the European dry heath feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The feature must be stable or increasing in the long term.
• The habitat will be dominated by at least two dwarf shrub species, usually heather *Calluna vulgaris* and bilberry *Vaccinium mytillus*, but sometimes western gorse *Ulex gallii* or crowberry *Empetrum nigrum* may be prominent.
• There will be a mixed age range of heath at an appropriate scale which includes stands of young vigorous dwarf shrubs, mature stands where the heather is becoming senescent, and all age ranges in between.
• The heath shrubs will not exhibit forms characteristic of overgrazing.
• There will be no signs of frequent burning nor reversion to grassland.

The vision for the Blanket bog feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The extent of this habitat should be of the order of 1342 ha (as notified on the N2K data form). This figure however includes a considerable amount of degraded blanket bog. At present it is unknown how much of this is capable of restoration to good quality blanket bog habitat.
• The good quality blanket bog will support typical species e.g. oligotrophic *Sphagnum* spp., cotton grass *Eriophourm* spp, ling *Calluna vulgaris*, bell heather *Erica cinerea*, crowberry *Empetrum nigrum*, cow berry *Vaccinium vitis-idaea*, and cranberry *Vaccinium oxycoccus*.
• The intact habitat will not show any signs of degradation as a result of overgrazing, drainage, or burning, such as depletion of dwarf shrubs and sphagna with increased grass cover.
• The degraded habitat will not show any recent signs of further degradation as a result of overgrazing, drainage or burning.

The vision for the Depressions on peat substrates of the *Rhynchosporion* feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

• The extent has not been fully measured because the nature of the habitat is small scale and patchy within mosaics of blanket bog and wet heath. However the extent should be at least that which has been mapped.
• The habitat, characterised by white beak sedge *Rhynchospora alba* will support a range of plant species such as bog pimpernel *Anagallis tenella*, ling *Calluna vulgaris*, round leaved sundew *Drosera rotundifolia*, cross-leaved heath *Erica tetralix*, cottongrass *Eriophorum angustifolium*, marsh St John's wort *Hypericum elodes*, purple moor grass *Molinia caerulea*, bog asphodel *Narthecium ossifragum*, bog pondweed *Potamogeton polygonifolius*, *Sphagnum* spp., and short sedges.
• There will be no signs of excessive grazing which would result in large areas of bare peat and possibly significant cover of rushes Juncus spp.
• Drainage or burning would damage this habitat and neither activity should be consented where this habitat could potentially be affected.
• At Cwmffynnon and other small areas in the Glyderau, the habitat supports the uncommon species, marsh clubmoss *Lycopodiella inundata*. Here we would expect to see frequent small patches of bare peat which support the species. Many of these areas may be caused by vigorous flushing of water rather than by grazing animals.

The vision for the Species-rich *Nardus* grassland on siliceous substrates in mountain areas feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The extent will be at least 10 hectares of the habitat to include 5 ha on the slopes above Llyn Llydaw.
• The grassland will support a range of plant species such as Harebell *Campanula rotundifolia*, Eyebright *Euphrasia* spp. Devilsbit scabious *Succisa pratensis*, Wild thyme *Thymus polytrichus*, Heath speedwell *Veronica officinalis*, Spring sedge *Carex caryophyllea*, Flea sedge *Carex pulicaris*, Carnation sedge *Carex panicea* and Lady's mantle *Alchemila glabr*.
• There will not be any significant cover of invasive species. New Zealand willowherb, *Epilobium brunnescens* is a long established alien plant on the site and is accepted at present as it doesn't appear to adversely affect the feature. (At present CCW has no knowledge of any means of reducing or eliminating it).

The vision for the Old sessile oakwoods with Ilex and Blechnum feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The extent is increasing.
• The woodland comprises locally native canopy forming trees including: *Quercus petraea*, *Betula pubescens*, *B. pendula*, *Fraxinus excelsior* and *Sorbus aucuparia*.
• There is a mixed age structure within the woodland.
• Regeneration is occurring and sufficient seedlings can grow on to saplings and ultimately canopy trees.
• There are no significant alien species.

The vision for the Petrifying springs with tufa formation (Cratoneuron) feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• This feature on Eryri does not form tufa but should display a dominant cover of mosses such as *Cratoneuron communatum*, *Philonotis fontana* and *Bryum pseudotriquetrum* with frequent characteristic forbs such as *Montia fontana*, *Chrysosplenium oppositifolium* and *Saxifraga stellaris*.
• There are no significant increases in grass or rush cover.

The vision for the Alkaline fens feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The habitat consists of flushes, influenced by some base-enrichment, where brown mosses (such as *Scorpidium scorpioides*, *Cratoneuron commutatum* and *Drepanocladus revolvens*) are present. Small sedge species such as *Carex viridula*, *C. panicea*, *C. dioica, C. pulicaris* and *Eriophorum* spp. will be present and usually also *Pinguicula vulgaris*.

The vision for the Alpine pioneer formations of the *Caricion bicolorisatrofuscae* feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The feature consists of base rich flushes at high altitude which are flushed continuously with cold water.
• This habitat should have a high bryophyte cover and support arctic alpines such as *Saxifraga oppositifolia*, *S. stellaris* and *Thalictrum alpinum*. *Juncus triglumis* should be present and sedges such as *Carex viridula*.
• There should be no non-native species.
• The flowering plants should be able to flower and set seed unhindered by grazing.

The vision for the feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• *Luronium natans* occurs in Llyn Cwmffynnon as a minimum.

The vision for the Slender green feather-moss *Drepanocladus (Hamatocaulis) vernicosus* feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The moss is present at Cwm Afon Llafar Flush A and Flush B.
• The associated vegetation should be dominated by rushes and sedges, with <20% rush cover.
• There should be less than 10% disturbed bare ground within the flushes.

Performance Indicators
A1. Extent of Siliceous alpine and boreal grasslands
A2. Condition of Siliceous alpine and boreal grasslands
F1. Livestock grazing
F2. Trampling by people and livestock
F3. Nitrogen deposition
A1. Extent of Alpine and Boreal Heaths
A2. Condition of Alpine and Boreal Heaths
A3. Restoration of Alpine and Boreal Heaths
F4. Burning
A1. Extent of tall herb ledge vegetation
A2. Condition of tall herb ledge vegetation
A3. Restoration of tall herb ledge vegetation
F2. Recreational activity
A1. Extent of calcareous chasmophytic vegetation
A2. Condition of calcareous chasmophytic vegetation
A3. Restoration of calcareous chasmophytic vegetation
A1. Extent of Alpine and subalpine calcareous grasslands
A2. Condition of Alpine and subalpine calcareous grasslands
A1. Extent of Siliceous rocky slopes with chasmophytic vegetation
A2. Condition of Siliceous rocky slopes with chasmophytic vegetation
A1. Extent of Siliceous scree of the montane to snow levels
A2. Condition of Siliceous scree of the montane to snow levels
A1. Extent of Oligotrophic to mesotrophic standing waters
A2. Condition of Oligotrophic to mesotrophic standing waters
F1. Abstraction
A1. Extent of wet heath
A2. Condition of wet heath
F3. Burning
A1. Extent of European dry heath
A2. Condition of European dry heath
F2. Burning and cutting
A1. Extent of blanket bog

A2. Condition of blanket bog
F3. Gorse invasion
F4. Drainage
F5. Damage from Vehicles
F6. Atmospheric deposition
A1. Extent of Rhynchosporion
A2. Condition of Rhynchosporion
A1. Extent of species-rich Nardus grassland
A2. Condition of species-rich Nardus grassland
A1. Extent of Old sessile Oakwoods
A2. Condition of Old sessile Oakwoods
F2. Alien species
A1. Extent of Petrifying springs with tufa formation
A2. Condition of Petrifying springs with tufa formation
A1. Extent of Alkaline fens
A2. Condition of Alkaline fens
A1. Extent of Alpine pioneer formations
A2. Condition of Alpine pioneer formations
A1. Extent of Floating water plantain
A2. Condition of Floating water plantain
A1. Extent of Upper limit: none Slender green feather-moss
A2. Condition of habitat supporting Slender green feather-moss

3.5 Afon Gwyrfai a Llyn Cwellyn SAC

The Afon Gwyrfai a Llyn Cwellyn SAC is located 15km to the south-west and is not hydrologically connected to the proposal. Therefore, it is considered extremely unlikely that impacts on the habitat Qualifying Features of this SAC would arise as a result of the proposal. However, habitat used by otters may be disturbed as a result of the proposal, and otters are a qualifying feature of this SAC.

Relevant Qualifying Features

- 1355 Otter (*Lutra lutra*)

The following information is taken from the Joint Nature Conservation Committee website.

Annex I habitats that are a primary reason for selection of this site

- 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the Isoëto-Nanojuncetea
- 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

Annex II species that are a primary reason for selection of this site

- 1106 Atlantic salmon (*Salmo salar*)
- 1831 Floating water-plantain (*Luronium natans*)

Annex II species present as a qualifying feature, but not a primary reason for site selection

- 1355 Otter (*Lutra lutra*)

The SAC series reflects the present discontinuous distribution of otters *Lutra lutra* in the UK. Sites that are known to support high densities have been selected to represent the current strongholds of the population. The sites selected also cover the ecologically variable conditions in which the species is found across its range. As well as a known high density of otters, sites selected have good

quality habitat features necessary for feeding and breeding. This is demonstrated by a known record of continuous occupation of the site, even, in England, during the period of population decline. Recent research has demonstrated that this approach has also ensured good coverage of the main lines of genetic variation in British otters.

The otter population is widespread and individuals are wide-ranging, normally occurring at low densities which, is reflected in the relatively large number of sites where the species occurs as a qualifying feature, but is not a primary reason for site selection. The selected sites include some very extensive areas (totalling over 175,000 ha). While the SAC series makes a contribution to securing favourable conservation status for this Annex II species, wider countryside measures, in particular Biodiversity Action Plan implementation, additionally contribute to conservation of this species in the UK.

Afon Gwyrfai a Llyn Cwellyn SAC Conservation Objectives
SAC Vision
The vision for the European otter *Lutra lutra* feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.
- The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. The size of breeding territories may vary depending on prey abundance.
- The population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient they should be created through habitat enhancement and where necessary the provision of artificial holts. No otter breeding site is subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary potentially harmful levels of disturbance are managed.
- The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.

Performance Indicators
A1. Extent of Oligotrophic to mesotrophic standing waters
A2. Condition of Oligotrophic to mesotrophic standing waters
F1. Abstraction
F2. Recreational activity
A1. Distribution within catchment
A2. Typical species
A3. Plant community Reproduction
A4. Bank and riparian zone vegetation
A5. Species indicative of eutrophication
A6. Alien / introduced species
F1. Water quality
F2. Flow
F3. Light levels
F4. Changes to substrate
A1. Adult run size
A2. Juvenile densities
F1. Water - Biological quality
F2. Water - Chemical quality
F4. Illegal fish poaching

F5. Invasive alien species
F6. Coarse woody debris (CWD)
A1. Species extent and abundance
A2. Sufficient habitat
F2. Water quality
F3. Dredging
F4. Competition from other aquatic plant species
A1. Population distribution
A2. Breeding activity
A3. Actual & potential breeding sites
F3. Food availability & riparian habitat
F7. Diffuse & point source pollution
F8. Agricultural operations
F9. Forestry operations
F10. River engineering
F11. Recreation
F12. Deposition atmospheric pollution
F13. Climate change

3.6 Gwydyr Forest Mines SAC

The components of the Gwydyr Forest Mines SAC are located 15km to the south-west and are not hydrologically linked to the Scheme. The site is located on the opposite side of the Carneddau mountain range and is primarily used by Lesser Horseshoe bats for hibernation roosts. Therefore it is considered extremely unlikely that impacts on the habitat Qualifying Features of this SAC would arise as a result of the proposal due to the lack of topographical links between the SAC and the site of the proposal. In addition, no water quality or flow impacts are expected due to the distance of the site from the proposals and lack of potential pathways. However, Lesser Horseshoe bat commuting and foraging habitat would be temporarily disturbed during the construction period.

Relevant Qualifying Features

- 1303 Lesser horseshoe bat (*Rhinolophus hipposideros*)

The following information is taken from the Joint Nature Conservation Committee website.

Annex I habitats that are a primary reason for selection of this site

- 6130 Calaminarian grasslands of the *Violetalia calaminariae*

Annex II species present as a qualifying feature, but not a primary reason for site selection

- 1303 Lesser horseshoe bat (*Rhinolophus hipposideros*)

The lesser horseshoe bat *Rhinolophus hipposideros* is one of the smallest bats in the UK. During the summer they form maternity colonies in old buildings and emerge to hunt in nearby woodland. The species prefers sheltered valleys with extensive deciduous woods or dense scrub, close to roost sites. Where habitat is fragmented, linear features such as hedgerows are important corridors between roosts and foraging areas. Ideally, roost sites offer a range of temperature conditions in different parts of a single site, allowing the bats to change location; otherwise breeding females are likely to change site during the summer. In winter they hibernate in caves, mines and other cave-like places. Summer and winter roosts are usually less than 5-10 km apart. The bats are vulnerable to the loss or disturbance of both summer and winter roost sites and the removal of linear habitat corridors.

The total UK population of about 17,000 individuals is dispersed, occurring in over 170 maternity roosts and over 300 hibernation sites (hibernacula) in south-west England and Wales. Until the early 20th century, the species benefited from abandoned mine workings, but the sealing of old mines is

likely to have reduced the population and range. Recent monitoring suggests that populations are increasing, particularly in Wales, with increased densities in wooded areas.

Gwydyr Forest Mines SAC Conservation Objectives
SAC Vision
The vision for the Lesser horseshoe bat Rhinolophus hipposideros feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
• The site will support a sustainable population of lesser horseshoe bats in the Gwydyr Forest area.
• The population will viable in the long term, acknowledging the population fluctuations of the species.
• The natural range of lesser horseshoe bats is neither being reduced nor is likely to be reduced for the foreseeable future.
• Mines on the site will be in optimal condition to support the populations.
• Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range.
• There is a sufficiently large area of suitable habitat surrounding the roosts to support the bat population, including continuous networks of sheltered broadleaved and coniferous woodland, and tree lines, connecting the various roosts with areas of insect rich grassland and open water.
• Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size, range or any decline in the extent or quality of breeding, foraging or hibernating habitat.

Performance Indicators
A1. Extent of Calaminarian grassland
A2. Condition of the calaminarian grassland –sample target
A3. Condition of the calaminarian grassland – "good quality" calaminarian grassland habitat
F1. Disturbance (human impact and recreation)
F2. Broadleaf, coniferous, exotic and scrub species encroachment
A1. Extent (bats)
A2. Extent (entrances)
A3. Quality (entrances)
F1. Site security
F2. Roost entrances
F3. Disturbance (external and internal)
F4. Availability of bat fly-ways and feeding areas on surrounding land

3.7 Meirionnydd Oakwoods and Bat Sites SAC

The components of the Meirionnydd Oakwoods and Bat Sites SAC are 17km to the south-east and are not hydrologically linked to the Scheme; therefore it is considered extremely unlikely that impacts on the habitat Qualifying Features of this SAC would arise as a result of the Scheme. In addition, no water quality or flow impacts are expected.

The Meirionnydd Oakwoods and Bat Sites SAC components are used by Lesser Horseshoe bats as both maternity and hibernation roosts. The components of the Meirionnydd Oakwoods and Bat Sites SAC are not considered to have any connectivity with the proposal due to the lack of local and suitable topographical links and being located approximately 17km to the south-east on the opposite side of the Carneddau mountain range. However, Lesser Horseshoe bat commuting and foraging habitat would be temporarily disturbed during the construction period.

Relevant Qualifying Features
• 1303 Lesser horseshoe bat (*Rhinolophus hipposideros*)

The following information is taken from the Joint Nature Conservation Committee website.

Annex I habitats that are a primary reason for selection of this site

- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae)* * Priority feature

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site

- 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 * Priority feature
- 91D0 Bog woodland * Priority feature

Annex II species that are a primary reason for selection of this site

- 1303 Lesser horseshoe bat (*Rhinolophus hipposideros*)

This large composite site includes most of the known maternity roosts in Meirionnydd and some hibernacula, and comprises the centre of distribution for lesser horseshoe bats *Rhinolophus hipposideros* in Wales. The sheltered river valleys provide excellent tree cover and numerous suitable maternity roosts.

Meirionydd Oakwoods and Bat Sites SAC Conservation Objectives
SAC Vision

The vision for the Lesser horseshoe bats *Rhionolphus hipposideros* feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

1 The population of lesser horseshoe bats should be maintained at its current size and encouraged where possible to increase. See Table 7 for summaries of population counts at recorded roost sites and maps in Annex 4, showing the locations of the roosts. As there has been an upward trend in lesser horseshoe bats numbers in Wales it is reasonable to expect the Gwynedd population to increase.

2 There are sufficient breeding roosts (buildings, structures and trees) and hibernation roosts (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.

Performance Indicators

A1. Population of lesser horseshoe bats
A2. Roosts
A3. Foraging or feeding habitat
A4. Range of the population
F1. Building or structure including mine
F2. Disturbance to roosts
F3. Bat navigation flight lines
F4. Roads and development
F5. Weather

3.8 Glynllifon SAC

Glynllifon SAC is designated specifically for Lesser Horseshoe bats and is located approximately 19km to the south of the proposal. The site supports both maternity and hibernation roosts. Again it is considered that no connectivity with the proposal exists due to the lack of local and suitable topographical links between the SAC and the proposal. However, Lesser Horseshoe bat commuting and foraging habitat would be temporarily disturbed during the construction period of the proposal.

Relevant Qualifying Features

- 1303 Lesser horseshoe bat (*Rhinolophus hipposideros*)

The following information is taken from the Joint Nature Conservation Committee website.

Annex II species that are a primary reason for selection of this site

- 1303 Lesser horseshoe bat (*Rhinolophus hipposideros*)

This single site in north Wales is both a maternity and hibernation site for a large population of lesser horseshoe bat *Rhinolophus hipposideros*, comprising about 6% of the UK population.

Glynllifon SAC Conservation Objectives

SAC Vision

The Vision for the Lesser horseshoe bat *Rhinolophus hipposideros* feature.

• The natural range of lesser horseshoe bats will not be reduced, nor be likely to be reduced for the foreseeable future.

• There is, and will continue to be, sufficient habitat to maintain the lesser horseshoe bat population on a long-term basis.

• The three maternity roosts will continue to be occupied annually by lesser horseshoe bats and their babies

o Glynllifon Mansion (Unit 16).

o Melin y Cim (Unit 32).

o Pen y Bont (Unit 36).

• There will be a sufficiently large area of suitable habitat surrounding these roosts to support the bat

population, including continuous networks of sheltered, broadleaved and coniferous woodland, tree lines and hedgerows connecting the various types of roosts with areas of insect-rich grassland and open water.

• All factors affecting the achievement of these conditions are under control.

Performance Indicators

A1. Extent (bats) Maternity roosts

A2. Extent (bats) Hibernacula roosts

F1. Site security (maternity and hibernation roosts)

F2. External condition of the building (maternity roost)

F3. Roost entrance – buildings and underground sites (maternity and hibernation roosts)

F4. External disturbance (maternity and hibernation roosts)

F5. Internal condition (maternity and hibernation roosts)

F6. Temperature of roost area (maternity roost)

F7. Internal disturbance (maternity and hibernation roosts)

A3. Quality (habitat within the SAC boundary)

4.0 Sources of Information Used in the Assessment

4.1 Desk Study

GIS software was used to identify the locations of the European sites which could be affected by the scheme described in Section 3. Historical biodiversity records have been obtained from Cofnod and the British Trust for Ornithology (BTO).

The Conservation Objectives for the Menai Strait and Conwy Bay SAC, Traeth Lafan SPA, Afon Gwyrfai a Llyn Cwellyn SAC, Gwydyr Forest Mines SAC, Meirionnydd Oakwoods and Bat Sites SAC and Glynllifon SAC along with the information required to describe the sites' vulnerability have been obtained from the Natural Resources Wales site management plans and the Joint Nature Conservation Committee website.

4.2 Field Surveys

Ecological surveys to gather baseline data on protected sites and species throughout the proposed development have been undertaken in accordance with the guidelines of the Chartered Institute of Ecology and Environmental Management (CIEEM).

A number of surveys within a 14 year period have been carried out for protected species. Otter surveys were conducted in 2002 and 2003. No otter holts or resting places were recorded during this survey. A further protected species survey was carried out in 2005 to update the potential impacts of the Scheme, with a supplementary protected species survey to include additional land required to widen part of the Roman Road (Henffordd) carried out in 2006. A further survey covering additional land required for the proposed new county road on the northern side of the A55(T) from opposite Tai'r Meibion Farm to the Tal-y-Bont Interchange, and for the proposed access track from Roman Road (Henffordd) to the south of Coed Wern-Porchell was carried out in February 2007, with an additional otter survey across the site in spring/summer 2008.

Surveys were undertaken in 2002 to identify bat roosts in trees adjacent to the A55(T) within the proposed scheme corridor and also any use of the cattle underpasses at Tai'r Meibion and Wig Farm by bats. The protected species surveys undertaken in 2005 and 2007 also included an assessment of potential bat roosting and foraging habitat. Surveys were undertaken in 2008 to establish bat activity levels adjacent to the northern and southern side of the proposed scheme. Standard transect methodology was adopted using static monitoring and emergence surveys of identified roosts and logging activity using frequency division detectors and recording devices to enable sonograph analysis. These surveys were updated in 2011 with further transect surveys. A bat survey (internal inspection and dusk and dawn emergence surveys) was also conducted on the Wig Bach property in 2011 prior to its demolition; this was a detached property with bat potential within 5m of the eastbound A55(T) carriageway within the proposed scheme corridor.

For the current scheme the most recent protected species surveys were carried out in the 2016 survey season, specifically as the advance works pre-construction surveys for otter and badger in August 2016. Baseline surveys for otter were initially undertaken in April and May 2015, again with no otter holts or resting places recorded within the survey area. Bat activity and roost emergence baseline surveys were undertaken in in the 2015 survey season, which recorded a Common pipistrelle roost located in Tai'r Meibion farm property and a low amount of bat activity generally within the survey area, with one Lesser horseshoe bat pass being recorded. Baseline bat activity surveys of the two cattle underpasses was then undertaken throughout October and into November 2015 on the basis of the recommendations made in the initial 2015 survey report. The bat activity surveys of the two cattle underpasses were also updated throughout the 2016 survey season and were undertaken in May, July and September 2016. The bat activity surveys confirmed that both the Tai'r Meibion and Wig farm underpasses are used by low numbers of Lesser horseshoe, Myotis

species, Soprano and Common Pipistrelles and Brown long-eared bat species as a commuting flight path beneath the A55(T). Soprano and Common pipistrelle bats were also recorded using the Tai'r Meibion farm underpass as a foraging resource.

It is important to note that the latest 2016 survey information for bats and otter has not changed significantly since 2002 when the first base line surveys were undertaken for the historic version of the previously proposed scheme. It is therefore considered very unlikely that the ecology baseline situation would change significantly between the anticipated completion of the advance works in summer 2017 and the anticipated commencement of the main works in winter/spring 2017/18. However, pre-construction surveys for otter and bats have already been undertaken prior to the commencement of the advance works (no new evidence requiring NRW EPS licences as stated above), and will be undertaken prior to the commencement of the main works.

4.3 Determination of mitigation

Mitigation measures considered for the purpose of this screening exercise are based on the recommendations made in the ecological survey reports, the accepted methods described in best practice guidance documents and the outcomes of consultation with NRW. Most have been applied on construction schemes on which the project team have previously been involved. The delivery of these measures will be dictated through the contract conditions which will also include mechanisms to ensure performance monitoring and reporting.

4.4 Use of Professional Judgement

Professional judgement has been used in the undertaking of this work where specific guidance was not available, and regarding 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.

The authors of this report are Christian Middle MCIEEM (Ecologist) and Chris Jones MCIEEM (Senior Environment Officer), with support from Nancy Wilkinson (Ecologist), and the report was reviewed by David Meller, Project Manager/Principal Engineer. Surveys were carried out by ecologists Christian Middle MCIEEM and Nancy Wilkinson and sub-consultant Tim Hodnett (Ecological Design Consultants).

Christian Middle is an ecologist at YGC with over 15 years consultancy experience and is a full member of the Chartered Institute for Ecology and Environmental Management (CIEEM). Chris Jones is a Senior Environment Officer at YGC with over 12 years consultancy experience and is also a full member of CIEEM. Nancy Wilkinson is also an ecologist with YGC with over 8 years of consultancy experience.

Their work includes undertaking EIAs and Appropriate Assessments for a range of terrestrial, freshwater and marine projects including major road improvements and new bridge and road construction, such as the A470 Gelligemlyn Interim and Improvement schemes, A470 Maes yr Helmau to Cross Foxes Improvement and Pont Briwet bridge replacement. They have specific experience of working on AIES within the last three years and have the experience, through various projects, of consultation with NRW to agree appropriate measures to avoid adverse effects on integrity of these international sites.

Professional judgement has been used in the gathering and interpretation of data used to support this report. It has also been used in the interpretation of the results in relation to the potential

impacts on the Menai Strait and Conwy Bay SAC, Traeth Lafan SPA, Afon Gwyrfai a Llyn Cwellyn SAC, Gwydyr Forest Mines SAC, Meirionnydd Oakwoods and Bat Sites SAC and Glynllifon SAC.

4.5 Assessment Methodology

This section sets out the applicable methodologies and assumptions for the consideration of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement with regard to the requirements of the Habitats Regulations (2010) and the Assessment of the Implications on European Sites (AIES) (including Statement to Inform Appropriate Assessment (SIAA)) process as set out in DMRB HD44/09 guidance (Highways Agency, 2009).

4.5.1 AIES Process

The AIES is principally a five stage process (as explained below) involving one or more of the following sequential stages:

- Stage 1: Screening
- Stage 2: Appropriate Assessment
- Stage 3: Alternative Solutions
- Stage 4: Imperative Reasons of Overriding Public Interest (IROPI)
- Stage 5: Compensatory Measures

The first stage of the AIES process is Stage 1: Screening Assessment to determine whether Likely Significant Effects (LSE) on the features of European sites could potentially occur. If the outcome of the Stage 1: Screening Assessment determines that there could be a LSE (or such an effect cannot be discounted), then Stage 2: Appropriate Assessment is triggered and an assessment of whether there will be an effect on the integrity of the European site is undertaken.

For the A55(T) Abergwyngregyn to Tai'r Meibion Improvement, the initial Stage 1: Screening Assessment has been undertaken and, as LSEs could be discounted for all qualifying features, Stage 2: Appropriate Assessment has not been triggered.

4.5.2 Summary of Stage 1: Screening Assessment on European / International Sites

The first step of the AIES (Stage 1: Screening Assessment) was to identify all of the European sites that could potentially be affected following DMRB HD44/09 guidance. These include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) and in accordance with Government policy in England and Wales, Wetlands of International Importance (Ramsar sites), potential SPA's (pSPA), candidate SACs (cSAC), and possible Ramsar sites should also be considered.

Consultation also forms part of the process in ensuring that all appropriate sites and features are included. NRW and WG were consulted on the draft project level AIES Screening Assessment for the A55(T) Abergwyngregyn to Tai'r Meibion Improvement.

4.5.3 Conservation Objectives

Following identification of the European/International sites that could be potentially affected, the conservation objectives for each of the relevant qualifying features were obtained. In Wales, the conservation objectives are considered to consist of the vision and performance indicators as stated in the relevant Core Management Plans available from the NRW website.

There is one conservation objective for each feature. Each conservation objective is a composite statement representing a site-specific description of what is considered to be the favourable conservation status of the feature. Each conservation objective consists of the following two elements:

1. Vision for the feature
2. Performance indicators

4.5.4 Identification of Plans or Projects Considered for In-Combination Effects

A requirement of the Habitat Regulations (2010) is to also examine the potential for a plan or project to have a significant effect either alone or in combination with other plans and projects. These include those with spatial and/or temporal overlap with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement (based on DMRB HD44/09), namely:

- Trunk road and motorway plans or projects which have been confirmed.
- Developments and other projects which are currently under construction.
- Proposed developments which are currently under consideration with the local planning authority or other determining bodies.
- Local Plan commitments and indicative timescales for implementation.

Following guidance in Tyldesley (2011), the following criteria were also used to confirm the types of projects to be considered in the in-combination assessment:

- All projects started but not yet completed;
- All projects with consent but not yet started;
- All projects subject to ongoing review e.g. annual licences;
- All applications lodged but not yet determined;
- All refusals subject to appeal procedures not yet completed;
- All known projects that do not need consent;
- All proposals in adopted plans
- All proposals in draft plans formally published for consultation.

It was therefore not considered appropriate to include projects which have not yet been submitted for consent. In some instances, however, it may be the case that there are known to be projects that will inevitably and necessarily follow on from other projects which have been formally proposed, and in such cases it is necessary to consider these where they are necessary future requirements of the original development.

Following a judgment of the European Court of Justice in October 2005, it is also necessary to include as part of in-combination checks, the following proposals:

- Allocations or other forms of proposals in adopted development plans; and
- Allocations or other forms of proposals in draft development plans which have been published for consultation purposes.

Plans and projects to be considered in-combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement were initially identified from a review of the Gwynedd Unitary Development Plan and the forthcoming Gwynedd and Anglesey Joint Local Development Plan and further refined in the project level AIES Screening Assessment. These plans and projects are detailed in Section 7.0: Possible In-Combination Effects with Other Plans or Projects.

4.5.5 Test of Likely Significant Effects (LSE)

The screening stage assesses the potential effects produced by the proposed development against the interest features of each European site, to determine whether there is a LSE. This is essentially a risk-based process to decide whether a more detailed assessment is required (alone and in-combination).

The screening for LSE involves identifying whether the proposed development is a source of potential effects that might affect any of the interest features of the relevant European sites. If there is such an effect, it is then necessary to determine whether there is a potential pathway through which the proposed development could affect the interest features of relevant European sites, the length of those pathways and what may reduce or prevent the potential effect reaching the relevant European sites. Where there is a source, a pathway and an effect that reaches the

interest feature, it is judged that there is a LSE that requires more detailed assessment (*i.e.* appropriate assessment stage). When carrying out screening at this LSE stage, account is taken of the avoidance and mitigation measures that have been built into the proposed design. Mitigation measures considered in this assessment are those which are plainly established and uncontroversial. The screening for LSE identifies those aspects of the proposed development, and those interest features of each relevant European site, where there is confidence that they are not likely to be significantly affected, and which therefore need not be considered further. If it cannot be concluded with confidence that LSE's are unlikely, then under the precautionary principle, it is assumed that the issue requires more detailed consideration.

The AIES process for the A55(T) Abergwyngregyn to Tai'r Meibion Improvement has concluded that there would be no adverse effects on the integrity of the European sites and that following consultation the relevant SEB's are in agreement with this conclusion.

5.0 Design Rationale and Consideration of Alternatives

5.1 Proposed Design

A general arrangement plan for the proposal is provided in Figures 2.2 to 2.5 of the Appendix of this report. The proposed scheme design is explained in Section 2 of this report.

5.2 Alternatives Considered

The Scheme is an 'on-line' highway improvement and does not therefore have any alternative 'route options' in the strict sense of this term. However, prior to publication of the draft Orders in 2008 alternative access provision was considered for the affected properties. One option involved a Private Means of Access/Non-motorised User route along the south side of the existing A55(T), which started from the new westbound-only junction (y Glyn) and headed west up to the Wig cattle underpass.

A PMA/NMU route with an underpass was also proposed. This would have involved constructing the PMA/NMU route through Tai'r Meibion farmland, from Roman Road (Henffordd) south of Tai'r Meibion north-east towards Wig farm. The underpass would then have connected this feature with the proposed PMA/NMU route along the northern side of the carriageway from the Wig underpass eastwards to the Abergwyngregyn interchange. These options were rejected in favour of the increased safety benefits afforded by the Scheme.

A number of flooding events in recent years have led to a new culvert being included in the proposals, to accommodate the Afon Wig, in place of the existing pipe culvert; this affords an opportunity to provide mammal shelves in the new culvert.

Structures

In considering the extension of the two existing cattle underpasses, the scheme proposals were reviewed[3] to determine whether retention of these structures was the best option, or whether a new structure or structures would provide a better solution in terms of whole life performance. The results of this desk-top review are summarised in the following text.

Apart from the through traffic on the trunk road, the key movements affected by the scheme are:

- residents of Wig Crossing Cottages, Wig Farm and Bryn Meddyg dwellings;
- agricultural operations at both Wig and Tai'r Meibion farms;
- public footpaths 9, 43, 42, 1 and 2, and;
- bats and other wildlife.

[3] A55 Abergwyngregyn to Tai'r Meibion Improvement, Structures Options Report (YGC, 2016)

The principal options for provision of access to meet the required needs are:

- Option 1 – new county road along the northern side of the A55(T) as in the previously-published scheme;
- Option 2 – new bridge under the A55(T), or;
- Option 3 – new bridge over the A55(T).

It was concluded that Option 2 (underbridge) not only had a higher capital cost than Option 3 (overbridge), but had ongoing operational costs. For this reason, it was recommended that Option 2 be discarded. Furthermore, because of recently discovered bat activity at the Tai'r Meibion cattle underpass, it was considered unlikely that this structure could be demolished/infilled, even if a new bridge were built over the A55(T) at the boundary between the Wig and Tai'r Meibion holdings.

Option 3 would probably have advantages over Option 1 in terms of a reduced impact on ecology (by virtue of avoiding a badger sett), trees/hedgerows and agriculture. It would also be less visually intrusive overall, but the effect on the Wig locality would be greater. For cyclists, the route under Option 3B would be longer than Option 1, but would still constitute a significant improvement over the existing situation.

The most significant factor weighing against Option 3 was however the extra £0.5 - 1.0m estimated cost over Option 1, with rather modest advantages in terms of environment and agriculture. Option 3 was therefore ruled out on grounds of capital cost and Option 1 confirmed as the preferred option.

Alternatives to widening of Roman Road (Henffordd)

The Scheme involves widening of the unclassified Roman Road (Henffordd) eastwards from Tai'r Meibion Farm, in order to enable it to cope with the increased use, particularly by large agricultural vehicles, that would result from the closure of the central reserve gaps and field accesses on the A55(T), and provision of alternative access to the fields to the south of the A55(T) that form part of the Wig Farm holding. This road has hedges on each side which are identified as having significant environmental importance.

When the statutory Orders for the scheme were published in 2008 it was identified that, due to the presence of the property Capel Gilfach close to the southern highway boundary, it would be necessary to widen on the north side past that property, and therefore it was probably best to widen on that side throughout the section to be widened. Following publication of the draft Orders objections were received from the tenants at Tai'r Meibion and Wig farms, and the owners of Tai'r Meibion Farm, regarding the proposal to provide part of the new access track to Wig land over part of the Tai'r Meibion holding, and a modification was therefore made.

Bat survey transects recorded foraging activity for three species of bat along the road. It was considered that if the entire northern hedgerow was removed this could open up the road structure considerably and the retained latent heat within the road structure could be lost more quickly. It was therefore recommended that the eastern section of the road which recorded most activity had the southern hedgerow removed instead.

Therefore the options of widening part of Roman Road to the north or to the south have been compared. The design of the road widening, whether to north or south, is based on maintaining the existing road level wherever possible, in order to minimise the effect on whichever hedge boundary is to remain intact.

It was considered that the broader environmental impact of widening on the south side out-weighs the impact of widening on the north side. The translocation of the hedgerow is also intended to maintain the barrier effect. Whilst the wider road corridor may result in a quicker loss of latent

heat, such effects would be the same irrespective of which side the widening takes place. It is therefore proposed that the road be widened on the north side, and that the translocation is monitored in terms of establishing and maintaining the barrier effect. If the barrier effect were to be lost then temporary measures would need to be taken to maintain such an effect, until new planting becomes sufficiently established.

Environmental design alternatives

The following design measures to improve on the current situation for ecology and other environmental aspects at the site have also been considered during the design phase:

- Enhanced mammal passage: Dry pipes for mammals (including otters and badgers) have been considered at various locations adjacent to existing watercourses. Some locations have had to be ruled out due to topographical constraints (the ground being higher on the southern side of the A55(T) than the northern side). However, dry pipes are considered to be feasible at two of the watercourses affected by the scheme (numbers 2 and 6, in the vicinity of westbound Junction 12 and at the site of Wig Bach respectively).
- Enhancements to the new verges: A request from NMWTRA to consider enhancing the new verges for wildflowers instead of grassland has been incorporated within the design of the scheme.
- Detention pond location: The previous scheme included such a pond on farmland adjacent to the Wig Bach property. Since the Wig Bach property was demolished in 2011 it is proposed to locate the pond on that site in order to reduce agricultural land take and provide better connectivity with Stream 6.
- In order to minimise the loss of mature trees with bat roosting potential along the proposed route of the new PMA between Roman Road (Henffordd) and the A55(T), the route has been aligned to utilise the location of the existing fording point where it crosses the Afon Wig (Stream 5) and mature trees would be retained where possible throughout the corridor of the Scheme.

Hydraulic modelling has confirmed that there would be an increase in flood risk to the Wig Crossing Cottages during a 1 in 1000yr event (due to increased flow being conveyed along the Afon Wig to the downstream railway culvert); the full results can be found in the Flood Consequence Assessment (see Technical Report D, Volume 2) and are summarised in Chapter 5.10 of this ES.

Mitigation of this increased flood risk would include a wall/bund (up to 1m high) along the Wig Crossing Cottages' eastern and southern boundaries and increased outfall points surrounding the properties; with the detailed design aspects to be agreed with the property owners and NRW. The final location and height of the wall would also be determined at the detailed design stage and with agreement from NRW. The following principles would be adopted for the detailed design and construction of this feature in order to reduce its environmental impact, particularly to landscape and ecological receptors:

1) Consideration would be given to the nature of the wall, and whether soft construction could be used (*i.e.* cloddiau or earth bank) to reduce the visual intrusion of a 'hard finished' wall (*e.g.* a clawdd, with a concrete flood-proof core, surrounded by earth and faced with masonry with a hedge on top so that a vegetative screen is created within a few years of construction);
2) The flood wall would avoid removal of existing boundary vegetation, particularly to the southern and eastern boundaries where hedges and trees interrupt/filter views of the wider countryside. The detailed design would consider how the wall is constructed, avoiding disturbance to the tree root protection area where possible by adopting non-invasive construction techniques. Hand digging techniques would be employed where excavation is required within the tree root protection area and roots pruned to reduce impacts;
3) Any works associated with the boundary treatments, and in particular the eastern boundary would seek to prune vegetation back to facilitate construction and retain existing root balls in-situ to give retained vegetation an opportunity to recover, and;

4) Proposals would include the planting of a hedge along the eastern boundary, using feathered nursery stock and pruned back to the height of the wall following planting in order to restore a boundary feature.

Do Minimum option

If the Scheme were not carried out then a 'Do Minimum' scenario would be necessary in order to ensure the continued safety of road users along this section of the A55(T); this would involve addressing relevant items when the situation arose.

The items requiring attention immediately or in the very near future include:

- Reconstruction of the existing road pavement, which has reached the end of its operational life;
- Upgrading the existing drainage to reduce the risk of flooding of the carriageway;
- Ongoing maintenance (re-tensioning) of the existing central reserve safety barriers in accordance with the Welsh Government Trunk Road Maintenance Manual (WGTRMM); and,
- Improvements to the junction with the county road to Wig Crossing Cottages and the access to the Bryn Meddyg properties.

Many of these items would require individual traffic management with associated delays. If they were to be carried out individually there would be unnecessary duplication of the traffic management costs and associated delays.

Implementation of the Do Minimum items would not address some matters of safety, including the closure of all the individual field and private accesses and directing them to one junction in each direction.

The 'Do Minimum' option is not considered to be a satisfactory alternative or solution to improving safety for all road users of the A55(T) at this location or improving network resilience by reducing flood risk.

None of the Do Minimum items would provide a wider verge, to accord with present-day standards. To accomplish this would necessitate land acquisition, as would the provision of 1m wide hardstrips and a NMU/PMA.

None of the alternatives considered and described above were considered more or less likely to result in increased likelihood of implications on any of the relevant European protected sites assessed in this document with regard to the A55(T) Abergwyngregyn to Tai'r Meibion Improvement. It has therefore been concluded that there would be no change to the conclusions regarding the assessment of the likelihood of potential effects on the relevant European protected sites as a result of the chosen option over and above the alternatives considered.

6.0 Potential Impacts on European Protected Sites (see matrices in Sections 11 to 16)

A summary of the potential construction and operational impacts of the advance and main works is provided in Table 6.1 below.

Table 6.1: Summary of Potential Advance and Main Works Impacts

Works Phase	Potential Impact
Advance Works (February 2017 to summer 2017)	• Temporary disturbance to habitats and species associated with European sites via vegetation removal, site clearance and construction to the south of the A55(T). • Sedimentation and pollution of watercourses entering European sites

	via excavation of cut-off channel, connection to watercourse and drainage works.
Main Works (winter/spring 2017/18 to winter/spring 2019/20)	• Temporary disturbance to habitats and species associated with European sites via vegetation removal, site clearance and construction of A55 improvements and new county road/PMA/NMU route. • Permanent loss of foraging habitat and disturbance for oystercatcher and curlew in fields adjacent to the A55 carriageway • Sedimentation and pollution of watercourses entering European sites via excavation and drainage works. • Prevention of otters crossing the A55(T) carriageway due to the new concrete central reserve barrier. • Increased risk of road mortality of otters during operation of the scheme as the new concrete central reserve safety barrier could trap animals on the carriageway.

6.1 Coedydd Aber SAC and Snowdonia SAC

Although hydrologically connected to the proposal via watercourses, both SACs are located upstream and therefore no impacts associated with water quality or quantity are expected.

The requirement for dust control during the construction phase and associated control measures are specified in the Environmental Statement (YGC, 2016). Through adopting these measures and being mindful of changing weather patterns, especially prolonged dry periods, the dust nuisance associated with the Scheme would be limited. The prevailing wind direction for the area is south-westerly meaning that any significant air pollution from the scheme would be unlikely to reach these sites, and no significant effects on local air quality are predicted from the proposal during operation.

Therefore, it is considered that the Snowdonia SAC and Coedydd Aber SAC will not be adversely affected by the proposals and have therefore been scoped out of further assessment.

6.2 Menai Strait and Conwy Bay SAC

There would be no direct impact on this site as a result of habitat loss or fragmentation as it is located at least 410m away from the proposals. However, water quality and flow impacts may occur during the construction and operational phases.

The advance and main construction works for the Scheme have the potential to impact water quality in any of the receiving surface or groundwater receptors, including the Menai Strait and Conwy Bay SAC. This may be due to excavation, the deposition of soils, sediment, or other construction materials, spillage of fuels or other contaminating liquids, the mobilisation of contamination following disturbance of contaminated ground or groundwater, or through uncontrolled site runoff. There is a risk of increased sediment loads, accidental spillages and channel obstructions affecting the water quality and flow of the watercourses that enter Menai Strait and Conwy Bay SAC and Traeth Lafan SPA during this period.

During operation road drainage can impact the water environment through discharge of sediments, pollutants and volume of water. However, detailed calculations have shown that there would be no impact of routine runoff to surface waters during the operation of the Scheme, as the change to predicted levels of dissolved copper or total zinc in the receiving watercourses is below the threshold. As a result, no significant effects are predicted and no additional pollution control measures are required.

Pollution from accidental spillages during the operation of the Scheme is potentially the most damaging form of pollution to both surface and groundwater. The risk of a pollution incident from accidental spillages within the Scheme is <0.5% and is therefore below the acceptable risk threshold recommended by HD 45/09 for sensitive waters (100 years). As a result, no significant effects are predicted and there is no requirement for pollution mitigation measures to be incorporated into the Scheme design. However, despite this pollution control points for accidental spillages would be installed at the outfalls of each watercourse, as detailed in Section 2.

On completion of the proposal no additional pollution or degradation of the watercourses is expected.

No habitat loss from this site is expected as a result of the proposal due its distance from it (410m). However, since fluvial pathways exist via the Afon Wig and other smaller un-named watercourses which flow into this site from the proposal, features of the SAC could be negatively affected and therefore this site has been considered within this assessment.

6.3 Traeth Lafan SPA

There would be no direct impact on this site as a result of habitat loss or fragmentation as it is located at least 410m away from the proposals. Potential water quality and flow impacts have been considered and are the same as explained for the Menai Strait and Conwy Bay SAC.

The improved grassland fields between the SPA boundary and the carriageway, including those affected by the scheme, offer potential foraging habitat for two mobile features of the SPA; Oystercatcher *Haematopus ostralegus* and Eurasian Curlew *Numenius arquata*. Approximately 5.7a of the adjacent fields (mostly a linear length of improved grassland adjacent to the A55 carriageway) would be permanently lost and approximately 9.1ha would be temporarily lost during the construction phase.

Since the fields adjacent to the scheme offer potential feeding opportunities for Oystercatcher *H. ostralegus* and Eurasian Curlew *N. arquata*, these species could also be disturbed from using the fields as foraging habitat during the construction period, and potentially during the operational phase with the introduction of a new county road/PMA/NMU route along the northern edge of the carriageway.

The closest high tide roosts of Eurasian Oystercatcher to the proposals have previously been identified along the Menai Strait at Ogwen (2,630 individuals), Wig (5,938 individuals) and Aber (126 individuals) (BTO, 2005). None of these sites would be lost or disturbed by the proposals, which are approximately 410m south of the closest (Wig). The main carriageway works are approximately 625m south at their closest. In addition, large numbers of Eurasian Curlew are known to regularly roost on the foreshore of the Aber Local Nature Reserve, approximately 775m north of the proposals, which again would not be lost or disturbed by the proposals. The most recently available WeBS (Wetland Bird Survey) data for Eurasian Oystercatcher and Eurasian Curlew from Traeth Lafan is from 2015 and is presented in Tables 6.3.1 to 6.3.3.

Table 6.3.1: Five-year peak monthly counts of Eurasian Oystercatcher (2010 – 2015) (source: BTO)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5919	5652	4948	N/C	N/C	988	1325	4183	7091	6732	5154	7794

The value reported represents the highest count obtained over the five-year period during the month in question

Table 6.3.2: Five-year peak monthly counts of Eurasian Curlew (2010 – 2015) (source: BTO)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2310	2206	1384	N/C	N/C	295	1490	1404	1380	2178	1542	1845

The value reported represents the highest count obtained over the five-year period during the month in question

Table 6.3.3: WeBS Low Tide Count data for the winter 2010/11 (source: BTO)

	Nov	Dec	Jan	Feb
Eurasian Oystercatcher	5212	4462	4307	4520
Eurasian Curlew	522	583	761	952

These species are present at the site throughout the year, with a reduction in numbers during the summer months and a peak during winter. Since these species tend to roost close to their feeding grounds, these figures indicate that the majority of the Eurasian Oystercatcher and Eurasian Curlew population using the Traeth Lafan SPA rely on the intertidal and adjacent non-tidal habitats provided by the Menai Strait for feeding and roosting; these habitats would not be lost or disturbed by the Scheme. Furthermore, considering the abundance of suitable foraging and roosting habitat in the immediate surrounding area, including the Traeth Lafan SPA and the surrounding mud and sandflats at low tide as well as the agricultural fields between the SPA and the scheme that would not be affected by the proposals, existing disturbance due to present farming practices and the A55(T) carriageway and the presence of hedgerows that could provide shelter for predators along large sections of the land affected, the proposals are unlikely to have a significant impact on Eurasian Oystercatchers or Eurasian Curlews as a result of loss of foraging habitat or disturbance.

With regard to disturbance during operation, noise levels and visual disturbance on the A55(T) at the project location are not expected to increase significantly from the baseline levels during the operation of the scheme. The advance works are located on the south side of the A55(T) and as such would not result in disturbance to the bird populations using the Traeth Lafan SPA. The new county road/PMA is to provide access for five properties so would not be subject to significantly high levels of traffic. The NMU routes in the footprint of the Scheme currently have low usage by pedestrians and this is not expected to change significantly as a result of the scheme, although there may be an increase in cyclists using the NMU route. However, both the county road and NMU route would be screened by a new hedgerow along their northern boundary to match the existing boundary feature and would be lower than the carriageway and hills to the south, so users would not be silhouetted against the sky.

In addition, the disturbance already occurring in the fields due to present farming practices and their close proximity to the existing carriageway, along with the large amount of alternative foraging habitat between the project and the site, mean that the proposals are unlikely to cause significant disturbance to Eurasian Oystercatchers or Eurasian Curlews. It is considered that Traeth Lafan, the surrounding mud and sandflats and land immediately adjacent to the SPA boundary offer more suitable feeding habitat, which are more readily utilised by these birds as indicated by the WeBS data, and would continue to remain undisturbed by the project.

Due to the distance of the site from the proposals and the presence of the existing dual carriageway and agricultural practices no direct adverse impacts are predicted to the SPA due to habitat loss or disturbance. However, habitat loss and disturbance that could adversely affect any mobile Eurasian Oystercatcher and Eurasian Curlew features present outside of the site boundaries in the vicinity of the scheme have been considered within this assessment. Since fluvial pathways exist via the Afon Wig and other smaller un-named watercourses which flow into this site from the proposal, features of the SPA could be negatively indirectly affected. Therefore, this site has been considered within this assessment.

6.4 Afon Gwyrfai a Llyn Cwellyn SAC

There would be no direct impact on this site as a result of habitat loss or fragmentation as it is located at least 15km to the southwest of the proposals.

Degradation may occur to the watercourses used by otters that flow through the proposed scheme during construction. Impacts on water quality could occur from accidental spillages and pollution caused by works in or adjacent to the watercourses *e.g.* sedimentation and these have already been addressed in Section 6.1 (Menai Strait and Conwy Bay SAC).

Temporary disturbance to foraging otters and otter foraging habitat would occur as a result of the proposal in the advance and main works construction periods due to the presence of the works and associated site personnel/plant machinery. On completion of the proposal no additional disturbance or pollution to otters or otter foraging habitat is expected.
The existing A55(T) carriageway already creates a high risk to otters, but there is a risk of increased otter mortality on the carriageway associated with the installation of a new concrete central reserve barrier.

It is considered unlikely that otters from this SAC forage in the habitat within or adjacent to the Scheme due to it being located at least 15km to the south-west. It is however, considered possible that individual otters may disperse from the SAC to the habitat within the footprint of the scheme at which point they would be considered to be part of the local otter population and would therefore be subject to temporary potential disturbance during the construction period due to noise and construction activities.

Commuting routes and / or foraging habitat used by the local otter population are likely to be temporarily disturbed by the proposal. An additional potential impact on the local otter population is posed by the installation of a new concrete central reserve barrier which would limit movement over the A55(T) carriageway and may trap any animals that access the highway. Therefore, despite the lack of evidence of crossing points of otters over or under the road being identified in the course of the 2015 and 2016 baseline and pre-construction advance works surveys, the precautionary principle has been applied to the otter mobile species feature of this SAC and the site has been included within this assessment.

6.5 Gwydyr Forest Mines SAC, Meirionnydd Oakwoods and Bat Sites SAC and Glynllifon SAC

There would be no direct impact on these sites as a result of habitat loss or fragmentation as they are located at least 15km, 17km and 19km away from the proposals respectively.

Temporary disturbance to commuting and foraging habitat used by bats, including the local Lesser Horseshoe bat population, would occur as a result of vegetation clearance/translocation in the advance and main works construction periods. Construction works within the two cattle underpasses during the main works could affect the free passage of Lesser Horseshoe bats through these.
On completion of the proposal no disturbance to commuting and foraging bat habitat is expected as all hedgerows and vegetated flight routes used by commuting and foraging bats would either be translocated or replanted as part of the proposal.

Habitat enhancement benefits will also be provided as a result of an enlarged culvert to be installed for the Afon Wig crossing underneath the A55(T). This could potentially provide an additional crossing point for bats (including Lesser Horseshoe) underneath the carriageway, in addition to the two farm underpasses that would remain in place. Gaps in the existing roadside hedgerows are also proposed to be filled in, which would help to improve habitat connectivity for bats (including Lesser Horseshoe) in the local area.

It is considered unlikely that Lesser Horseshoe bats from these SACs forage in the habitat within or adjacent to the Scheme due to them being located at least 15km and 17km to the southeast and southwest and 19km to the south respectively. It is however, considered possible that Lesser Horseshoe bats may disperse from the SACs to the habitat within the footprint of the scheme, at which point they would be considered to be part of the local Lesser Horseshoe bat population and would therefore be subject to temporary potential disturbance during the construction period due to noise and construction activities.

Commuting routes and foraging habitat used by the local Lesser Horseshoe bat population are likely to be temporarily disturbed by the proposal. Therefore, the Lesser Horseshoe bat mobile species feature of these sites has been considered within this assessment.

7.0 Possible In-Combination Effects with Other Plans or Projects

7.1 Tal y Bont Flood Alleviation Scheme

The construction of this project to reduce the risk of flooding to properties within the village of Talybont, Gwynedd, approximately 1.3km to the southwest of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement proposal, was completed in autumn 2016.

The scheme involves the construction of a weir structure on the western bank of the unnamed watercourse at Grid Reference SH 60882, 70173, which has been designed to divert peak flows above approximately $2m^3/s$ from the watercourse. The structure is supported on either side by walls built to prevent water backing up and flooding over the banks and is fitted with a 500mm orifice through which the unnamed watercourse continues to flow.

The water which flows over the weir during times of heavy flow is culverted to the west for approximately 200m, under two unclassified roads, prior to entering an open channel with a base width of 2.2m for approximately 260m. From this channel the flow enters a second culvert structure which extends for 160m through agricultural land before crossing beneath a minor road which runs parallel to the Afon Ogwen and discharges onto the eastern river bank via a new stepped spillway, directly upstream of the A55(T) at Grid Reference SH 60247, 70088.

The Assessment of Significant Effects for the project concluded that the proposed land drainage improvement works would not generate significant adverse effects upon the environment at the location and any adverse effects would be temporary and restricted to the construction period only. The construction phases of the two projects will not overlap and therefore significant in-combination effects are not considered likely.

7.2 Glyn Rhonwy Pumped Storage Scheme

Project to construct a pumped storage hydroelectric scheme at Glyn Rhonwy, former quarry at Llanberis, Gwynedd situated approximately 11.7km to the southwest of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement.

An Environmental Statement (ES) was completed in 2012 as part of the approved scheme and the current draft ES builds upon the regulatory agreements for the various technical assessments which supported the 2012 ES. The scope of the EIA for the development is in the process of being agreed with the regulatory bodies and has been supplemented with early engagement with the statutory consultees and also with the Planning Inspectorate. As stated in the ES a low number of Lesser Horseshoe bats have been recorded roosting at Glyn Rhonwy. No evidence of otter has been recorded on the site. However, otters are present within the adjacent Llyn Padarn SSSI.

It is considered unlikely that the Glyn Rhonwy Pumped Storage Scheme project would act in-combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement proposal and result in

negative impacts on the otter Qualifying Feature of the Pen Llyn a'r Sarnau SAC or the Lesser Horseshoe bat Qualifying Feature of the Meirionydd Oakwoods and Bat Sites SAC due its distance and topography from the site of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement.
It is also considered extremely unlikely that individuals from the local otter and Lesser Horseshoe bat population resident within the habitat at the location of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement proposal would commute, forage, breed or disperse to the Glyn Rhonwy site. Therefore, significant in-combination effects are not considered likely.

7.3 A487 Caernarfon to Bontnewydd Bypass

The A487 Caernarfon to Bontnewydd By-Pass Scheme crosses the Afon Gwyrfai a Llyn Cwellyn SAC and as such has been identified as a scheme that has the potential to result in an in-combination impact on the otter qualifying feature of the SAC.

However, the SIAA for the proposed scheme states that the scheme has been subject to an iterative design process, whereby impacts on sites of nature conservation value have been minimised and avoided where possible through appropriate scheme design. For example, the Afon Gwyrfai a Llyn Cwellyn SAC will be crossed by a clear-span structure, thus avoiding direct impacts to the SAC. Culverts have been oversized as far as possible to allow passage of wildlife and will be designed so that they should never be in full spate wherever possible. This includes the three additional culverts added to increase the general permeability of the scheme following discussions with NRW during the consultation process; and the clear span structures at the Afon Seiont and the Afon Gwyrfai.

It is also considered unlikely that otters from this SAC forage in the habitat within or adjacent to the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme due to its distance from the proposal located at least 15km to the south-west. It is however, considered possible that individual otters may disperse from the SAC to the habitat within the footprint of the Scheme, at which point they would be considered to be part of the local otter population and would therefore be subject to temporary potential disturbance during the construction period due to noise and construction activities.

However, the proposal would not restrict or affect the movement of otter between habitats. In addition, the provision of improved otter passage along three watercourses within the Scheme (dry mammal ledges/shelves on the Afon Wig culvert and two dry pipes on streams 2 and 6) is expected to enhance habitat connectivity and increase the amount of available habitat for otters in the local area.

In addition, the A487 Caernarfon to Bontnewydd By-Pass Scheme highlighted potential impacts on the Lesser Horseshoe bat qualifying feature of the Glynllifon SAC. However, whilst no roosts would be directly affected, there is potential for indirect impacts, in the form of disturbance, disruption of potential commuting routes and potential incidental killing of individuals during the operational phase of the scheme. Therefore, the potential impacts on Lesser Horseshoe bats including loss of foraging habitat, habitat fragmentation and disturbance via lighting, noise and vibration would require detailed and site-specific mitigation measures including adoption of a landscape-scale approach. This approach is based on the principle that there needs to be permeability through the scheme and habitat connectivity around the scheme. In this situation this has involved maximising the number of safe and suitable crossing points available across the scheme by providing clear-span structures and oversized pipes and culverts. These are located on vegetated watercourses, roads, hedgerows and other features, which have high potential for use by bats as potential commuting routes. In addition to these crossing points additional mitigation is required. Crossing points would be connected along the length of the scheme and to the wider landscape by temporary fencing during construction; and by dense hedgerow and woodland planting.

It is also considered unlikely that individuals from the local otter and Lesser Horseshoe bat population resident within the habitat at the location of the A55(T) Abergwyngregyn to Tai'r Meibion Improvement proposal would commute, forage, breed or disperse to the Caernarfon to Bontnewydd Bypass site. Therefore, significant in-combination effects with the Scheme are not considered likely.

7.4 Local Planning Policy

A review of Gwynedd's UDP and Gwynedd and Anglesey's forthcoming Joint Local Development Plan (JLDP) has been undertaken to ensure that any other remaining potential plans for development within Gwynedd and Anglesey are highlighted with regard to the A55(T) Abergwyngregyn to Tai'r Meibion Improvement and the conclusions made in relation to possible in-combination effects as detailed in this assessment.

Table 7.4.1 describes the plans considered within this assessment and includes details of the European Protected sites and the features potentially effected by each, as identified in the relevant Habitats Regulations Assessment (HRA) reports for those plans.

It should be noted that due to the outline nature of the plans, these assessments are often produced at a strategic level and do not provide sufficient detail to undertake a detailed in-combination assessment for the project. Furthermore, the conclusions of plan level HRAs do not remove the requirement for project-level HRAs for specific projects associated with these plans. When these projects come forward, these will need to undertake specific, detailed assessments of the potential effects on European sites and include this project (if relevant) as part of their in-combination assessment.

Table 7.4.1: Gwynedd UDP and Gwynedd & Anglesey Joint Local Development Plan (JLDP)

Name of Plan	Summary of European Protected Sites and Features Affected
Gwynedd and Anglesey Joint Local Development Plan (2011 – 2025)(Deposit Plan)	In line with the screening requirement of the Habitats Regulations, an assessment was undertaken to determine the likelihood for significant effects on European sites within the influence of the Deposit JLDP. The screening assessment found that individually, the majority of policies or site allocations proposed within the Deposit JLDP are unlikely to have significant effects on European sites. There are a number of reasons for this including: the majority of the policies do not necessarily propose development, but rather support certain types of development and set out criteria for the determination of any planning applications. A number of the policies also contain safeguards that seek to protect biodiversity or require any proposal for development to undertake a HRA. This along with the mitigation provided in Deposit JLDP policies, including Strategic Policy PS16 (Conserving and Enhancing the Natural Environment) - which seeks to manage development to conserve and where possible enhance the natural environment by safeguarding European sites and wider biodiversity - will help to ensure that there are no likely significant effects on European sites. The screening assessment also considered the potential impacts of the Deposit JLDP as a whole as well as in-combination with other plans and projects. It concluded that that the Deposit JLDP

	is unlikely to have significant effects on any European sites either alone or in-combination with other plans and projects as a result of atmospheric pollution, increased disturbance, habitat loss or fragmentation and reduced water quality and levels. These findings will be subject to consultation comments and advice from NRW and wider stakeholders. It is recommended that further screening work is carried out to consider any proposed modifications to the JLDP following the Deposit consultation.

8.0 Monitoring

Ecological monitoring for the Scheme would be undertaken between the duration of the advance and main works construction periods and on completion of the project in the operational phase for a period of 12 months post construction to check for and monitor the continued use of the habitat by the Qualifying Features species recorded during the baseline surveys (Lesser Horseshoe bats and otter). Ecological monitoring commitments would then terminate following review of the data collected with NRW.

Monitoring of Lesser Horseshoe bat and otter activity at the location of the enlarged Afon Wig Culvert habitat enhancement measure on Stream 5 would also be undertaken for a 12 month period post construction in the operational phase to determine if the predicted positive benefit to wildlife by increased provision of passage beneath the A55(T) has been achieved.

Pre-construction (advance and main works):

- Monitoring of Lesser Horseshoe bat activity through the Tai'r Meibion and Wig farm underpasses (once with human surveyors and five days passive static recording at 3 key periods in the bat activity season in May, July and September);
- Otter survey to confirm the absence/presence of any holts or resting sites within the vicinity of the Scheme (once between advance and main works (pre-construction survey for advance works already completed));

During construction (advance and main works):

- Monitoring of Lesser Horseshoe bat activity through the Tai'r Meibion and Wig farm underpasses (once with human surveyors and five days passive static recording at 3 key periods in the bat activity season in May, July and September);
- Monitoring of otter activity in the vicinity of the Scheme (once at any time), and;
- Monitoring of the surface water quality of the watercourses affected by the Scheme.

Post-construction (advance and main works):

- Monitoring of Lesser Horseshoe bat activity through the Tai'r Meibion and Wig farm underpasses (once with human surveyors and five days passive static recording at 3 key periods in the bat activity season in May, July and September);
- Monitoring of otter activity in the vicinity of the Scheme and particularly in the vicinity of new crossing points (once at any time);
- Monitoring the mammal proof fencing and new additional crossing points provided beneath the A55(T) to ensure maintenance is undertaken where necessary (once at any time);
- Monitoring the tree, shrub and hedgerow translocation and planting in parallel with landscaping obligations, to ensure that they continue to fulfil their ecological functions (once during the growth period in summer).

9.0 Consultation with Statutory Consultees prior to the SIAA

Natural Resources Wales (NRW) were consulted regarding the proposals and the potential effect they could have on the local environment and European Protected sites. Consultation was also

carried out with the NMWTRA ecologist and GC biodiversity officer. The comments received from NMWTRA, NRW and GC have been considered within the scoping of the surveys and the design of the proposals. Following the changes made in light of the NRW, NMWTRA and GC comments received, WG have also provided comments which have been incorporated into this SIAA document.

10.0 Mitigating Impacts of Construction and Operation **(see matrices in Sections 11 to 16)**

10.1 Menai Strait and Conwy Bay SAC and Traeth Lafan SPA

The pollution prevention measures outlined below would be detailed in an agreed Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR) that would be produced and formed on the basis of the environmental commitments included in the Environmental Statement (ES) for the proposal. This would detail both generic and specific instructions for both the advance and main works to enable construction to be undertaken with minimal impact on the water environment and ensure appropriate consents are obtained prior to works commencing.

The following generic, plainly established and uncontroversial mitigation measures would be applied prior to and during the advance and main works construction phase:

- Adherence to Pollution Prevention Guidelines (PPGs);
- Statutory Drainage Consents would be required for works associated with all of the watercourses within the proposed scheme corridor;
- Construction personnel would be made aware of the sensitive environment of the works through toolbox talks provided by a suitably qualified Environmental Manager or Environmental Clerk of Works, as appropriate.
- Provision of adequate temporary storage to contain surface water run-off during the construction period;
- On-site availability of oil spill clean-up equipment;
- Use of drip trays under mobile plant;
- Sediment trapping matting installed downstream of any construction activities adjacent to or over watercourses;
- Preparation of incident response plans, prior to construction, and present on site throughout construction to inform sub-contractors of required actions in the event of a pollution incident;
- The use of construction materials on site that are free from contaminated material;
- Ensuring that wet cement does not come into contact with river or groundwater, and;
- Testing of made soils and soils that will be reworked to identify any soil contamination.

The best practice techniques listed below would also be employed to minimise the risks of pollutants reaching surface water features to a level where any events that did occur would be contained and limited in scale:

- The use of concrete would be monitored carefully to ensure no accidental discharge into any watercourse;
- Mixer washings and excess concrete would not be discharged to water;
- All fuel, oils or chemicals stored on site would be located as far as is reasonably possible, and in no case less than 10m from any water body;
- Stores would be surrounded by an effective and impervious bund capable of holding the full contents of the store plus 10%;
- Dust suppression measures would be applied in order to prevent entry of suspended solids into nearby water bodies, particularly in dry weather conditions;
- No plant would be used in-stream without prior consent from NRW;

- Plant and wheel washing facilities would be sited appropriately. To prevent indiscriminate washing out of the mobile plant, designated wash-out bays would be employed on site. Once full, the wash out sumps would be pumped into a tanker for disposal off-site at a licensed disposal point. No wash waters would be discharged to surface waters, and;
- Refuelling of construction equipment would only occur at locations remote from surface water features.

Pollution prevention measures will also be adhered to in accordance with statutory drainage consents that would be required for working in watercourses.

This would reduce the potential risk of pollution and subsequent degradation such that the integrity of the Menai Strait and Conwy Bay SAC and the Traeth Lafan SPA and their Qualifying Features would not be compromised significantly.

10.2 Afon Gwyrfai a Llyn Cwellyn SAC (Otter)

The following plainly established and uncontroversial mitigation is proposed for otters during the construction and operational phases of the proposals.

Site compounds, welfare units, generators and construction lighting (where possible) would be positioned at least 30m away from the watercourses to minimise disturbance, with all construction lighting directed away from them where light spill is possible. No night time working in the vicinity of watercourses and the habitat off the A55(T) carriageway would take place.

As there is the potential for new otter resting sites to be established within or adjacent to the proposed scheme since the most recent baseline surveys undertaken in 2016, prior to construction, a pre-construction survey would be completed of the entire study area to determine the continued absence (or presence) of otter resting sites which may be located within close proximity to the scheme. The advance works pre-construction survey for otter undertaken in August 2016 did not identify any holts or resting places requiring a European Protected Species licence from NRW. However, should any other holts or resting sites be identified during the pre-construction surveys for the main works, the level of impact would be assessed and if necessary a European Protected Species licence may be required from NRW, along with associated mitigation.

200mm diameter holes would be provided at the base of the concrete central reserve barrier where the height difference between the two carriageways is not greater than 50mm, to allow mammals to cross from one side of the A55(T) to the other. These would be located at least 50m apart and positioned to coincide with areas without mammal fencing and areas more likely to be used by mammals where possible. The mitigation measures associated with the installation of the concrete central reserve barrier and increased capacity drainage culverts, plus two dry mammal pipes (streams 2 and 6) and dry mammal ledges/shelves (stream 5, Afon Wig) will improve access for otters, to a greater area of habitat than was previously available due to insufficient capacity drainage pipes and obstructions such as grilles and sheer falls within the existing culverts currently preventing access underneath the A55(T).

In addition, mammal-resistant fencing is proposed to be installed at the two cattle underpasses and in association with Railway Line Wood 2, Stream 7, the two dry mammal pipes at Streams 2 and 6 and the dry mammal ledges/shelves at Stream 5. The existing stock-proof grilles over the culverts at streams 6 and 7 would be replaced with stock-proof grilles adapted to allow mammal access.

It is therefore considered that the proposal would not restrict or affect the movement of otters between habitats due to the provision of improved passage along three watercourses within the scheme. The addition of dry mammal ledges/shelves at stream 5 on the Afon Wig culvert and two

dry pipes adjacent to streams 2 and 6 are expected to enhance habitat connectivity and increase permeability of the road and the amount of available habitat for otters in the local area.

10.3 Gwydyr Forest Mines SAC, Meirionnydd Oakwoods and Bat Sites SAC and Glynllifon SAC (Lesser Horseshoe bat)

Temporary disturbance to foraging and commuting bat habitat is expected during the advance and main works construction periods and appropriate plainly established and uncontroversial mitigation for all bat species, including Lesser Horseshoe, will be provided by translocating or replanting linear hedgerow features and the provision of temporary navigational aids leading into the entrances of the underpasses.

Bat flight paths through both the Tai'r Meibion and Wig Farm underpasses will be kept open and free of significant obstruction (supports will be required for the formwork during extension of the underpasses) throughout the advance and main works construction periods, including the winter hibernation period, in order to continue to allow use of the habitat by bats and the continued ecological functionality of the habitats and bat species present.

In order to mitigate against the negative impact of vegetation removal during the advance works, a 940m length of hedgerow present on the south of the A55(T) between the Tai'r Meibion Farm underpass to the west, past the Wig Farm underpass as far as stream 6 to the east will be translocated. In addition during the main works, a 460m length of hedgerow either side of the Tai'r Meibion Farm underpass to the north will also be translocated, as would the 860m section of hedgerow along Roman Road. The remaining affected hedgerows would be replanted.

Temporary bat navigation features, such as hurdle fencing, would be installed in the vicinity of the underpasses where any existing boundaries that lead into the underpasses are to be removed prior to the commencement of the advance works, and retained until completion of the main works and until the translocated / replanted vegetation establishes. Temporary hurdle fencing would also be provided along the stock-proof fence between the Tai'r Meibion cattle underpass and Railway Line Wood 2 during the main works.

In addition, no night time working or lighting in the vicinity of the approaches to the Tai'r Meibion and Wig Farm underpasses and the habitat off the A55(T) carriageway would take place.

On completion of the proposal the movement of Lesser Horseshoe bats underneath and alongside the A55(T) is expected to be improved by the enlarged culvert on the Afon Wig and the infilling by planting of existing hedgerow gaps.

A summary of the mitigation measures associated with the potential impacts on the European Protected sites is provided in Table 10.0 below.

Table 10.0: Summary of Advance and Main Works Mitigation Measures

Phase of Works	Proposed Mitigation Measures
Advance Works (winter 2016/17 to spring 2017)	• Hedgerow translocation / replanting under ecological watching brief to the south of the A55(T). • Installation of temporary bat guidance hurdle fencing leading into the underpasses. • No night time working or lighting in vicinity of bat roosts, the Tai'r Meibion and Wig farm underpasses and watercourses. • Location of site facilities at least 30m away from any watercourse. • The Tai'r Meibion and Wig Farm underpasses will be kept open and free of significant obstruction throughout the construction

	period. • Adherence to Pollution Prevention Guidelines (PPGs), Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR). • Site facilities to be located at least 150m away from Tai'r Meibion bat roost and cattle underpasses and any construction lighting directed away from them.
Main Works (autumn 2017 to spring 2019)	• Hedgerow translocation / replanting under ecological watching brief. • Installation of temporary bat guidance hurdle fencing leading into the underpasses. • Temporary hurdle fencing would be provided along the stock-proof fence between the Tai'r Meibion cattle underpass and Railway Line Wood 2. • The Tai'r Meibion and Wig Farm underpasses will be kept open and free of significant obstruction throughout the construction period. • No night time working or lighting in vicinity of bat roosts, the Tai'r Meibion and Wig farm underpasses and watercourses. • Site facilities to be located at least 150m away from Tai'r Meibion bat roost and cattle underpasses and any construction lighting directed away from them. • Location of site facilities at least 30m away from any watercourse. • Installation of two dry mammal pipes on streams 2 and 6 and dry mammal shelves on Afon Wig (stream 5). • Provision of 200mm diameter holes in central reservation barrier at minimum 50m intervals where the level difference between the westbound carriageway to the eastbound carriageway is 50mm or less. • Planting of an additional hedgerow along the northern side of proposed county road/PMA/NMU route to the north of the A55(T) to create an additional sheltered foraging corridor • Planting of native broad-leaved woodland, scrub and scattered trees in a number of locations to the north and south of the A55(T) to provide a larger area than the area lost • Mammal proof fencing adjacent to dry mammal pipes at streams 2 and 6, Afon Wig (stream 5) dry mammal shelves and Tai'r Meibion and Wig farm underpasses. • Adherence to Pollution Prevention Guidelines (PPGs), Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR).

11.0 Assessing the Impacts on the Menai Strait and Conwy Bay SAC - Screening Matrix

Project Name:	A55(T) Abergwyngregyn to Tai'r Meibion Improvement	
Natura 2000 Site under Consideration	Menai Strait and Conwy Bay SAC	
Date:	**Author (Name/Organisation)**	**Verified (Name/Organisation)**
27/05/16	Christian Middle (MCIEEM) YGC	Chris Jones (MCIEEM) YGC

Description of project

- **Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:**

· **Size and scale** ***(road type and probable traffic volume)***	See Section 2.1 for scheme description
· **Land-take**	The scheme does not lie within this European statutory protected site. No land will be taken from this protected site.
· **Distance from the European Site or key features of the site** ***(from edge of the project assessment corridor)***	The boundary of the scheme is located approximately 410m south from the boundary of the SAC at its closest.
· **Resource requirements** ***(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)***	There will not be any resources required from the SAC for the construction of this scheme.
· **Emissions** ***(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)***	The proposal poses a low risk of contamination to the Menai Strait and Conwy Bay SAC via runoff from storage of earth piles, spillages of chemicals and concrete entering the watercourse during the advance and main works construction phases. This is especially important as there are eight watercourses which cross the scheme and lead into the SAC.
· **Excavation requirements** ***(e.g. impacts of local hydrogeology)***	No excavation will be required from the SAC, or in a location which will affect the SAC.
· **Transportation requirements**	There will be no transportation within the SAC.
· **Duration of construction, operation, etc**	It is expected that the contractors undertaking the advance works would require a site presence for approximately 4 months from winter 2016/17 to spring 2017. It is expected that the contractors undertaking the proposed main works would require a site presence for approximately 18 months from spring/summer 2017.

· **Other.**	N/A
Description of avoidance and/or mitigation measures ***Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:***	
· ***Nature of proposals***	Pollution Prevention Guidelines will be adhered to in order to prevent any contamination of the Menai Strait and Conwy Bay SAC, in accordance with any conditions imposed by the statutory drainage consents required for working with watercourses. Pollution prevention Guidelines (see Section 10.1) will be detailed in an agreed Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR) that will be produced on the basis of the environmental commitments as detailed in the Environmental Statement (ES) for the proposal.
· ***Location***	The location of the proposed works at their closest is approximately 410m from the Menai Strait and Conwy Bay SAC, while the main carriageway works (at their closest) are approximately 625m away, which will limit the likelihood and extent of any impacts of water pollution on this site. The avoidance/mitigation measures proposed will be applied within the scheme footprint during the advance and main works construction periods.
· ***Evidence for effectiveness***	Tried and tested technique from previous similar schemes.
· ***Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)***	Environmental Commitments Register and Construction Environmental Management Plan. Statutory flood defence/land drainage consents. A contractor has not yet been appointed. When the contract is finalised this will include the environmental commitments regarding pollution prevention and statutory drainage consents.
<u>Characteristics of European Site(s)</u> **A brief description of the European Site should be produced, including information on:**	
• Name of European Site and its EU code	Menai Strait and Conwy Bay, UK0030202

• Location and distance of the European Site from the proposed works	410m to the north
• European Site size	26482.67 ha
• Key features of the European Site including the primary reasons for selection and any other qualifying interests	*Sandbanks which are slightly covered by sea water all the time* *Mudflats and sandflats not covered by seawater at low tide* *Reefs* *Submerged or partially submerged sea caves* *Large shallow inlets and bays*
• Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Construction can cause disturbance to European habitats and disrupt physical processes essential for maintenance of these habitats; Commercial fishing (i.e. trawling); Disposal of dredged material may contribute to an increase in turbidity which in turn can affect the distribution and composition of sub-tidal algal communities; and Development of oil wells and frequent boat traffic into Liverpool Bay may present potential pollution sources.
• European Site conservation objectives – where these are readily available	RANGE Mudflats and sandflats not covered by seawater at low tide, Reefs, Sandbanks which are slightly covered by seawater all the time. Large shallow inlets and bays. Submerged or partially submerged sea caves. The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing. For the intertidal mudflats and sandflats feature these include; • Muddy gravel communities • Dwarf eelgrass, Zostera noltei beds • Sediment communities at Traeth Lafan For the reef feature these include; • Reef communities in high energy wave-sheltered, tide-swept conditions • Under-boulder, overhang and crevice communities • Limestone reef communities • Clay outcrop reef communities For the large shallow bay feature these include; • Organically enriched muddy sediment areas. STRUCTURE AND FUNCTION 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. This includes a need for nutrient levels in the water column and sediments to be: • at or below existing statutory guideline concentrations • within ranges that are not potentially detrimental to the long term maintenance of the features species populations, their abundance and range. Contaminant levels in the water column and sediments derived from human activity to be: • at or below existing statutory guideline concentrations • below levels that would potentially result in increase in contaminant concentrations within sediments or biota • below levels potentially detrimental to the long-term maintenance of the features species populations, their abundance or range. Restoration and recovery This includes the need for restoration of some reef features such as under boulder, overhang and crevice communities, and of some mudflat and sandflat features such as the muddy gravel habitats and sheltered muddy habitats. All of these habitats are also part of the large inlets and bays feature. TYPICAL SPECIES The presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded. Important elements include: - species richness: - population structure and dynamics, - physiological heath, - reproductive capacity - recruitment, - mobility - range

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.

Elements of the project likely to give rise to impacts on European site:
Water pollution from the advance and main works construction activities as there are fluvial pathways from the scheme to this site.

In combination impacts:
It is concluded that there are no other schemes or projects which would act in combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme that would result in a significant

effect on the qualifying features of this European site.	
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	None predicted – the scheme is not located within the SAC and there will not be a reduction in habitat area.
• Disturbance to key species	There are no mobile species which are a component of this site. Species associated with the habitat features of this site will not be disturbed as part of this scheme.
• Habitat or species fragmentation	None predicted – there will be no habitat or species fragmentation affecting this site. No mobile species would be affected from the site.
• Reduction in species density	None predicted - the proposal would not be expected to reduce the density of any species associated with the SAC.
• Changes in key indicators of conservation value (water quality, etc)	None predicted – the proposal is not expected to significantly affect any watercourses.
• Climate change	It is currently unknown as to what effect climate change would have on the habitats and species of the SAC. Recent winters have seen increased rainfall leading to flooding events on the A55(T) at this location and subsequently higher water flows are assumed to be entering the SAC as a result. The proposals incorporate improved drainage to alleviate flooding issues at this location, but with enlarged drainage pipes and a detention pond to reduce flow volumes during high rainfall events.
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	None predicted – there will be no interference with any key relationships that define the structure of the site.
• Interference with key relationships that define the function of the site	None predicted – there will be no interference with any key relationships that define the function of the site.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
• Reduction of habitat area	None
• Disturbance to key species	None
• Habitat or species fragmentation	None

• Loss	None
• Fragmentation	None
• Disruption	None
• Disturbance	None
• 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 of the impacts are likely to be significant.	
Outcome of screening stage	No Significant Effects likely.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**Yes**

12.0 Assessing the Impacts on the Traeth Lafan SPA - Screening Matrix

Project Name:	A55(T) Abergwyngregyn to Tai'r Meibion Improvement	
Natura 2000 Site under Consideration	Traeth Lafan SPA	
Date:	**Author (Name/Organisation)**	**Verified (Name/Organisation)**
27/05/16	Christian Middle (MCIEEM) YGC	Chris Jones (MCIEEM) YGC

Description of project **Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:**	
· **Size and scale** ***(road type and probable traffic volume)***	See Section 2.1 for scheme description
· **Land-take**	The scheme does not lie within the Traeth Lafan European statutory protected site. No land will be taken from this protected site.
· **Distance from the European Site or key features of the site** ***(from edge of the project assessment corridor)***	The closest point of the scheme is located approximately 410m south from the boundary of the SPA. The main carriageway works are located approximately 625m to the south at their closest.
· **Resource requirements** ***(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)***	There will not be any resources required from the SPA for the construction of this scheme.
· **Emissions** ***(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)***	The proposal poses a low risk of contamination to the Traeth Lafan SPA via runoff from storage of earth piles, spillages of chemicals and concrete entering the watercourse during the advance and main works construction phases. This is especially important as there are eight watercourses which run through the scheme and discharge into the sea which is designated as the SPA.
· **Excavation requirements** ***(e.g. impacts of local hydrogeology)***	No excavation will be required from the SPA, or in a location which will affect the SPA.
· **Transportation requirements**	There will be no transportation within the SPA.
· **Duration of construction, operation, etc**	It is expected that the contractors undertaking the advance works would require a site presence for approximately 4 months from winter 2016/17 to spring 2017. It is expected that the contractors undertaking the proposed main works would require a site presence for approximately 18 months from spring/summer 2017.

· **Other (Noise disturbance)**	The fields adjacent to the scheme offer potential feeding opportunities for two SPA species: Eurasian Oystercatcher *H. ostralegus* and Eurasian Curlew *N. arquata*. Therefore, these species could be disturbed from using the fields as foraging habitat during the construction and operational period.
Description of avoidance and/or mitigation measures ***Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:***	
· ***Nature of proposals***	Pollution Prevention Guidelines will be adhered to in order to prevent any contamination of the Traeth Lafan SPA, in accordance with any conditions imposed by the statutory drainage consents required for working with watercourses. Pollution Prevention Guidelines (see Section 10.1) will be detailed in an agreed Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR) that will be produced on the basis of the environmental commitments as detailed in the Environmental Statement (ES) for the proposal.
· ***Location***	The location of the proposed works for the majority of the scheme is approximately 6m from the Traeth Lafan SPA, which will limit the likelihood and extent of any impacts of water pollution on this site. The avoidance/mitigation measures proposed will be applied within the scheme footprint during the advance and main works construction periods.
· ***Evidence for effectiveness***	Tried and tested technique from previous similar schemes.
· ***Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)***	Environmental Commitments Register and Construction Environmental Management Plan. Statutory flood defence/land drainage consents. A contractor has not yet been appointed. When the contract is finalised this will include the environmental commitments regarding pollution prevention and statutory drainage consents.
Characteristics of European Site(s) **A brief description of the European Site should be produced, including information on:**	

• Name of European Site and its EU code	Traeth Lafan / Lafan Sands SPA, UK9013031
• Location and distance of the European Site from the proposed works	The site is located approximately 410m from the proposed works at its closest. However, Oystercatcher and Curlew from this site could use the fields adjacent to the scheme as foraging habitat.
• European Site size	2642.98 ha
• Key features of the European Site including the primary reasons for selection and any other qualifying interests	Oystercatcher *H. ostralegus* Curlew *N. arquata* Great Crested Grebe *P. cristatus*
• Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	There have been concerns that the sporadic cockle suction-dredging may deplete oystercatchers' food source. NRW have developed a protocol with the North Wales Sea Fisheries Committee (NWSFC) to allow an assessment of applications for licences to harvest cockles. NWSFC will now only invite applications for licences if cockle stocks are considered to be relatively high. NRW is commissioning research to quantify cockle stocks in relation to their depletion by foraging oystercatchers.
• European Site conservation objectives – where these are readily available	Not available

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.

Elements of the project likely to give rise to impacts on European site:
Potential disturbance and loss of foraging habitat for birds using fields outside of the SPA during construction and operation. Water pollution could have a negative impact on the site.

In combination impacts:
It is concluded that there are no other schemes or projects which would act in combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme that would result in a significant effect on the qualifying features of this European site.

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	None predicted – there will be no reduction of the area of the SPA as a result of this scheme. Approximately 5.7ha of improved grassland adjacent to the A55 carriageway would be

	permanently lost to the scheme, which could provide feeding habitat for mobile features of the SPA (Oystercatcher and Curlew), thus reducing the foraging habitat available. However, much of this habitat is located adjacent to hedgerows and trees, which provide cover for predators, and is therefore less favourable for these two species, which utilise more open areas of ground. In addition, the large expanse of suitable habitat in the surrounding improved grassland fields and adjacent Menai Strait would remain and continue to provide foraging opportunities for these species.
• **Disturbance to key species**	There could be disturbance during the main works construction phase to any birds which are using the fields immediately adjacent to the road for foraging. However, WeBS data indicate that the majority of these birds favour the Menai Strait and associated habitat, which would not be disturbed. In addition, the disturbance already occurring in the fields due to farming practices and their close proximity to disturbance from the existing carriageway mean that the proposals are unlikely to have a significant impact on Eurasian Oystercatchers or Eurasian Curlews as a result of disturbance. Noise levels and visual disturbance on the A55(T) at the project location are not expected to increase significantly from the baseline levels during the operation of the scheme. The inclusion of a new county road/PMA/NMU along the northern side of the carriageway would be screened by hedgerow planting to the north and is not expected to generate significant volumes of traffic, providing access to 5 residential properties and local non-motorised user access only. Both the county road and NMU route would be screened by a new hedgerow along their northern boundary to match the existing boundary feature and would be lower than the carriageway and hills to the south, so users would not be silhouetted against the sky.
• **Habitat or species fragmentation**	None predicted – the proposal would not restrict or affect the movement of birds between habitats.
• **Reduction in species density**	None predicted - the proposal would not be expected to reduce the density of the bird population.
• **Changes in key indicators of conservation value (water quality, etc)**	None predicted – the proposal is not expected to adversely affect any watercourses if suitable mitigation measures are put in place.

• Climate change	It is currently unknown as to what effect climate change would have on habitats and species of the SPA. The SPA is designated as a refuge for wintering birds dispersed from the Dee Estuary during harsh winter weather conditions. Recent years have seen mild winter weather conditions and fewer wintering wading birds believed to be spending the winter period on western estuaries as a result.
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	None predicted
• Interference with key relationships that define the function of the site	None predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	
• Reduction of habitat area	None from SPA. Not significant for adjacent foraging habitat.
• Disturbance to key species	Not significant
• Habitat or species fragmentation	None
• Loss	None
• Fragmentation	None
• 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 of the impacts are likely to be significant.	
Outcome of screening stage	No Significant Effects likely.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**Yes**

13.0 Assessing the Impacts on the Afon Gwyrfai a Llyn Cwellyn SAC - Screening Matrix

Project Name:	A55(T) Abergwyngregyn to Tai'r Meibion Improvement	
Natura 2000 Site under Consideration	Afon Gwyrfai a Llyn Cwellyn SAC	
Date:	**Author (Name/Organisation)**	**Verified (Name/Organisation)**
27/05/16	Christian Middle (MCIEEM) YGC	Chris Jones (MCIEEM) YGC

Description of project

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

· **Size and scale** ***(road type and probable traffic volume)***	See Section 2.1 for scheme description
· **Land-take**	The proposal is not located within the Afon Gwyrfai a Llyn Cwellyn European statutory protected site. No land will be taken from this protected site.
· **Distance from the European Site or key features of the site** ***(from edge of the project assessment corridor)***	The boundary of the proposal is located approximately 15km from the boundary of the SAC.
· **Resource requirements** ***(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)***	There will not be any resources required from the SAC for the construction of this scheme.
· **Emissions** ***(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)***	The proposal does not pose a risk of contamination from emissions to the SAC as there are no hydrological links or pathways from the proposal to the protected site and the site is 15km away from the proposals.
· **Excavation requirements** ***(e.g. impacts of local hydrogeology)***	No excavation will be required from the SAC, or in a location which will affect the SAC.
· **Transportation requirements**	There will be no transportation within the SAC.
· **Duration of construction, operation, etc**	It is expected that the contractors undertaking the advance works would require a site presence for approximately 4 months from winter 2016/17 to spring 2017. It is expected that the contractors undertaking the proposed main works would require a site presence for approximately 18 months from spring/summer 2017.
· **Other (Noise disturbance)**	No impact on the SAC would arise from noise levels and visual disturbance on the A55(T) at

	the location of the proposal.
Description of avoidance and/or mitigation measures ***Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:***	
· ***Nature of proposals***	As part of the main works the new concrete central reserve barrier will have 200mm diameter holes provided within the barrier at minimum 50m intervals, for all mammals, where the level difference between the westbound carriageway to the eastbound carriageway is 50mm or less. During the main works improved passage for otters and other mammals across the A55 along three watercourses is to be provided (dry mammal pipes at streams 2 and 6 and dry mammal shelves at the Afon Wig culvert (stream 5)). No night time working or lighting adjacent to watercourses. During both the advance and main works site compounds, welfare units, generators and construction lighting (where possible) would be positioned at least 30m away from the watercourses to minimise disturbance, with all construction lighting directed away from them where light spill is possible. Pollution Prevention Guidelines measures will be outlined and detailed in an agreed Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR) that will be produced on the basis of the environmental commitments as detailed in the Environmental Statement (ES) for the proposal.
· ***Location***	Watercourses and adjacent habitat within the proposed scheme corridor.
· ***Evidence for effectiveness***	Generally accepted good practice when working on/near watercourses with evidence of otter usage.
· ***Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)***	Environmental Commitments Register and Construction Environmental Management Plan. Statutory flood defence/land drainage consents. A contractor has not yet been appointed. When the contract is finalised this will include the environmental commitments regarding pollution prevention and statutory drainage consents.

Characteristics of European Site(s) **A brief description of the European Site should be produced, including information on:**	
• Name of European Site and its EU code	Afon Gwyrfai a Llyn Cwellyn SAC, UK0030046
• Location and distance of the European Site from the proposed works	The SAC is located approximately 15km from the proposal.
• European Site size	114.29 ha
• Key features of the European Site including the primary reasons for selection and any other qualifying interests	*Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea.* *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation* *Atlantic salmon Salmo salar* *Floating water-plantain Luronium natans* *Otter Lutra lutra*
• Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Acidification; Afon Gwyrfai is most vulnerable to cumulative impacts of small-scale changes along its course which may affect water quality and habitat structure.
• European Site conservation objectives – where these are readily available	Otter (*Lutra lutra*) The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour. The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. The size of breeding territories may vary depending on prey abundance. The population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient they should be created through habitat enhancement and where necessary the provision of artificial holts. No otter breeding site is subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance are managed. The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges/shelves, fencing etc. at road bridges and other artificial barriers.

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.

Elements of the project likely to give rise to impacts on European site:
Temporary potential disturbance to otter and their foraging habitat during the advance and main works construction periods due to noise and construction activities.

In combination impacts:
The A487 Caernarfon to Bontnewydd By-Pass Scheme crosses the Afon Gwyrfai a Llyn Cwellyn SAC. It is considered unlikely that otters from the Afon Gwyrfai a Llyn Cwellyn SAC forage in the habitat within or adjacent to the scheme due to its distance from the proposal at least 15km to the southwest. It is however, considered possible that individual otters may disperse from the SAC to the habitat within the footprint of the scheme at which point they would be considered to be part of the local otter population and would therefore be subject to temporary potential disturbance during the advance and main works construction periods due to noise and construction activities.

However, the proposal would not restrict or affect the movement of otter between habitats. In addition, the provision of improved mammal passage along three watercourses within the scheme (dry mammal ledges/shelves on the Afon Wig culvert and two dry pipes on streams 2 and 6) is expected to enhance habitat connectivity and increase the amount of available habitat for otters, and other mammals, in the local area. Therefore, significant in-combination effects with the Scheme are not considered likely.

It is therefore concluded that there are no other schemes or projects which would act in combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme that would result in a significant effect on the qualifying features of this European site.

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**	None predicted – there will be no reduction of the area of this site as a result of the proposal.
• **Disturbance to key species**	There could be temporary disturbance to foraging otters during the advance and main construction periods, although the site is 15km away from the location of the proposals.
• **Habitat or species fragmentation**	None predicted – the proposal would not restrict or affect the movement of otter between habitats. The provision of improved mammal passage along three watercourses within the scheme (mammal ledges/shelves and dry pipes) has potential to enhance habitat connectivity for otters in the local area.
• **Reduction in species density**	None predicted - the proposal would not be expected to reduce the density of the otter population.
• **Changes in key indicators of**	None predicted – the proposal is not

conservation value (water quality, etc)	hydrologically linked to this SAC.
• Climate change	The Monarch III report (UKCIP, May 2007) predicts the effects of climate change on selected species, but does not include otters. Otters are considered to be relatively resilient to climate change by favouring a variety of wetland habitats and having a wide range of food sources.
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	None predicted
• Interference with key relationships that define the function of the site	None predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	
• Reduction of habitat area	None
• Disturbance to key species	Not significant
• Habitat or species fragmentation	None.
• Loss	None
• Fragmentation	None
• Disruption	None
• Disturbance	Not significant
• Change to key elements of the site *(e.g. water quality, hydrological regime etc)*	None
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 of the impacts are likely to be significant.	
Outcome of screening stage	No Significant Effects likely.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**Yes**

14.0 Assessing the Impacts on the Gwydyr Forest Mines SAC - Screening Matrix

Project Name:	A55(T) Abergwyngregyn to Tai'r Meibion Improvement	
Natura 2000 Site under Consideration	Gwydyr Forest Mines SAC	
Date:	**Author (Name/Organisation)**	**Verified (Name/Organisation)**
27/05/16	Christian Middle (MCIEEM) YGC	Chris Jones (MCIEEM) YGC

Description of project

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

· **Size and scale** ***(road type and probable traffic volume)***	See Section 2.1 for scheme description
· **Land-take**	The proposal is not located within the Gwydyr Forest Mines European statutory protected site. No land will be taken from this protected site.
· **Distance from the European Site or key features of the site** ***(from edge of the project assessment corridor)***	The boundary of the proposal is located approximately 15km from the boundary of the SAC
· **Resource requirements** ***(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)***	There will not be any resources required from the SAC for the construction of this scheme.
· **Emissions** ***(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)***	The proposal does not pose a risk of contamination from emissions to the SAC as there are no hydrological links or pathways from the proposal to the protected site and the site is 15km away from the proposals.
· **Excavation requirements** ***(e.g. impacts of local hydrogeology)***	No excavation will be required from the SAC, or in a location which will affect the SAC.
· **Transportation requirements**	There will be no transportation within the SAC.
· **Duration of construction, operation, etc**	It is expected that the contractors undertaking the advance works would require a site presence for approximately 4 months from winter 2016/17 to spring 2017. It is expected that the contractors undertaking the proposed main works would require a site presence for approximately 18 months from spring/summer 2017.
· **Other (Noise disturbance)**	No impact on the SAC would arise from noise levels and visual disturbance on the A55(T) at the location of the proposal.

Description of avoidance and/or mitigation measures ***Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:***	
· ***Nature of proposals***	During the advance works to mitigate against the negative impact of vegetation removal, a 940m length of hedgerow present on the south of the A55(T) between the Tai'r Meibion Farm Underpass to the west, past the Wig Farm Underpass as far as stream 6 to the east will be translocated. In addition, during the main works, a 460m length of hedgerow either side of the Tai'r Meibion Farm Underpass to the north will also be translocated. The remaining affected hedgerows would be replanted. Temporary bat navigation features, such as hurdle fencing, would be installed in the vicinity of the underpasses during both the advance and main works where any existing boundaries that lead into the underpasses are to be removed and retained until completion of the main works and until translocated/replanted vegetation establishes. Temporary hurdle fencing would also be provided along the stock-proof fence between the Tai'r Meibion cattle underpass and Railway Line Wood 2 prior to the commencement of the main works and retained until completion of the main works and until translocated/replanted vegetation establishes. Site facilities to be located at least 150m away from Tai'r Meibion bat roost and cattle underpasses and any construction lighting directed away from them. No night time working or lighting in the vicinity of Tai'r Meibion bat roost, the approaches to the Tai'r Meibion and Wig Farm Underpasses or the habitat off the A55 carriageway. All hedgerow habitats will be translocated or replanted. The Tai'r Meibion and Wig Farm underpasses will be kept open and free of significant obstruction throughout the advance and main works construction periods. The enlargement of the Afon Wig culvert during the main drainage works could result in improved passage for bat species beneath the A55(T) carriageway. Pollution prevention measures will be detailed in an agreed Construction Environmental

	Management Plan (CEMP) and Environmental Commitments Register (ECR) that will be formed on the basis of the environmental commitments as detailed in the Environmental Statement (ES) for the proposal.
· ***Location***	Within the proposed scheme working corridor and specifically the hedgerows, two farm underpasses and Afon Wig culvert.
· ***Evidence for effectiveness***	Generally accepted good practice when working on sites with bats present.
· ***Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)***	Environmental Commitments Register and Construction Environmental Management Plan. Statutory flood defence/land drainage consents. A contractor has not yet been appointed. When the contract is finalised this will include the environmental commitments regarding pollution prevention and statutory drainage consents.
Characteristics of European Site(s) **A brief description of the European Site should be produced, including information on:**	
• Name of European Site and its EU code	Gwydyr Forest Mines SAC, UK0030161
• Location and distance of the European Site from the proposed works	The SAC is located approximately 15km from the proposal.
• European Site size	39.75 ha
• Key features of the European Site including the primary reasons for selection and any other qualifying interests	*6130 Calaminarian grasslands of the Violetalia calaminariae* *1303 Lesser horseshoe bat Rhinolophus hipposideros*
• Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Generally unmanaged Component grassland sites, generally unmanaged and not used for recreation; Conifer encroachment may pose a problem, continued monitoring required.
• European Site conservation objectives – where these are readily available	Lesser horseshoe bat (*Rhinolophus hipposideros*) The site will support a sustainable population of lesser horseshoe bats in the Gwydyr Forest area. The population will be viable in the long term, acknowledging the population fluctuations of the species. The natural range of lesser horseshoe bats is neither being reduced nor is likely to be reduced for the foreseeable

	future. Mines on the site will be in optimal condition to support the populations. Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range. There is a sufficiently large area of suitable habitat surrounding the roosts to support the bat population, including continuous networks of sheltered broadleaved and coniferous woodland, and tree lines, connecting the various roosts with areas of insect rich grassland and open water. Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range nor any decline in the extent or quality of breeding, foraging or hibernating habitat.

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.

Elements of the project likely to give rise to impacts on European site:
Temporary disturbance to Lesser Horseshoe bat commuting and foraging habitat during the advance and main construction periods only.

In combination impacts:
It is concluded that there are no other schemes or projects which would act in combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme that would result in a significant effect on the mobile qualifying feature lesser Horseshoe bat of this European site.

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**	None – there will be no reduction of the area of this site as a result of the proposal.
• **Disturbance to key species**	There would be temporary disturbance to commuting and foraging Lesser Horseshoe bat habitat during the advance and main works construction periods.
• **Habitat or species fragmentation**	None predicted – the proposal would not restrict or affect the movement of Lesser Horseshoe bats between habitats considering the mitigation proposed. Long term habitat connectivity could be improved for bat species by the provision of a larger culvert for the Afon

	Wig, infilling of existing hedgerow gaps and maintenance works to the two farm underpasses.
• **Reduction in species density**	None predicted - the proposal would not be expected to reduce the density of the Lesser Horseshoe bat population.
• **Changes in key indicators of conservation value (water quality, etc)**	None predicted – the proposal is not hydrologically connected to the proposal.
• **Climate change**	The Monarch III report (UKCIP, May 2007) predicts the effects of climate change on selected species, including Lesser Horseshoe bats, which are predicted to gain 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**	None
• **Interference with key relationships that define the function of the site**	None
Indicate the significance as a result of the identification of impacts set out above in terms of:	
• **Reduction of habitat area**	None
• **Disturbance to key species**	Not significant
• **Habitat or species fragmentation**	None. Potential positive impacts due to improved habitat connectivity.
• **Loss**	None
• **Fragmentation**	None
• **Disruption**	None
• **Disturbance**	Not significant
• **Change to key elements of the site** ***(e.g. water quality, hydrological regime etc)***	None
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 of the impacts are likely to be significant.	
Outcome of screening stage	No Significant Effects likely.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**Yes**

15.0 Assessing the Impacts on the Meirionnydd Oakwoods and Bat Sites SAC - Screening Matrix

Project Name:	A55(T) Abergwyngregyn to Tai'r Meibion Improvement	
Natura 2000 Site under Consideration	Meirionnydd Oakwoods and Bat Sites SAC	
Date:	**Author (Name/Organisation)**	**Verified (Name/Organisation)**
27/05/16	Christian Middle (MCIEEM) YGC	Chris Jones (MCIEEM) YGC

Description of project

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:

· **Size and scale** ***(road type and probable traffic volume)***	See Section 2.1 for scheme description
· **Land-take**	The proposal is not located within the Meirionnydd Oakwoods and Bat Sites SAC European statutory protected site. No land will be taken from this protected site.
· **Distance from the European Site or key features of the site** ***(from edge of the project assessment corridor)***	The boundary of the proposal is located approximately 17km from the boundary of the SAC.
· **Resource requirements** ***(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)***	There will not be any resources required from the SAC for the construction of this scheme.
· **Emissions** ***(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)***	The proposal does not pose a risk of contamination from emissions to the SAC as there are no hydrological links or pathways from the proposal to the protected site and the site is 17km away from the proposals.
· **Excavation requirements** ***(e.g. impacts of local hydrogeology)***	No excavation will be required from the SAC, or in a location which will affect the SAC.
· **Transportation requirements**	There will be no transportation within the SAC.
· **Duration of construction, operation, etc**	It is expected that the contractors undertaking the advance works would require a site presence for approximately 4 months from winter 2016/17 to spring 2017. It is expected that the contractors undertaking the proposed main works would require a site presence for approximately 18 months from spring/summer 2017.
· **Other (Noise disturbance)**	No impact on the SAC would arise from noise levels and visual disturbance on the A55(T) at the location of the proposal.

Description of avoidance and/or mitigation measures ***Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:***	
· ***Nature of proposals***	During the advance works to mitigate against the negative impact of vegetation removal, a 940m length of hedgerow present on the south of the A55(T) between the Tai'r Meibion Farm underpass to the west, past the Wig Farm underpass as far as stream 6 to the east will be translocated. In addition, during the main works, a 460m length of hedgerow either side of the Tai'r Meibion Farm underpass to the north will also be translocated. The remaining affected hedgerows would be replanted. Temporary bat navigation features, such as hurdle fencing, would be installed in the vicinity of the underpasses during both the advance and main works where any existing boundaries that lead into the underpasses are to be removed and retained until completion of the main works and until translocated/replanted vegetation establishes. Temporary hurdle fencing would also be provided along the stock-proof fence between the Tai'r Meibion cattle underpass and Railway Line Wood 2 prior to the commencement of the main works and retained until completion of the main works and until translocated/replanted vegetation establishes. Site facilities to be located at least 150m away from Tai'r Meibion bat roost and cattle underpasses and any construction lighting directed away from them. No night time working or lighting in the vicinity of Tai'r Meibion bat roost, the approaches to the Tai'r Meibion and Wig Farm underpasses or the habitat off the A55 carriageway. All hedgerow habitats will be translocated or replanted. The Tai'r Meibion and Wig Farm underpasses will be kept open and free of significant obstruction throughout the advance and main works construction periods. The enlargement of the Afon Wig culvert for the main drainage works could result in improved passage for bat species beneath the A55(T) carriageway. Pollution prevention measures will be detailed in an agreed Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR) that will be

	formed on the basis of the environmental commitments as detailed in the Environmental Statement (ES) for the proposal.
· ***Location***	Within the proposed scheme working corridor and specifically the hedgerows, two farm underpasses and Afon Wig culvert.
· ***Evidence for effectiveness***	Generally accepted good practice when working on sites with bats present.
· ***Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)***	Environmental Commitments Register and Construction Environmental Management Plan. Statutory flood defence/land drainage consents. A contractor has not yet been appointed. When the contract is finalised this will include the environmental commitments regarding pollution prevention and statutory drainage consents.
Characteristics of European Site(s) **A brief description of the European Site should be produced, including information on:**	
• Name of European Site and its EU code	Meirionnydd Oakwoods and Bat Sites SAC UK0014789
• Location and distance of the European Site from the proposed works	The SAC is located approximately 17km from the proposal.
• European Site size	2813.7 ha
• 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, Alnion incanae, Salicion albae) * Priority feature* *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 * Priority feature* *91D0 Bog woodland * Priority feature* *1303 Lesser horseshoe bat Rhinolophus hipposideros*

• **Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways**	Liverworts and mosses in gorges are threatened by recreational activities. Soils within the woodland are vulnerable to acidification. Lesser horseshoe bats are vulnerable at certain times of year – summer and winter roosts.
• **European Site conservation objectives – where these are readily available**	Lesser horseshoe bat (*Rhinolophus hipposideros*) The population of lesser horseshoe bats should be maintained at its current size and encouraged where possible to increase. As there has been an upward trend in lesser horseshoe bat numbers in Wales it is reasonable to expect the Gwynedd population to increase. There are sufficient breeding roosts (buildings, structures and trees) and hibernation roosts (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. 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.

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.

Elements of the project likely to give rise to impacts on European site:
Temporary disturbance to Lesser Horseshoe bat commuting and foraging habitat during the advance and main works construction periods only.

In combination impacts:
It is concluded that there are no other schemes or projects which would act in combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme that would result in a significant effect on the mobile qualifying feature Lesser Horseshoe bat of this European site.

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**	None – there will be no reduction of the area of this site as a result of the proposal.
• **Disturbance to key species**	There would be temporary disturbance to commuting and foraging Lesser Horseshoe bat habitat during the advance and main works

	construction periods.
• **Habitat or species fragmentation**	None predicted – the proposal would not restrict or affect the movement of Lesser Horseshoe bats between habitats considering the mitigation proposed. Long term habitat connectivity could be improved for bat species by the provision of a larger culvert for the Afon Wig, infilling of existing hedgerow gaps and maintenance works to the two farm underpasses during the main works.
• **Reduction in species density**	None predicted - the proposal would not be expected to reduce the density of the Lesser Horseshoe bat population.
• **Changes in key indicators of conservation value (water quality, etc)**	None predicted – the proposal is not hydrologically connected to the proposal.
• **Climate change**	The Monarch III report (UKCIP, May 2007) predicts the effects of climate change on selected species, including Lesser Horseshoe bats, which are predicted to gain 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**	None
• **Interference with key relationships that define the function of the site**	None
Indicate the significance as a result of the identification of impacts set out above in terms of:	
• **Reduction of habitat area**	None
• **Disturbance to key species**	Not significant
• **Habitat or species fragmentation**	None. Potential positive impacts due to improved habitat connectivity.
• **Loss**	None
• **Fragmentation**	None
• **Disruption**	None
• **Disturbance**	Not significant
• **Change to key elements of the site** ***(e.g. water quality, hydrological regime etc)***	None
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 of the impacts are likely to be significant.	
Outcome of screening stage	No Significant Effects likely.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**Yes**

16.0 Assessing the Impacts on the Glynllifon SAC - Screening Matrix

Project Name:		A55(T) Abergwyngregyn to Tai'r Meibion Improvement
Natura 2000 Site under Consideration		Glynllifon SAC
Date:	**Author (Name/Organisation)**	**Verified (Name/Organisation)**
27/05/16	Christian Middle (MCIEEM) YGC	Chris Jones (MCIEEM) YGC

Description of project **Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:**	
· **Size and scale** ***(road type and probable traffic volume)***	See Section 2.1 for scheme description
· **Land-take**	The proposal is not located within the Glynllifon SAC European statutory protected site. No land will be taken from this protected site.
· **Distance from the European Site or key features of the site** ***(from edge of the project assessment corridor)***	The boundary of the proposal is located approximately 19km from the boundary of the SAC.
· **Resource requirements** ***(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)***	There will not be any resources required from the SAC for the construction of this scheme.
· **Emissions** ***(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)***	The proposal does not pose a risk of contamination from emissions to the SAC as there are no hydrological links or pathways from the proposal to the protected site and the site is located 19km away from the proposals.
· **Excavation requirements** ***(e.g. impacts of local hydrogeology)***	No excavation will be required from the SAC, or in a location which will affect the SAC.
· **Transportation requirements**	There will be no transportation within the SAC.
· **Duration of construction, operation, etc**	It is expected that the contractors undertaking the advance works would require a site presence for approximately 4 months from winter 2016/17 to spring 2017. It is expected that the contractors undertaking the proposed main works would require a site presence for approximately 18 months from spring/summer 2017.
· **Other (Noise disturbance)**	No impact on the SAC would arise from noise levels and visual disturbance on the A55(T) at the location of the proposal.

Description of avoidance and/or mitigation measures ***Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:***	
· ***Nature of proposals***	During the advance works to mitigate against the negative impact of vegetation removal, a 940m length of hedgerow present on the south of the A55(T) between the Tai'r Meibion Farm underpass to the west, past the Wig Farm underpass as far as stream 6 to the east will be translocated. In addition, during the main works, a 460m length of hedgerow either side of the Tai'r Meibion Farm underpass to the north will also be translocated. The remaining affected hedgerows would be replanted. Temporary bat navigation features, such as hurdle fencing, would be installed in the vicinity of the underpasses during both the advance and main works where any existing boundaries that lead into the underpasses are to be removed and retained until completion of the main works and until translocated/replanted vegetation establishes. Temporary hurdle fencing would also be provided along the stock-proof fence between the Tai'r Meibion cattle underpass and Railway Line Wood 2 prior to the commencement of the main works and retained until completion of the main works and until translocated/replanted vegetation establishes. Site facilities to be located at least 150m away from Tai'r Meibion bat roost and cattle underpasses and any construction lighting directed away from them. No night time working or lighting in the vicinity of Tai'r Meibion bat roost, the approaches to the Tai'r Meibion and Wig Farm underpasses or the habitat off the A55 carriageway. All hedgerow habitats will be translocated or replanted. The Tai'r Meibion and Wig Farm underpasses will be kept open and free of significant obstruction throughout the advance and main works construction periods. The enlargement of the Afon Wig culvert during the main drainage works could result in improved passage for bat species beneath the A55(T) carriageway. Pollution prevention measures will be detailed in an agreed Construction Environmental Management Plan (CEMP) and Environmental Commitments Register (ECR) that will be

	formed on the basis of the environmental commitments as detailed in the Environmental Statement (ES) for the proposal.
· ***Location***	Within the proposed scheme working corridor and specifically the hedgerows, two farm underpasses and Afon Wig culvert.
· ***Evidence for effectiveness***	Generally accepted good practice when working on sites with bats present.
· ***Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)***	Environmental Commitments Register and Construction Environmental Management Plan. Statutory flood defence/land drainage consents. A contractor has not yet been appointed. When the contract is finalised this will include the environmental commitments regarding pollution prevention and statutory drainage consents.
Characteristics of European Site(s) **A brief description of the European Site should be produced, including information on:**	
• Name of European Site and its EU code	Glynllifon SAC UK0012661
• Location and distance of the European Site from the proposed works	The SAC is located approximately 19km from the proposal.
• European Site size	189.27 ha
• Key features of the European Site including the primary reasons for selection and any other qualifying interests	*1303 Lesser horseshoe bat Rhinolophus hipposideros*
• Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The site includes the roost and adjacent feeding areas utilised by the bats. The building in which the roost is located is currently with receivers, and the management of the estate grounds, including the woodlands, is being revised. There is some scope for improving management of the site as a whole for bats, through management agreement, agri-environment schemes and other partnership initiatives.
• European Site conservation objectives – where these are readily available	Lesser horseshoe bat (*Rhinolophus hipposideros*) The natural range of lesser horseshoe bats will not be reduced, nor be likely to be reduced for the foreseeable future. There is, and will continue to be, sufficient habitat to maintain the lesser horseshoe bat population on a long-

	term basis. The three maternity roosts will continue to be occupied annually by lesser horseshoe bats and their babies. o Glynllifon Mansion (Unit 16). o Melin y Cim (Unit 32). o Pen y Bont (Unit 36). There will be a sufficiently large area of suitable habitat surrounding these roosts to support the bat population, including continuous networks of sheltered, broadleaved and coniferous woodland, tree lines and hedgerows connecting the various types of roosts with areas of insect-rich grassland and open water.
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.**	
Elements of the project likely to give rise to impacts on European site: Temporary disturbance to Lesser Horseshoe bat commuting and foraging habitat during the advance and main construction periods only. **In combination impacts:** It is concluded that there are no other schemes or projects which would act in combination with the A55(T) Abergwyngregyn to Tai'r Meibion Improvement scheme that would result in a significant effect on the mobile qualifying feature, Lesser Horseshoe bat of this European site.	
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**	None – there will be no reduction of the area of this site as a result of the proposal.
• **Disturbance to key species**	There would be temporary disturbance to commuting and foraging Lesser Horseshoe bat habitat during the advance and main construction periods.
• **Habitat or species fragmentation**	None predicted – the proposal would not restrict or affect the movement of Lesser Horseshoe bats between habitats considering the mitigation proposed. Long term habitat connectivity could be improved for bat species by the provision of a larger culvert for the Afon Wig, infilling of existing hedgerow gaps and maintenance works to the two farm underpasses during the main works.
• **Reduction in species density**	None predicted - the proposal would not be expected to reduce the density of the Lesser

	Horseshoe bat population.
• Changes in key indicators of conservation value (water quality, etc)	None predicted – the proposal is not hydrologically connected to the proposal.
• Climate change	The Monarch III report (UKCIP, May 2007) predicts the effects of climate change on selected species, including Lesser Horseshoe bats, which are predicted to gain 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	None
• Interference with key relationships that define the function of the site	None
Indicate the significance as a result of the identification of impacts set out above in terms of:	
• Reduction of habitat area	None
• Disturbance to key species	Not significant
• Habitat or species fragmentation	None. Potential positive impacts due to improved habitat connectivity.
• Loss	None
• Fragmentation	None
• Disruption	None
• Disturbance	Not significant
• Change to key elements of the site *(e.g. water quality, hydrological regime etc)*	None
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 of the impacts are likely to be significant.	
Outcome of screening stage	No Significant Effects likely.
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	**Yes**

17.0 Conclusions

DMRB HD44/09 guidance (Highways Agency, 2009) recommends that, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended), answers to the following four questions (a and b) 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?

The A55(T) Abergwyngregyn to Tai'r Meibion Improvement project is neither connected with nor necessary to site management for any of the European sites considered within this document.

(b) 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?

The A55(T) Abergwyngregyn to Tai'r Meibion Improvement AIES Stage 1: Screening concluded that LSE's could be ruled out on the qualifying features of the following European sites (summarised in Section 6 and 11 of this SIAA):

- Menai Strait and Conwy Bay SAC
- Traeth Lafan SPA
- Afon Gwyrfai a Llyn Cwellyn SAC
- Gwydyr Forest Mines SAC
- Meirionnydd Oakwoods and Bat Sites SAC
- Glynllifon SAC

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

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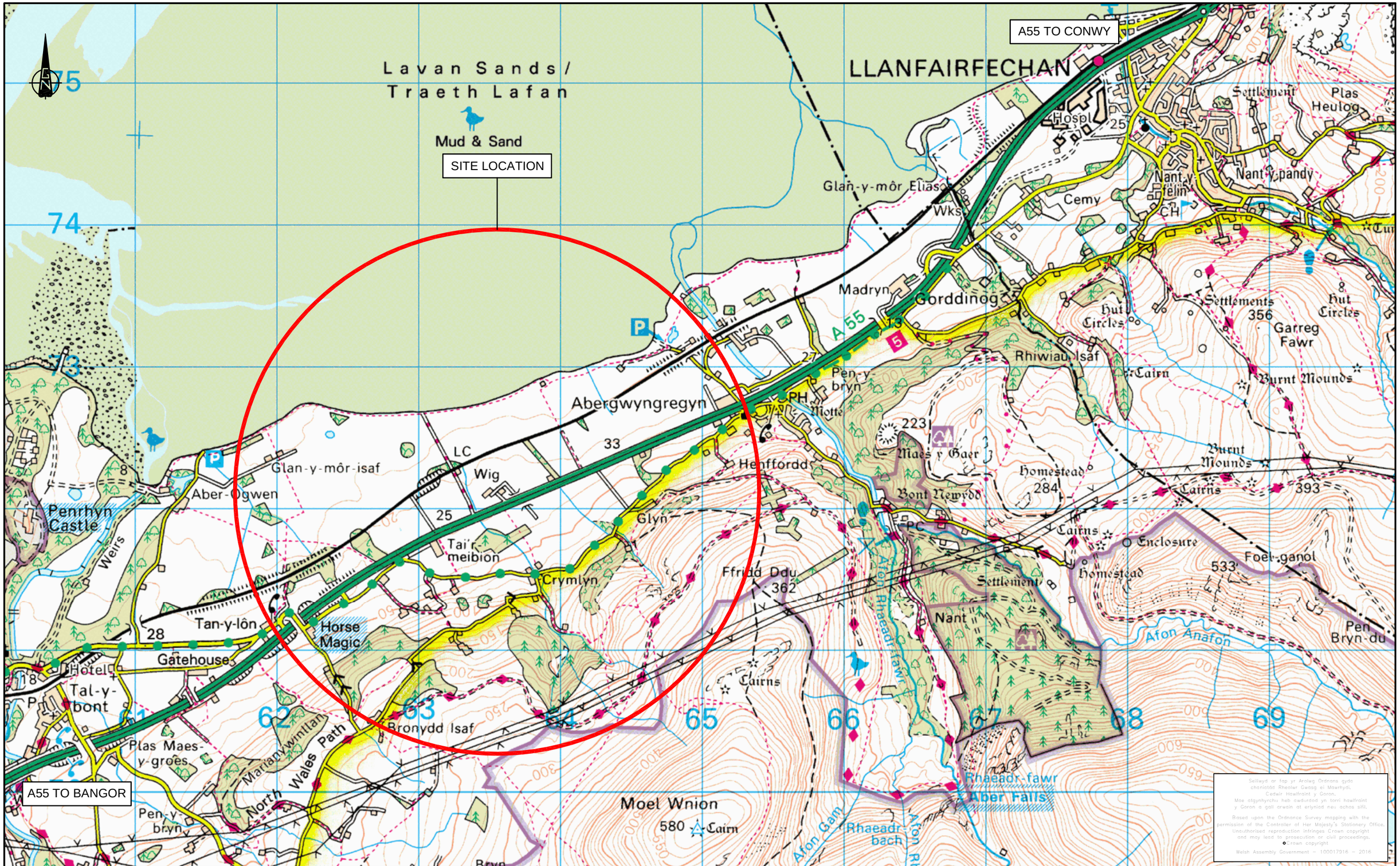
Appendix



CYNLLUN / SCHEME : A55 Abergwyngregyn to Tai'r Meibion Improvement

TEITL LLUNIAD / DRAWING TITLE : Location Plan

CLEIENT / CLIENT : Llywodraeth Cymru Welsh Government

DARLUNWYD GAN : DRAWN BY :	EH	DYDDIAD DARLUNWYD : DATE DRAWN :	14/04/2016
GWIRIWYD GAN : CHECKED BY :	CJ	DYDDIAD GWIRIWYD : DATE CHECKED :	14/04/2016
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Rhif Lluniad Drawing No. Figure 1

CYWI REV

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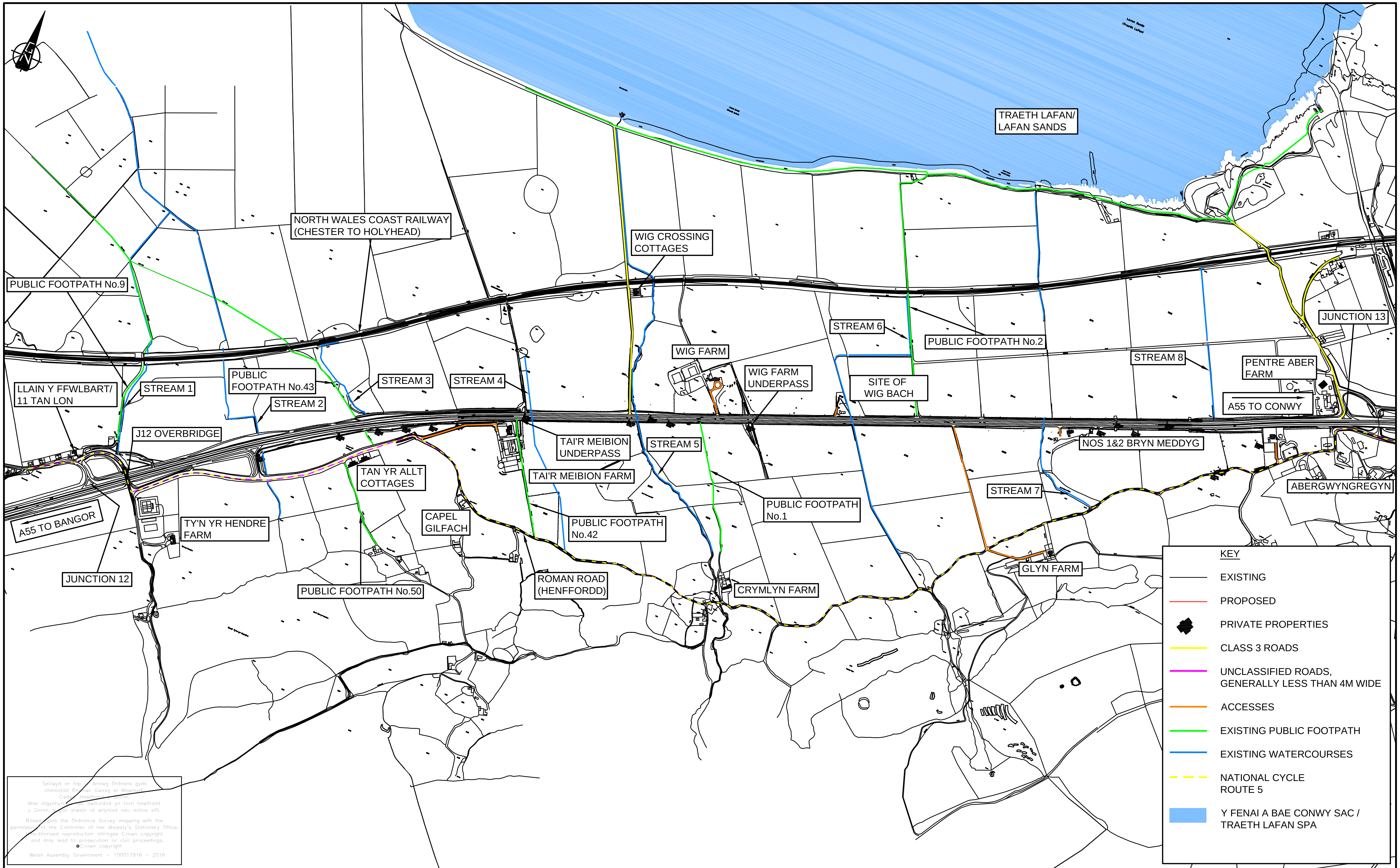

CYNLLUN / SCHEME : A55(T) Abergwyngregyn to Tai'r Meibion Improvement

TEITL LLUNIAD / DRAWING TITLE : Context Plan

CLEIENT / CLIENT : Llywodraeth Cymru / Welsh Government

DARLUNWYD GAN : DRAWN BY :	EH	DYDDIAD DARLUNWYD : DATE DRAWN :	19/04/2016
GWIRIWYD GAN : CHECKED BY :	CJ	DYDDIAD GWIRIWYD : DATE CHECKED :	19/04/2016
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Rhif Lluniad Drawing No.	Figure 2.1	CYWI REV	

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CYNLLUN / SCHEME : A55(T) Abergwyngregyn to Tai'r Meibion Improvement

TEITL LLUNIAD / DRAWING TITLE :

General Arrangement
Read with Figures 2.3 to 2.7

CLEIENT / CLIENT:
Llywodraeth Cymru
Welsh Government

DARLUNWYD GAN : DRAWN BY : J.Humphreys
DYDDIAD DARLUNWYD : DATE DRAWN : 02/06/2016
GWIRIWYD GAN : CHECKED BY : C.Jones
DYDDIAD GWIRIWYD : DATE CHECKED : 02/06/2016
Taflen Sheet 1 o of 1
GRADDFEYDD : SCALES : N.T.S
Rhif Lluniad Drawing No. FIGURE 2.2
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\\YGC.GWYNEDD.GOV.UK@SSL\DAVWWWROOT\PD\R3\5055\CDP – COMPUTER DESIGN PROGRAMS\AUTOCAD\EP\FIGURE 2.2 – 2.8.DWG

28/03/2017 10:07:22

Proposed access
A55(T) from Bangor
Existing lay-by lengthened and widened
Proposed access
Public footpath No. 43 to link with new County Road north of A55(T)
CUT LINE
CUT LINE
CUT LINE
CUT LINE
Proposed County Road
Public footpath No. 9 to link with new County Road
Proposed Footway
Llain y Ffwlbart
A55(T) J12
A55(T) J12
Tai'r Meibion
Existing cattle underpass
Public footpath No. 42 to be diverted via cattle underpass
Proposed widening of County Road along north-eastern side
FIG 2.7
FIG 2.7
Tan yr Allt Cottages
Public footpath No. 43 to be stopped up on south side of A55(T)
Proposed footway from Llain y Ffwlbart to Tan yr Allt Cottages
Existing accesses to County Road.
Existing footway
Proposed footway from Llain y Ffwlbart to Tan yr Allt Cottages
Existing access to County Road.
New Headwall and Trash Screen

CUT LINE
CUT LINE
CUT LINE
CUT LINE
Proposed access
Existing County Road Junction to Wig Crossing Cottages stopped up and new junction with new County Road to Wig Crossing Cottages provided
Wig Farm
Existing lay-by lengthened and widened
A55(T) from Bangor
Proposed County Road
FIG 2.6
A
PMA for Wig Farm & NMU Route
CUT LINE
CUT LINE
CUT LINE
CUT LINE
Tai'r Meibion
Existing cattle underpass
Proposed drainage channel
FIG 2.6
A
New culvert
Public footpath No. 42 to be diverted via cattle underpass
Public footpath No. 1 to be diverted via Wig cattle underpass
Proposed widening of County Road along north-eastern side
FIG 2.7
D
CUT LINE
CUT LINE
CUT LINE
CUT LINE
43 to be

CYNLLUN / SCHEME : A55(T) Abergwyngregyn to Tai'r Meibion Improvement

TEITL LLUNIAD / DRAWING TITLE :
Detailed Proposals
Read with Figures 2.2 to 2.7

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Rhif Lluniad Drawing No. FIGURE 2.3
CYWI REV

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\\YGC.GWYNEDD.GOV.UK@SSL\DAV\WWWROOT\PD\R31.5055\CDP - COMPUTER DESIGN PROGRAMS\AUTOCAD\EP\FIGURE 2.2 - 2.8.DWG
17/03/2017 10:23:04

Proposed access

A55(T) from Bangor

Proposed County Road

FIG 2.6 A

Existing County Road Junction to Wig Crossing Cottages stopped up and new junction with new County Road to Wig Crossing Cottages provided

PMA for Wig Farm & NMU Route

Wig Farm

CUT LINE CUT LINE

Existing cattle under

New culvert

Tai'r Meibion

Existing cattle underpass

Proposed drainage channel

A FIG 2.6

Public footpath No. 42 to be diverted via cattle underpass

Public footpath No. 1 to be diverted via Wig cattle underpass

Proposed agricultural tra

Proposed widening of County Road along north-eastern side

FIG 2.7

FIG 2.7

Existing accesses to County Road.

Existing access to County Road.

Proposed culvert

Proposed agricultural track

Proposed agricultural track

Proposed widening of County Road along north-eastern side

Proposed access to County Road.

Existing access to County Road.

INSET: Wig Crossing Cottages

New wall / bund and drainage under the road

Wig Crossing Cottages

CYNLLUN / SCHEME : A55(T) Abergwyngregyn to Tai'r Meibion Improvement

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Rhif Lluniad Drawing No. FIGURE 2.4

CYWI REV

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Proposed drainage attenuation pond

FIG 2.6 B

Public footpath No. 2 connected to NMU route

Proposed NMU Route

CUT LINE CUT LINE

FIG 2.7 C

Existing cattle underpass

Proposed drainage channel

Proposed Variable Message Sign

Private access for y Glyn closed and new combined access for y Glyn and Nos. 1 & 2 Bryn Meddyg provided

New shared access for No's 1 and 2 Bryn meddyg

Proposed drainage channel

Nos. 1 and 2 Bryn Meddy

Proposed agricultural track

A55(T) J13

Pentre Aber Farm

Proposed NMU Route

Ffriddoedd

The Old School

Abergwyngregyn

Nos. 1 and 2 Bryn Meddyg

Proposed drainage channel

Unclassified road (Henffordd Road)

Seiliwyd ar fap yr Arolwg Ordnans gyda chaniatad Rheolwr Gwasg ei Mawrhydi. Cedwir Hawlfraint y Goron.
Mae atgynhyrchu heb awdurdod yn torri hawlfraint y Goron a gall arwain at erlyniad neu achos sifil.
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Rhif Lluniad Drawing No. FIGURE 2.5

CYWI REV

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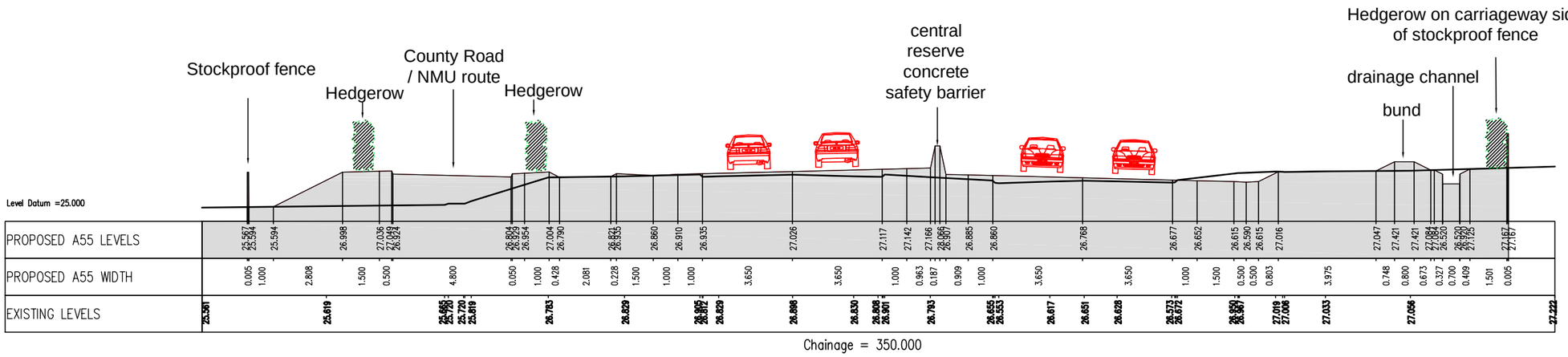

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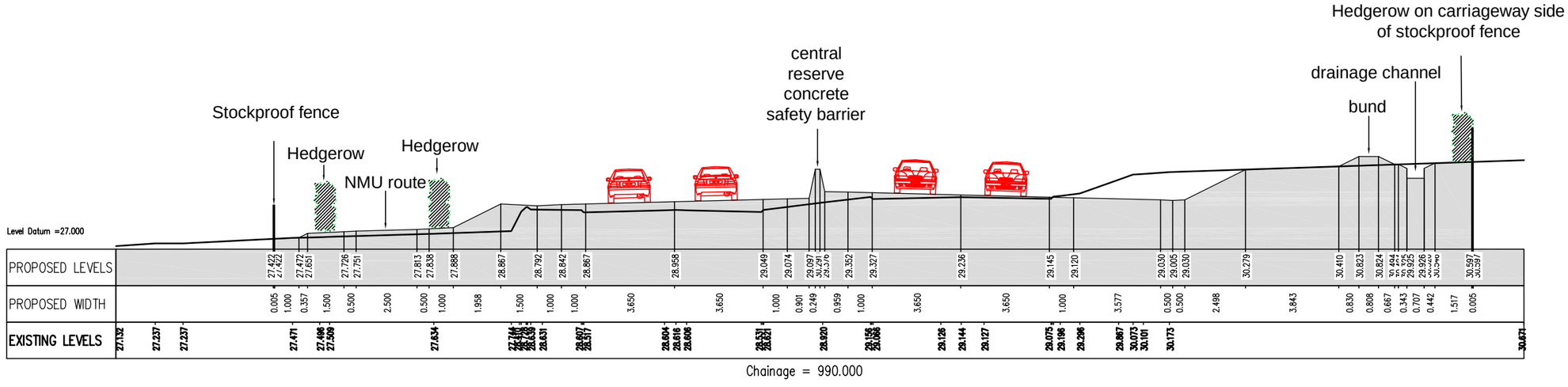
Scale 1:200



Cross Sections: B-B
Scale 1:200

CYNLLUN / SCHEME : A55(T) Abergwyngregyn to Tai'r Meibion Improvement

TEITL LLUNIAD / DRAWING TITLE :

Detailed Proposals
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Rhif Lluniad Drawing No. FIGURE 2.6

CYWI REV

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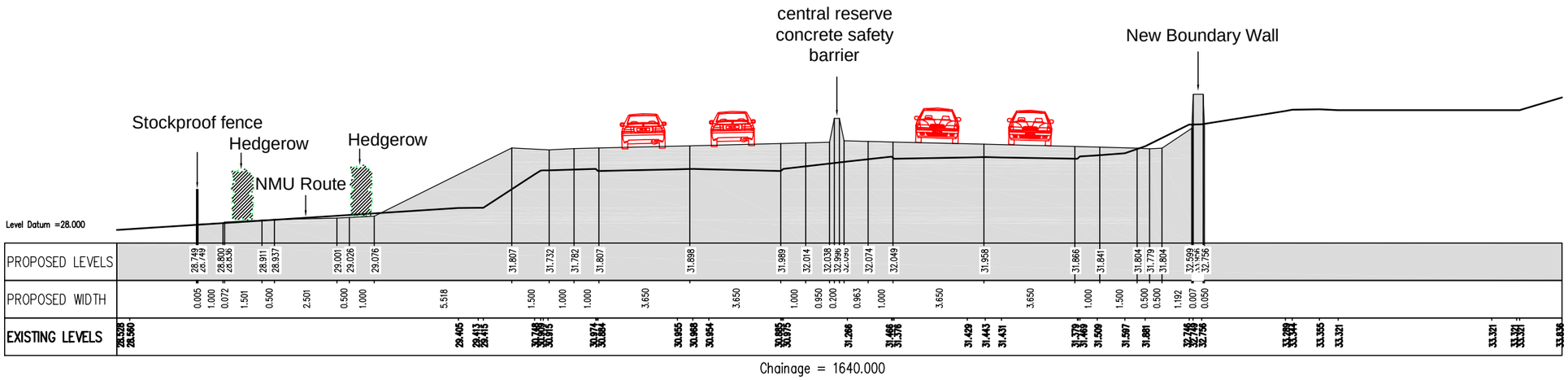
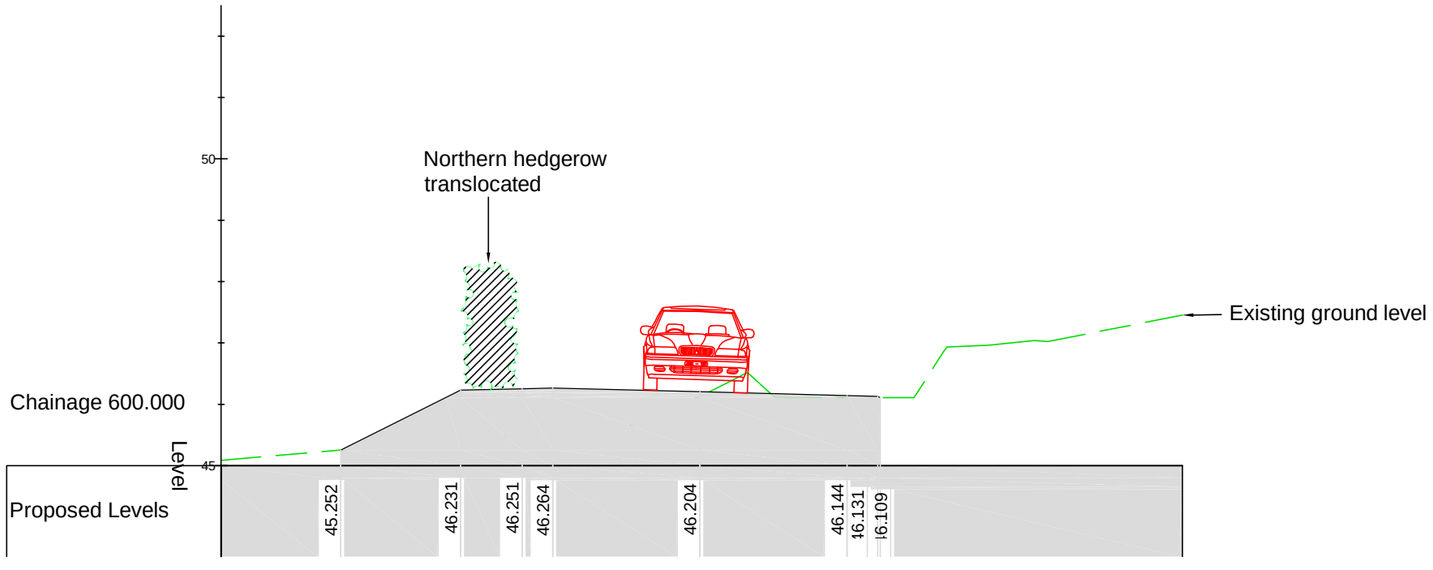
\\YGC.GWYNEDD.GOV.UK@SSL\DAV\WWROOT\PD\R3\5055\CDP - COMPUTER DESIGN PROGRAMS\AUTOCAD\EP\FIGURE 2.2 - 2.8.DWG

14/10/2016 10:34:08



Cross Sections: C-C
Scale 1:200



Cross Sections: D-D
Scale 1:100

CYNLLUN / SCHEME : A55(T) Abergwyngregyn to Tai'r Meibion Improvement

TEITL LLUNIAD / DRAWING TITLE :
Detailed Proposals
Read with Figures 2.2 to 2.7

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Rhif Lluniad Drawing No. FIGURE 2.7 CYWI REV

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14/10/2016 10:34:51

Allwedd/ Key

- Y Fenai a Bae Conwy / Menai Strait and Conwy Bay SAC
- Coedydd Aber SAC
- Eryri / Snowdonia SAC
- Traeth Lafan / Lavan Sands, Conway Bay SPA

Extent of Proposed Improvement

A55(T) Abergwyngregyn - Tai'r Meibion Improvement

International Sites for Nature Conservation within 2km of the Proposed Improvement

Llywodraeth Cymru
Welsh Government

DARLUNWYD GAN: DRAWN BY:	P. Irvine	DYDDIAD DARLLUNWYD: DATE DRAWN:	12/10/2016
GWIRIWYD GAN: CHECKED BY:	C. Jones	DYDDIAD GWIRIWYD: DATE CHECKED:	12/10/2016
TAFLEN: SHEET:	1 o 1 1 of 1	GRADDFEYDD; SCALES:	1:20,000
Rhif Lluniad: Drawing No:	FIGURE 3	CYWI REV	

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Allwedd/ Key
Proposed Improvement
Glynllifon SAC
Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC
Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC
Afon Gwyrfai a Llyn Cwellyn SAC
Anglesey
Holy Island
Llangefni
Menai Bridge
Benllech
Beaumaris
Rhosneigr
Llandudno
Conwy
Colwyn Bay
Prestatyn
Rhyl
Abergele
St Asaph
Bangor
Bethesda
Llanfair Talhaiarn
Denbigh
Llanrwst
Ruthin
Caernarfon
Caernarfon Bay
Llanberis
Snowdon
1085m
Betws-y-Coed
Pentrefoelas
Llanaelhaearn
Blaenau Ffestiniog
Nefyn
Porthmadog
Llan Ffestiniog
Llyn Celyn
Criccieth
Pwllheli
Lleyn
Trawsfynydd
SNOWDONIA
Y Bala
Harlech
A5
A55
A545
A4080
A4086
A470
A548
A544
A5151
A525
A543
A487
A4085
A498
A499
A497
A4212
Afon Conwy
N
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A55(T) Abergwyngregyn - Tai'r Meibion Improvement

International Sites for Nature Conservation designated for otters or lesser horseshoe bats within 30km of the Proposed Improvement

Llywodraeth Cymru
Welsh Government

Darlunwyd Gan: Drawn By:	P Irvine	Dyddiad Darllunwyd: Date Drawn:	12/10/2016
Gwiriwyd Gan: Checked By:	C Jones	Dyddiad Gwiriwyd: Date Checked:	12/10/2016
Taflen: Sheet:	1 o 1 / 1 of 1	Graddfeydd: Scales:	1:250,000
Rhif Lluniad: Drawing No:	FIGURE 4	Cywi Rev	

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Stream 1

Stream 2

Stream 3

Stream 4

Stream 5
(Afon Wig)

Stream 5a (field
drainage feature)

Stream 5b (field
drainage feature)

Stream 6

Stream 7

Stream 8

Notes:
Culverted Watercourse

CYNLLUN / SCHEME :

A55(T) Abergwyngregyn to Tai'r Meibion Improvement

TEITL LLUNIAD / DRAWING TITLE :

Surface Water Features

DARLUNWYD GAN : DRAWN BY :	SW	DYDDIAD DARLUNWYD : DATE DRAWN :	20/05/16
GWIRIWYD GAN : CHECKED BY :	RW	DYDDIAD GWIRIWYD : DATE CHECKED :	20/05/16
Taflen Sheet	1 o 1 of 1	GRADDFEYDD : SCALES :	1:5000 @ A3
Rhif Lluniad Drawing No.	Figure 5	CYWI REV	A

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C:\USERS\600051\APPDATA\LOCAL\MICROSOFT\WINDOWS\TEMPORARY INTERNET FILES\CONTENT.OUTLOOK\F5LDVFM8\FIGURE 5 WATER FEATURES_SIAA.DWG

12/12/2016 10:09:39