LLANBRYNMAIR WIND FARM

Supplementary Environmental Information

August 2013

Volume II – C - Transport Appendices and Figures

power for good

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LLANBRYNMAIR WINDFARM

FIGURE 10.1

WATER FEATURES MAP

KEY:

- WIND TURBINE
- HARDSTANDING
- SITE ACCESS TRACK
- BORROW PIT
- CONSTRUCTION COMPOUND
- SUBSTATION
- BATCHING PLANT
- WELFARE BUILDING
- PERMANENT MAST
- SITE BOUNDARY
- TRANSPORT ROUTE
- BRYN COCH
- CORSYDD LLANBRYNMAIR
- GWEUNYDD DOLWEN
- SURFACE WATER CATCHMENT BOUNDARY
- SURFACE WATER SUB-CATCHMENT BOUNDARY

LAYOUT DWG	T-LAYOUT NO:
N/A	N/A

DRAWING NUMBER: **N/A**

SCALE - 1:45,000

SUPPLEMENTARY ENVIRONMENTAL INFORMATION 2013

APPENDIX 10.1: LOCAL TRANSPORT MANAGEMENT PLAN (LTMP)

Llanbrynmair Wind Farm – Local Traffic Management Plan (LTMP)

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Llanbrynmair Wind Farm – Local Traffic Management Plan

Rev No	Comments	Checked by	Approved by	Date
D4	Final Issue following Review	SC	KM	26/07/13
D3	Issued for ES Legal Review	SC	KM	16/07/13
D2	Second Internal Draft for Approval and Legal Review	SC	KM	21/06/13
D1	Initial Draft for Comment	SR	SC	31/05/13

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Job No 60283248 Reference LTMP-2013 Date Created June 2013

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1 Executive Summary

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1 Executive Summary

The proposed Llanbrynmair Wind Farm is located to the north of the C2031, a 17.5km long rural road which links the villages of Llanerfyl at the A458 and Talerddig at the A470. The road also provides access for the hamlets of Neinthirion, Gosen and Diosg. The C2031 is used by the Llanbrynmair Wind Farm for construction access from the A470 and for access by abnormal indivisible loads (carrying the turbine components), from the A458. Although the impact of the construction of the Llanbrynmair Wind Farm is temporary in nature, the provision of highway enabling works will offer a number of permanent improvements to the existing infrastructure whilst maintaining the character of the road in the longer term.

The previous highway proposals for the Llanbrynmair Wind Farm which were commented on at Planning Cabinet in September 2013 were assessed and commented upon by Powys County Council (PCC) and Natural Resources Wales (NRW). These comments, detailed in Section 2, have been used as a base position for a revised design philosophy for the highway enabling works associated with this Local Traffic Management Plan. This new design philosophy is now focussed on providing an improved level of detail and safe means of operation for the road during the construction period, whilst minimising the permanent impacts of the scheme on the road and its character. The works have been designed sympathetically in relation to the existing character of the road to ensure that any works will blend in with the existing character of the road post construction.

This sympathetic design has been achieved by:

- Consultation between specialist consultants on the scheme to ensure that the highway engineering proposals were developed to be compatible with the aims and objectives of the ecology, hydrology and the landscape and visual consultants also working with Renewable Energy Systems.
- An iterative design process has been used with consultation and site visits with the ecology, landscape and visual and hydrology teams. Discussions took place on site with representatives from Powys County Council and National Resources Wales. These processes have allowed for the designs and detailed proposals to be refined to a point where the scheme does not have any significant impact on the character of the road in the long term.
- Revising the construction traffic route to reduce the number of receptors impacted by the works (construction traffic now entering and leaving via the A470 and Talerddig which removes all of the construction traffic passing through Llanerfyl.)
- Reducing the area of hard surfacing and, instead, providing widening and other works through the use of reinforced grass solutions where possible. This provides for the long term re-establishment of vegetation in verges and the continued possible use of the road as an abnormal load delivery route.
- Revisiting and providing further details of the proposals at key infrastructure locations such as Gosen Bridge, Dolwen, the Site Accesses and the Neinthirion Bypass, following consultation and designing the proposals to better integrate into the landscape.
- The proposals have been reviewed to mitigate the impact on the Public Rights of Way and existing road users along the road during the construction period. Traffic management proposals have been proposed where there is interaction between non-motorised users, existing road traffic and construction traffic.
- The proposed improvements have been designed to provide a safe environment on the public highway, to take into account the initial comments from PCC and NRW, to offer a number of permanent community benefits through the delivery of road improvements and to minimise the permanent impacts due to the nature of the temporary works.

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2 Introduction

2 Introduction

2.1 Background

Renewable Energy Systems UK & Ireland Ltd (RES) have submitted a planning application to the Department of Energy and Climate Change (DECC) in April 2009 for a 100MW wind farm between the villages of Llanbrynmair and Llanerfyl in Montgomeryshire, Powys. The planning application for this wind farm, known as the Llanbrynmair Wind Farm, is currently under consideration by DECC and the statutory consultees and is due to be appraised at a conjoined public inquiry with four other onshore wind energy schemes at The Mid Wales (Powys) Conjoined Wind Farms Public Inquiry in June 2013.

The originally submitted LTMP referred to traffic and transportation issues along a route from the A458 Llanerfyl along the C2031 to the four access junctions servicing the site. This original proposal included works in the existing highway to suit the transit of abnormal indivisible loads, as well as highway works designed to ensure the safe delivery of construction materials and personnel to site.

The comments raised during the planning process from the statutory consultees suggested that these proposed works were insufficiently detailed and were not acceptable due to the impacts associated with environment, ecology and highway infrastructure. These comments were detailed within the PCC Cabinet Report 25/09/12 and the supplementary documentation from CCW to accompany the Cabinet Report of the 12/10/12.

2.2 Purpose and Evolution of the Local Traffic Management Plan (LTMP)

This document is a full LTMP superseding the previously submitted documentation. This document has taken into account the comments raised by the statutory consultees as well as comments raised by the ecology, landscape and visual and hydrology consultants for this project. This LTMP details further work which has been carried out to address the comments raised by PCC, the local highway authority and comments raised by NRW in the Llanbrynmair Wind Farm Cabinet Report of the 25th September 2012 (Powys County Council, 2012). During the consultation and design process , comment has also been sought from the Welsh Government (WG) for works on the trunk road network. The comments received from WG, PCC and NRW have been assessed and addressed within this LTMP as a part of the design philosophy. These comments included:

- Removal of ambiguity on the designs with respect to earthworks, red line boundaries and visibility splays;
- Details on the widening for the Gosen Bridge and proposals to ensure that the road will remain substantially open during the construction period;
- Management of Public Rights of Way, especially Glyndwr's Way, along the route so that enjoyment of the route is not hindered;
- Details on drainage at areas where there is significant additional impermeable area proposed;
- Inclusion and detailing of mitigation for landscape, visual and ecological issues;
- Redesign and relocation of highway features on a sympathetic basis to minimise impacts of natural heritage and the character of the road.

The LTMP and the originally proposed options have been reassessed. This has allowed options to be re-evaluated following the comments raised by WG, PCC and NRW. Because of this process, this LTMP is a wholly new proposal from what was issued at planning.

This scope of this LTMP has, therefore, been expanded from the original document to encompass the local road from Llanerfyl at the A458 to Talerddig at the A470. The impacts and management of the strategic road network are detailed in the sTMP which is provided in Appendix D.

This LTMP, between Llanerfyl and Talerddig:

- Reassesses options for the transportation of construction materials to the Llanbrynmair Wind Farm;
- Details communication with stakeholders and demonstrates that consultation has taken place to provide a scheme with improved consideration for the natural environment;

- Demonstrates that the short and the long term impact of the enabling works have been considered with respect to the enjoyment and use of the road;
- Demonstrates how distruption will be minimised during the construction, operation and decommissioning of the wind farm;
- Details how the impacts on the public rights of way and bridleways will be managed during the construction period;
- Describes how both the abnormal indivisible load (AIL) deliveries and the other construction deliveries to the site will be safely managed;
- Describes how the temporary and permanent enabling works within the highway will be delivered, constructed, supplied and demonstrate the building processes for the works; and
- Demonstrates how the works will provide a number of longer term community benefit along the route to the site by providing improved infrastructure which is in keeping with the existing environment.

2.3 Context of the Local Traffic Management Plan

2.3.1 Environmental Statement and Supplementary Environmental Information (SEI) Volume 4 - 2012

A TMP was included within the submission of SEI 4 of the Environmental Statement which was submitted for planning in August 2012. This document was produced in conjunction with the Strategic Traffic Management Plan (STMP) and comments on this document were given by PCC in the Llanbrynmair Wind Farm Cabinet Report of the 25th September 2012 (Powys County Council, 2012). This document is superseded by this LTMP.

2.3.2 Supplementary Environmental Information 2013

AECOM have been commissioned by RES to update the LTMP submitted as a part of SEI 4. The scope of this revised LTMP includes revised details for the highway works along the Llanerfyl and Talerddig road following consultation with the design team, PCC and NRW, formerly Countryside Council for Wales (CCW). This revised TMP explores alternative strategies for transporting materials to site.

2.3.3 Strategic Traffic Management Plan

A strategic Traffic Management Plan (sTMP) and associated strategic Transport Tool commissioned by RenewableUK Cymru addresses the impact on the trunk road network of abnormal load movements into the proposed Mid Wales wind farms. The scope of the sTMP covers the strategic and trunk road network from Ellesmere Port and the M53, south to Welshpool and to the west of Llanerfyl. RES is a funding partner to the works commissioned by RenewableUK Cymru. The sTMP is presented in modular format and comprises of 6 sections. The route to the Llanbrynmair Wind Farm for abnormal indivisible loads uses Section 2 and 3 of the sTMP. The applicable sections of the sTMP are as follows:

- sTMP Section 1: Overview Report
- sTMP Section 2: Ellesmere Port to Welshpool
- sTMP Section 3: Welshpool to SSA B

2.4 Scope of the Local Traffic Management Plan

This LTMP reviews the 17.5 kilometres of the minor road, C2031, from the A458 at Llanerfyl to the A470 at Talerddig, including the A470/Talerddig junction and the A458/Llanerfyl junction. It has been produced in conjunction with Chapter 11 of the Llanbrynmair Wind Farm Supplementary Environmental Information Volume 2013. The scope of this LTMP includes that of the original submission which was agreed with consultation from PCC and has been expanded following further consultation with PCC, NRW and discussions with the Welsh Government Transport Section.

2.5 Design Philosophy for the Local Traffic Management Plan

This LTMP identifies temporary and permanent enabling works and operational measures along the 17.5km road. The design philosophies used for these works are designed to ensure that:

1. The proposed works on each section of this route have as minimal impact as possible on local traffic movements and other users of this road,

2. The operation of the road is safely managed during the construction period for all road users and that closure of the road is minimised as much as possible,
3. That the enabling works minimise permanent visual and ecological impact, with only an impact in the short term during the construction period.

These aims are achieved through:

1. Review and amendment of the construction programming of the internal site and the enabling works on the public highway has been undertaken to reduce the total traffic using the road at any one time. This is detailed in Section 5.4 and 5.5 of this LTMP. In addition, the highway works have been designed to minimise the need for road closures along the road.
2. The works allow for the safe management and passing of oncoming traffic with the construction traffic through the provision of passing bays. These passing facilities are designed to fit in with the existing landscape and to provide community benefit in the long term at a number of locations.
3. The enabling works along the route have been minimised as far as is practicable to ensure the safe operation of construction traffic and delivery of turbine components through the construction period. The works have been designed so that there is permanent access for turbine components in the future which are provided by engineering solutions which fit into the existing landscape along the road. This has been achieved through minimising the use of "hard" construction materials, use of local materials and sustainable construction methods and undertaking replanting in areas where there has been vegetation loss.

This design philosophy has been incorporated into the design which is incorporated into the scheme design drawings in Appendix A.

2.6 Consultation Exercises

2.6.1 Environmental Statement and Supplementary Environmental Information Volume 4

In depth discussions have been held with PCC Highways Officers regarding the works on the C2031 and with Transport Wales regarding the A470/C2031 and A458/C2031 junctions at Talerddig and Llanerfyl respectively.

2.6.2 Supplementary Environmental Information 2013

As a part of the preparation for this Environmental Statement, RES and AECOM have been actively engaged in a proactive consultation process with the specialist design consultants encompassing transportation, ecology, hydrology, landscape, visual and noise and vibration specialism. The consultation has also encompassed wind turbine delivery companies and, PCC, WG and NRW. RES and AECOM have hosted workshops and meetings with these consultees and the design team through the development of the currently proposed highway enabling works.

The comments raised during the planning process from the statutory consultees suggested that the previous proposed works were insufficiently detailed (PCC and NRW) and were of a scale that would have potential to have significant cumulative impacts. NRW also indicated that the works should be undertaken sympathetically to minimise impacts on hedge lines and habitats along the route. These comments were detailed within the PCC Cabinet Report 25/09/12 and the supplementary documentation from NRW on the 12/10/12. Further to those comments, further consultation was undertaken to inform revised proposals. Meetings and workshops were held on the events held in Table 1 below.

Table 1 - Schedule of Consultation

Date	**Attendance, Purpose of Meeting/Discussion/Consultation**
10th January 2013	RES, AECOM and Landscape Consultants
11th January 2013	AECOM and Collett Transport Design Meeting
22nd January 2013	RES, AECOM, PCC and NRW Meeting
7th February 2013	Transportation Consultants Meeting
21st February 2013	AECOM and Collett Transport Design Meeting

Date	Attendance, Purpose of Meeting/Discussion/Consultation
27th and 28th February 2013	RES, AECOM, PCC and NRW Workshop at Metropole Hotel, Llandrindod Wells
14th March 2013	Multi Disciplinary Design Meeting for Llanbrynmair Wind Farm
15th March 2013	Telephone discussions with Welsh Government, leading to approval Appendix B-2
28th March 2013	Transportation Consultants Meeting
13th April 2013	Transportation Consultants Meeting
17th and 18th April 2013	RES, AECOM, PCC Site Visit and Workshop at Metropole Hotel, Llandrindod Wells –Appendix B-2
2nd May 2013	RES, AECOM, NRW Site Visit and Workshop at Metropole Hotel, Llandrindod Wells –– Appendix B-4
9th May 2013	AECOM, Ecology Site Visit
May 2013.	PCC – Public Rights of Way Officer, Various comments
29th May 2013	Transportation Consultants Meeting
31st May 2013 & 14th June 2013.	PCC and NRW issued with LTMP Drawings for approval in principle

Further consultation has occurred in writing with the following:

- Welsh Government – Appendix B-5 – Approval in principle for the A470 and A458 Junctions and for the sTMP.
- Collett Transport –third party review of the LTMP Proposals
- Drainage - Appendix B-6 - Assessment of impacts of the scheme on Flooding and Drainage
- PCC Public Rights of Way – Appendix B-7 – comments on the scheme with respect to public rights of way.
- Ecology – Appendix B-8 – Comments on the proposals with respect to Ecology and the Environment
- NRW and Landscape and Visual – Appendix B-9 – Comments on the proposals with respect to landscape and visual impact of the scheme.

2.7 Policy Context

2.7.1 UK and Welsh National Policy

The UK Department for Energy and Climate Change (DECC) renewable energy roadmap states that onshore wind can make a significant contribution to the UK target of 15% of all energy produced by renewable sources by 2020 (DECC, 2011).

Planning Policy Wales (PPW) is the Welsh Government's national planning policy. PPW is supported by a number of Technical Advice Notes (TANs), which include TAN 8: Planning for Renewable Energy and TAN 18: Transport. TAN 8 identifies seven Strategic Search Areas (SSAs) within Wales which are preferred for development of large scale (>25MW) wind farms (Welsh Assembly Government, 2005).The Llanbrynmair Wind Farm lies wholly within SSA B.

Section 8.11 of TAN 18 acknowledges that road transport is likely to remain the primary mode for many freight movements, but stresses the need to encourage freight movement by rail or water where feasible. TAN 18 also states that where possible, developments generating substantial freight movements should be located away from congested central and residential areas and with adequate access to the trunk road network. This revised LTMP for Llanbrynmair Wind Farm aims to avoid impact on populated areas by redistributing the construction traffic away from settlements to avoid key receptors.

A consortium of the Welsh Government, the Mid Wales Trunk Road Authority (MWTRA) and PCC commissioned Capita Symonds to review potential access routes to wind farm sites in Mid Wales and to identify the existing constraints on the highway network that would affect the movement of abnormal loads (Capita Symonds, 2008). The resulting Access Routes Study report

identified that existing highway constraints, many linked to the Cambrian Railway line, render access to the SSA B sites from the west or south impracticable. This report (Capita Symonds, 2008) goes on to recommend that large turbine components are transported via the A458 west of Welshpool. It recognises that PCC generally prefers abnormal loads to be moved via the trunk road network as far as possible. This is linked to the outcomes of the sTMP and these findings have been included within the sTMP and AECOM agree with this methodology and support the routing along the sTMP route.

2.7.2 Regional Policy

Trafnidiaeth Canolbarth Cymru (TraCC) is the Regional Transport Consortium for Mid Wales. It consists of the counties of Ceredigion and Powys, the Meirionnydd district of Gwynedd and parts of the Snowdonia and Brecon Beacons National Parks.

The Regional Transport Plan (Trafnidiaeth Canolbarth Cymru, 2009) refers to the number of turbines likely to be constructed in Mid Wales to achieve the Welsh Government's renewable energy targets. It outlines the anticipated increase in heavy goods vehicle movements, associated disruption to the travelling public and roadside communities and resulting impact on highway surfaces and structures. Whilst the RTP does not include a strategy for mitigating these effects, it states that TraCC will work with the Welsh Government and other affected parties to develop a strategic approach going forward. This is further re-iterated in the 2011 to 2012 annual progress report on the RTP (Trafnidiaeth Canolbarth Cymru, 2012).

2.7.3 Local Policy

The Powys County Council Unitary Development Plan (UDP) (Powys County Council, 2010) includes several specific policies with regard to wind power generation.

PCC UDP Policy E3 states, in relation to transport matters, that applications for wind farms will be approved where:

- They do not unacceptably adversely affect the enjoyment and safe use of highway and the public rights of way network, especially bridleways, including during the construction phase;
- They would be capable of being served by an acceptable means of highway access and any new or improved roads and accesses required would not have unacceptable environmental impacts.
- Any ancillary structures or buildings are so sited and designed (including the use of locally appropriate construction material) so as to adequately blend into their setting.

Policy E5 states that planning obligations or other legally binding agreements will be sought to ensure the implementation of off-site works where these are necessary in order to facilitate wind turbine development proposals or to ameliorate their impact.

PCC has published a Second Draft Interim Development Control Guidance (IDCG) (Powys County Council, 2008) with regard to onshore wind farm development as Supplementary Planning Guidance. This document has been issued as a response to TAN 8 (Welsh Assembly Government, 2005) as to how these national policies are applied at a local level.

It states that planning obligations may include highway infrastructure improvements outside the application site and that PCC will liaise with Transport Wales and other local highway authorities to deliver a strategic approach to road improvements on the Powys highway network. The IDCG requires that consideration be given to cumulative traffic impacts from wind farms in close proximity and the level of disruption during the construction period and that developers of wind farm schemes liaise with each other at the pre-application stage in order to mitigate cumulative traffic impact.

2.8 Legislative Context

2.8.1 Road Traffic Act 1988 and Motor Vehicles (Authorisation of Special Types) General Order 2003 (STGO)

An abnormal indivisible load (AIL) is any load that cannot be broken down into smaller loads for transport without undue expense or risk of damage. An abnormal load is also any load that exceeds certain criteria for weight, length and width whereupon the vehicle carrying the load would not comply with the Road Vehicles (Construction and Use) Regulations 1986.

There are special rules detailed within Section 44 of the Road Traffic Act 1988 and the Motor Vehicles (Authorisation of Special Types) General Order 2003 (STGO) that detail the rules which govern the road transport of AILs to be carried that exceed the weights and/or dimensions limits set in the Road Vehicles (Construction and Use) Regulations 1986.

AILs within the STGO have three distinct categories depending on their dimensions and weights. These categories are as described in Table 2 below.

Table 2 - STGO Categories

STGO Category	Weight Limits (GVW / Axle)	Width	Length
1	Gross weight or axle weight exceeding C&U or Authorised Weight limit up to 80,000kg Maximum Axle Weight = 11,500kg	Width exceeding 3.0m (9'10") up to 5.00m (16'5") for other loads;	Length exceeding 18.65m (61'2") up to 30.00m (98'5") rigid length – (vehicle or train of vehicles);
2	Gross weight exceeding 80,000kg (78.74 tons) up to 150,000kg (147.63 tons) Maximum Axle Weight = 12,500kg	Width exceeding 5.00m (16'5") up to 6.10m (20'00");	Vehicle combination exceeding 25.90m (85'00");
3	Gross weight exceeding 150,000kg (147.63 tons). Maximum Axle Weight = 16,500kg	Width exceeding 6.1m (20'00").	Length exceeding 30.00m (98'5") rigid length.

STGO Category 1 and 2 generally require two days clear notice to police, plus five days notice to highway authorities. Loads in excess of 5 metres width in Category 2 require additional notification with the VR1 form to the Highways Agency.

STGO Category 3 vehicles require a Vehicle special Order, BE16 form, to be issued with five days clear notice to Police and the Highway and Bridge authorities.

In all cases, this approval process can be undertaken through the Highway Agency's ESDAL system within England and Wales.

Schedule 1 part 5 of the STGO defines speed limits imposed on these various categories of vehicles. These are detailed in Table 3 below.

Table 3 - STGO Categories – Speed Limits

STGO Category	Speed Limit – Motorways	Speed Limit – Dual Carriageways	Speed Limit – Single Carriageway Roads
1	60 mph	50 mph	40 mph
2	40 mph	35 mph	30 mph
3	40 mph	35 mph	30 mph
Widths >4.3m	30 mph	25 mph	**20 mph**

For this LTMP and the sTMP, the maximum speed of the AILs is assumed to be 20mph based on the lowest speed in Table 2 above.

2.8.2 Traffic Management Act 2004

Under the Traffic Management Act 2004 (TMA), highway authorities had the duty imposed on them to, as far as reasonably practicable; secure the expeditious movement of traffic on the authority's road network and facilitating the expeditious movement on road networks for which another authority is responsible. This is achieved through making more efficient use of their road networks and/or managing road congestion and disruptions to the movement of traffic on their or others road networks.

3 Baseline Conditions

3 Baseline Conditions

3.1 Overview and Location

The Llanerfyl to Talerddig road is a minor, rural route along the Nant yr Eira valley. It links the settlements of Llanerfyl on the A458 to the north and Talerddig on the A470 to the south. The length of the road is 17.5km in length between Llanerfyl and Talerddig and the road is not subject to any speed restrictions along its length. Between Llanerfyl and Neinthirion the road is classified as the C2031. The remainder of the road from Neinthirion to Talerddig is unclassified as the U2319. The speed of the road is unrestricted with the actual speed variable along its length due to the visibility and alignment.

There is limited development on either side of the road with the route mostly servicing small hamlets, forestry sites and agricultural industry. The road is used by agricultural traffic, forestry traffic and other heavy goods vehicles servicing the farms and businesses along the road.

The road has a number of receptors in the form of residences and community buildings along it, which are mostly clustered towards the village of Llanerfyl and the hamlets of Diosg, Gosen and Neinthirion. In accordance with the overall philosophy of this LTMP, these receptors, defined in more detail below, have been taken into consideration and where possible, means of relocating construction traffic away from these receptors has been considered.

3.2 Baseline Highway Layout

The Llanerfyl to Talerddig road has been split into three sections to assist in the referencing of the existing road conditions and the referencing of the works along the route. Each of these three sections have different traffic impacts from the Llanbrynmair wind farm. These sections and their proposed traffic uses are as follows:

- Section 1 – Llanerfyl A458 (Chainage 0m) to Llanbrynmair Site Access 1 (Chainage 8250m) – 8250m in length. This section is proposed to be used y AILs only.
- Section 2 – Llanbrynmair Site Access 1 (Chainage 8250m) to Llanbrynmair Site Access 4 (Chainage 12350m) – 4150m in length. This section is used for both AILs and construction traffic arriving to site from Talerddig A470 and between the site accesses.
- Section 3 – Llanbrynmair Site Access 4 (Chainage 12350m) to Talerddig A470 (Chainage 17510m) – 5100m in length. This section is used for construction traffic only arriving to site from Talerddig A470.

These sections are described in more detail below and are detailed in Drawing 60283248-D-000 and in the other LTMP drawings within Appendix A. This drawing details chainages and key locations along the route, referred below.

These drawings show the existing infrastructure of the road and the proposed highway mitigation for the construction and AIL traffic to the Llanbrynmair wind farm. These drawings give detailed descriptions of the mitigation works and the mitigation proposed to reduce the impact of the scheme on public rights of way users, drainage, ecology and landscape and visual aspects.

The sections below detail the route from Llanerfyl at the start of Section 1, to Talerddig at the end of Section 3 and the existing road conditions, constraints and receptors along the road. These areas have been linked to chainages and drawings which are detailed on the design drawings in Appendix A.

3.2.1 Section 1 – Llanerfyl A458 (Chainage 0m) to Llanbrynmair Site Access 1 (Chainage 8250m)

3.2.1.1 A458 at Llanerfyl – Drawing 60283248-D-001

The C2031 meets the A458 trunk road at Llanerfyl as the minor arm of a simple priority junction. There are two single mature trees, both protected by Tree Preservation Orders (TPOs), on either side of the C2031 just south of the junction mouth. To the west of the junction mouth is the car park for the community centre. The east of the road and the junction is an existing field used for pasture and bordered by hedgerow.

The A458 at Llanerfyl is a 40mph road, with the C2031 minor road having an unrestricted speed limit through the village. The Llanerfyl Community Centre and Llanerfyl Church in Wales Foundation School are both accessed from the C2031 and are located between Chainage 0 and 600. The village and the schools are receptors sensitive to an increase in traffic. A photograph of the entrance to the road at Llanerfyl is shown in Photograph 1 below. Because of these receptors at Llanerfyl, alternative

routing for construction traffic via Talerddig, which has fewer properties along this section of the route, was preferred. Due to other issues associated with the Talerddig route, Llanerfyl is still required for access for abnormal indivisible loads.

The Glen Menial Bridge is a brick masonry arch bridge, located at chainage 450. This bridge is approximately 4 metres wide and has stone parapets which will be modified as a part of the LTMP enabling works. This bridge is shown in Photograph 2 below.

Photograph 1- A458 / C2031 Junction at Llanerfyl

Photograph 2 - Glen Menial Bridge

3.2.1.2 Diosg Bridge up to Chainage 3000 – Drawing 60283248-D-002 to 005

Between Llanerfyl and Diosg at Chainage 950 the road is flanked on both sides by hedge banks with the road being between 4.5 and 6m in width. Towards the Diosg bridge, a stone masonry arch bridge with concrete parapets, the road narrows and changes direction to cross the watercourse. There are three existing houses adjacent to this bridge and a collection of houses prior to the

bridge on the south side of the road. These are all possible receptors to traffic impact. The three houses adjacent to the bridge are shown in Photograph 3 below. The traffic impact on these houses has been mitigated by re-routing the majority of the construction traffic via Talerddig, however the temporary impact due to the AIL movements will remain.

From Diosg up to chainage 3000, the road is sinuous in nature as it runs parallel to the existing ground profile which slopes North West to south east towards the Nant Menial River. The road follows the river, while flanked on both sides by hedgerows, hedge banks and earthworks. There are several small properties located within the valley and on the hill that take access from this road. The road varies between 5 and 7 metres in width.

Photograph 3 - Houses immediately after Diosg Bridge

3.2.1.3 Ch 3000 Up to Gosen Bridge – Drawings 60283248-D-005 to 007
Up to chainage 4200 at Tywnedd Gosen the road straightens out slightly with wider verges, but is still flanked by hedgerows and hedge banks on both sides of the road. This section of the road has other small roads feeding into it as well as isolated properties accessed via their own private drive way and accesses.

3.2.1.4 Gosen Bridge – Drawings 60283248-D-008-001 (Layout Drawing) to 009.
At chainage 4450 is the Gosen Bridge. This structure, the crossing the Cledan river, a tributary of Afon Gam, is an existing 3.8m wide stone arch structure, located in a valley with gradients up to 14% on approach and exit from the structure. The structure itself is located on a double S bend, between existing properties at the top of the hill and the existing Chapel Gosen located at the southern corner of the bridge itself. To the west of the bridge is a smaller side road which links to farms to the north of Afon Gam. On exit from the Gosen Bridge, up to chainage 5000, the road is sinuous as it winds around a pair of small hills and dips prior to the Sycthyn Farm.

There are three houses at Gosen Bridge which will all be impacted by any works at this location. Two of the houses are located on approach to the bridge to the north east. The third house is the Chapel Gosen on the existing Gosen Bridge.

The Gosen Bridge and the approach down to the bridge are shown in Photograph 4. Photograph 5 shows the approach out of Gosen Bridge.

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Photograph 4 - Gosen Bridge - Looking west to east. Bridge is in the foreground, Chapel is to the right of the picture. Afon Gam is to the left of the hedgerow in the left of the picture.

Photograph 5 - Gosen Bridge - Hill leading westbound, away from the bridge

3.2.1.5 Sycthyn Farm – Drawings 60283248-D-009 - 010

From chainage 5000 to 6400 the road is more open in character up to and past Sycthyn Farm and Hafod Farm as the road passes through the Afon Gam valley to the south of Moel Ddolwen except for a small section past Sycthyn Farm. The road is approximately three metres wide in this section. Beyond the farm the road widens to be between 4.5 and 6 metres up to Hafod Farm. The road at the Sycthyn farm is shown in Photograph 6 below. The Sycthyn Farm is another receptor to traffic impact, but is located further back from the existing road.

Capabilities on project:
Transportation

Photograph 6 - Sycthyn Farm - Looking west to east with the road to the far left of the photograph.

3.2.1.6 Hafod Farm – Drawings 60283248-D-010 and 011

From Hafod Farm to Dolwen at chainage 7300, the road follows the existing contours along the Afon Gam river valley. The road along this section is flanked by hedgerows on the northern side towards the river, with an existing embankment up the hill to the south. The road, although relatively straight in this section, is narrow at less than 4 metres is frequented by several existing passing places on the southern side of the road, which is to the left on Photograph 7 below. The road has good forward visibility on this section.

Photograph 7 - Between Hafod Farm and Dolwen.

3.2.1.7 Dolwen Isaf and Uchaf Bridges up to Site Access 1 – Drawings 60283248-D-011 up to 014. Site Access 1 Drawing 60283248-D-042.

At Dolwen there are two bridges crossing Afon Gam and one of its tributaries. These bridges are skewed to the direction of the road and are located to the north east of an existing Site for Special Scientific Interest (SSSI). The road is wider, up to 6m in this section, narrowing again on approach from Dolwen Uchaf to the Dolwen Farm Access at chainage 7720. From the Dolwen Farm Access onwards, the road becomes wider and more open with fewer hedgerows and with wider verges up to Site Access 1. The Dolwen Isaf and Uchaf bridges are shown in Photographs 8 and 9 below.

From the Dolwen Farm, located at chainage 7750 the road is used as the route of the Glyndwr's Way, which is a long distance National Trail which continues past Site Access 1 and up to the existing road used for Site Access 2. The road is shared along this section with walkers and other non-motorised users who use both the existing soft verges and the road for passage. The section of the road where Glyndwr's Way begins is shown in Photograph 10 below.

Photograph 8 - Dolwen Isaf Bridge

Photograph 9 - Dolwen Uchaf Bridge

Photograph 10 - Dolwen Farm and the start of Glyndwr's Way

3.2.2 Section 2 – Llanbrynmair Site Access 1 (Chainage 8250m) to Llanbrynmair Site Access 4 (Chainage 12350m)

3.2.2.1 Site Access 1 – Drawing 60283248-D-014 and 042.

Site Access 1 is an existing access road to existing forestry and agricultural land in the northern parts of the Llanbrynmair site. The existing access is a gated junction adjacent to a series of watercourses, which the access tracks follow to the north. This road is currently used by farm access traffic and is not a public right of way. The proposed access tracks into the Llanbrynmair wind farm will access from the west and east. Opposite Access 1 there is an existing fork in the road leading down to the river and a ford. The existing road width is between 3.5 and 5 metres. The road at Access 1 can be seen in Photograph 11 below.

3.2.2.2 Site Access 1 to Neinthirion – Drawings 60283248-D-015 – 016

The section of road between Site Access 1 and the Neinthirion Bypass at chainage 8950 is generally open, with the road being of varying width between 3 and 4 metres once it passes the double bend to the west of Access 1. This section of road is relatively flat and straight with wide verges.

3.2.2.3 Neinthirion – Drawings 60283248-D-016, 17 and 045

Between the proposed Neinthirion Bypass access at chainage 8950 and the egress at 9650 is the hamlet of Neinthirion. The existing road through Neinthirion has a bridge crossing the Afon Cannon which is too constrained for two way HGV traffic and AIL movements. The hamlet of Neinthirion has multiple building frontages adjacent to the carriageway edge. Neinthirion itself is a receptor to vehicle movements. To mitigate this traffic impact, a bypass around Neinthirion has been proposed. This bypass crosses an existing public right of way and additionally diverts construction traffic from Glyndwr's Way which passes through Neinthirion.

Photographs 12 and 13 show the proposed access and egress for the Neinthirion Bypass (shown on drawing 60283248-D-045).

Photograph 11 - Site Access 1 - Looking east. The site access is located to the left of this photograph.

Capabilities on project:
Transportation

Photograph 12 - Neinthirion Bypass Access Location

Photograph 13 - Neinthirion Bypass Egress Location

3.2.2.4 Neinthirion to Site Access 2 – Drawings 60283248-D-017 to 018 and 043.

Between Neinthirion and Site Access 2 at chainage 10150, the road is sinuous as it passes through areas of pasture adjacent to Afon Gam. The road is between 3 and 4 metres wide open with few hedgerow constraints and is bound by a fence as the road crosses cattle grids and passes between areas of pasture. This section of road is still along the route of Glyndwr's Way and is used by non-motorised users who then turn right into the existing track at Site Access 2, north. This can be seen in Photograph 14 below.

Photograph 14 - Road leading up to Site Access 2

3.2.2.5 Site Access 2 to Site Access 4 – Drawings 60283248-D-018 to 022

From Site Access 2 onwards, the road drops into the Afon Gam valley and follows the course of the river through the flood plain. The road up to Site Access 4 is flat and sinuous as it negotiates the land boundaries and the meanders of the river. This section of the road has cattle grids between the areas of open pasture as well as existing bridge and culvert structures spanning the small water courses located along this section of route.

The road is generally 3m up to 4m wide, dotted with asphalt passing places at regular intervals and is flanked by fence lines as it traverses through field boundaries at each cattle grid. The road is used by an existing agricultural factory unit located at chainage 11,000.

Photographs 15 and 16 detail the conditions along this section of road. Further photographs are detailed on the drawings in Appendix A.

Capabilities on project:
Transportation

Photograph 15 - Existing Road between Access 2 and 4, at Chainage 11,400.

Photograph 16 - Existing Road at Site Access 4 - Chainage 12,350

3.2.3 Section 3 – Llanbrynmair Site Access 4 (Chainage 12350m) to Talerddig A470 (Chainage 17510m)

3.2.3.1 Site Access 4 to Nant-yr-esgair-Wen Farm – Drawings 60283248-D-023 - 026

From Site Access 4 to the south towards Talerddig the road is sinuous in nature and is open across the existing fields up to chainage 13700, farms at Ffridd Fawr and Esgair Ffridd Fawr. From this point onwards, the road follows the boundary fence of a forest to the north and the contours of the hill before dropping down at chainage 14600 to Nant-yr-esgair-Wen farm. The road along this section is between 3 and 4.5 metres in width and is dotted with existing passing bays at irregular intervals. Some of the passing bays are currently not intervisible. There are two receptors to traffic impact and these are the existing barn at Ffridd Fawr Farm and at Nant-yr-esgair-Wen Farm. Photographs 17 and 18 illustrate the visibility along this section of road.

Photograph 17 - Example of Passing Bay at Ch 13,560

Photograph 18 - Existing incline at Nant-yr-esgair-Wen farm. Buildings to left of photograph.

3.2.3.2 Nant-yr-esgair-Wen to Talerddig – Drawings 60283248-D-027 to 030

From Nant-yr-esgair-Wen onwards, the road continues downhill towards the A470 to the south west, following field boundaries, the edges of smaller wooded areas and passing the farms at Capel yr Aber and Pantglas. The character of the road changes, with the road becoming more ‘closed’ in character on both sides with field boundaries and hedgerows and trees as it continues south. This is shown on Photograph 20 below. The road also becomes narrower down to a width of 2.7 to 4m, with interspersed car-sized passing bays. The existing farm at Pantglas, located at chainage 16,450, is a receptor to traffic impact as the farm building is located adjacent to the road. There is an existing large hard standing area here, which is used for passing and for storage of farm vehicles. This is shown on Photograph 19 below.

Photograph 19 - Pantglas Farm

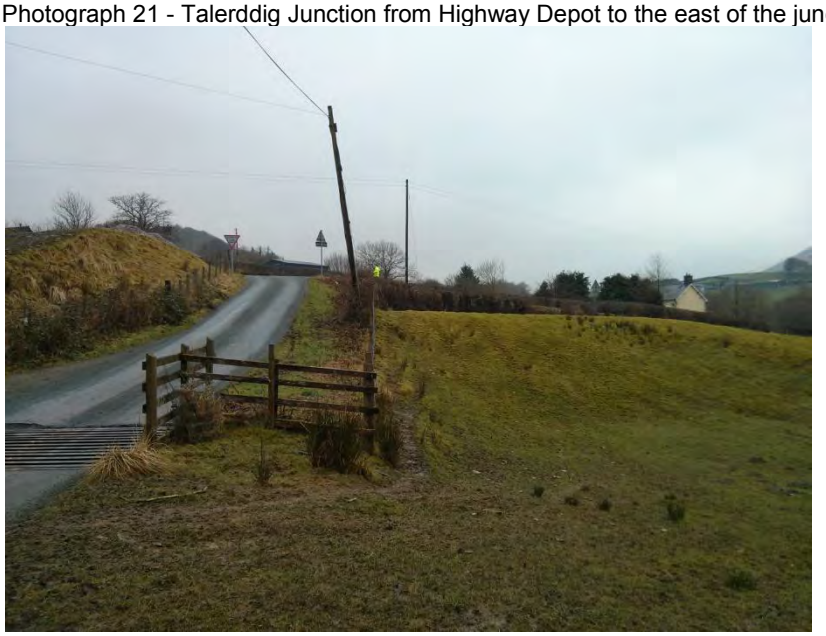
Photograph 20 - Road narrowing with hedgerows at Chainage 17,075

3.2.4 A470 at Talerddig – Drawing 60283248-D-030, 040

As the road approaches the A470, it enters into a valley towards the crossing of the Afon Laen and up to the junction with the A470. As the U2319 meets the A470 trunk road at Talerddig, it becomes the minor arm of a small simple priority junction. At this junction the minor road approached the trunk road at a gradient of 10 – 14% from an existing river crossing, while the A470 is has an 8% downhill grade in the westbound direction. The existing junction is not wide enough to accommodate two way HGV movements. To the west and east of the junction there are existing earthworks with the works to the east containing an existing area of hard standing that is used as a highway maintenance depot. These areas are shown in Photographs 21 and 22 below.

Capabilities on project:
Transportation

Photograph 21 - Talerddig Junction from Highway Depot to the east of the junction.



Photograph 22 - Talerddig Junction from the Bridge

3.3 Baseline Internal Site Conditions

The Llanbrynmair Wind Farm internal site connects to the public highway network at three existing access junctions. The site is interspersed by existing access tracks, constructed for a mixture of forestry and agricultural use. The site spans three forestry areas and areas of moorland and peat. The site is split into three distinct sections, serviced by each of the existing access tracks and junctions with the southernmost access track proposed to act as the main compound area. The detailed proposals for the Internal Site design are included within Chapter 3 of the Environmental Statement and for the purposes of traffic impact; this internal site design has been quantified to establish a construction volumes and traffic impact along the public highway.

3.4 Receptors to Traffic Impact

Based on our review of the baseline conditions, the following transportation-related receptors have been identified along the Llanerfyl to Talerddig Road, in chainage order from Llanerfyl to Talerddig.

- Llanerfyl Village;
- Llanerfyl Church in Wales School;
- Diosg;
- Gosen;
- Sychtyn;
- Dolwen;
- Neinthirion;
- Ffridd Fawr Farm;
- Nant yr Esgair Wen Farm; and
- Pantglas Farm.

The extents of these receptors have been discussed in the sections above. The locations of these receptors have helped identify the potential routing for construction traffic. The majority of the impact from construction traffic to these receptors has been mitigated through the re-routing of the construction traffic and the measures detailed in Appendix A.

There are other receptors in addition to those properties and residences listed above. These receptors include those related to: visual impact (Glyndwr's Way), ecological impacts (protected species habitats, hedgerows and trees) and hydrological impacts (rivers, peat). These receptors have been documented within the Environmental Statement under their respective specialist headings.

There are Public Rights of Way footpaths and bridleways which interact with the Llanerfyl to Talerddig road at some locations and guidance from PCC on how to ensure that the proposals do not unacceptably affect the enjoyment and safe use of highways and public rights of way has been embedded in the design philosophy for the mitigation works along the Llanerfyl to Talerddig road.

3.5 Baseline Traffic Levels

Traffic surveys and classified traffic movements have been undertaken along the Llanerfyl to Talerddig road. These surveys were taken to determine the existing traffic flows and to assist with the proposals with an aim to establishing a baseline traffic level for the environmental impact assessment and to identify the level of mitigation required to allow for passing vehicles.

The following surveys were obtained to establish this baseline:

- Hafod Farm – Chainage 6150 – Survey taken between 5th November and 11th November 2008
- Llanerfyl A458 Junction – Chainage 0 – Survey taken between 18 February and 3rd March 2013.
    - Site 1 = A458 major road,
    - Site 2 = C2031 minor road
- Talerddig A470 Junction – Chainage 17510 – Survey taken between 18th February and 11th March 2013
    - Site 3 = A470 major road,
    - Site 4 = U2319 minor road (Please note that the Site 4 was undertaken between the 26th February and the 11th March 2013 due to equipment failure).

- Other ATC data from the A458 and the A470 has been used to assess the traffic levels on the strategic road network.

These traffic surveys are included within Appendix C. The data obtained from these surveys are summated below. The locations for these surveys are shown on Figure 1 below.

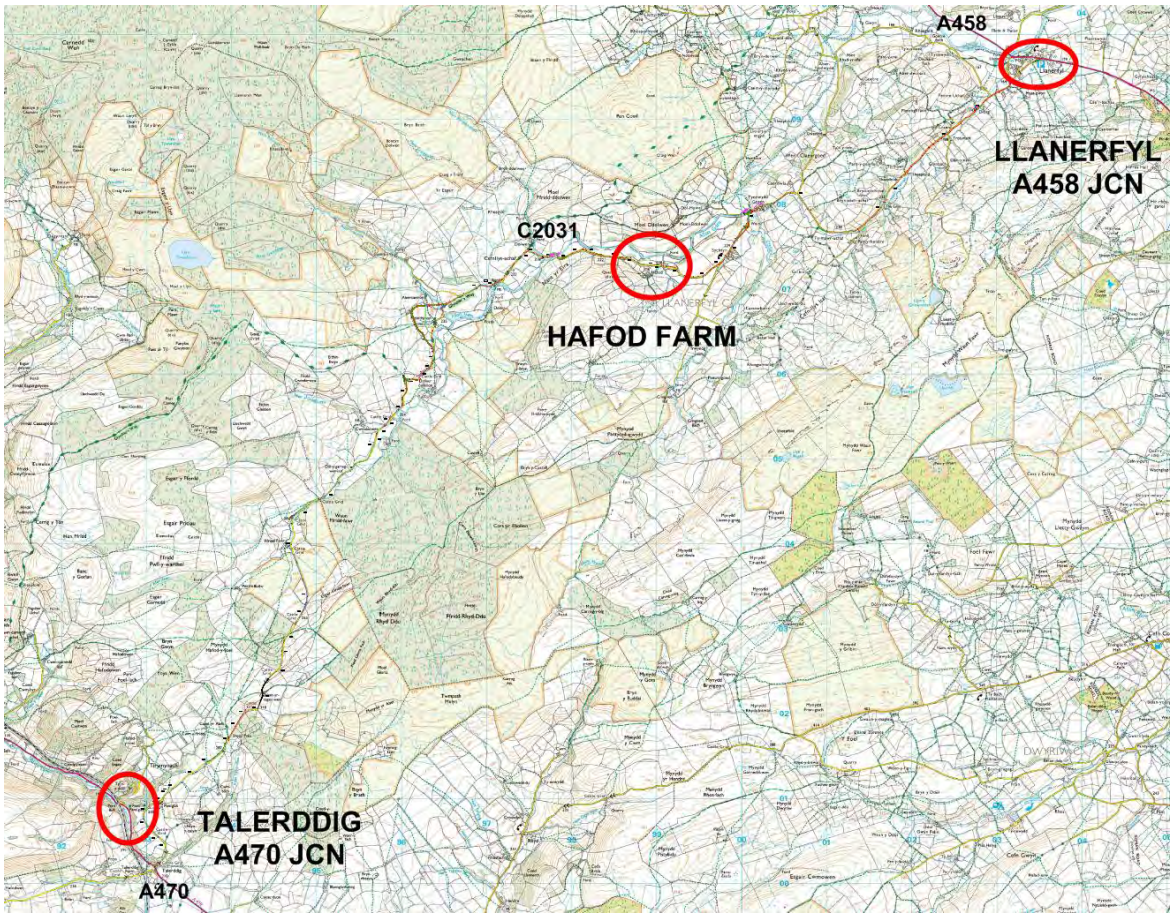


Figure 1 - Location of Traffic Survey Data

3.5.1 Hafod Farm – November 2008

The traffic survey data at Hafod Farm was collected by Powys County Council in November 2008 and the five day average flow has been summated in Table 4 below. Complete data is included in Appendix C-1.

Table 4 - Hafod Farm Traffic Data

Location.	Direction	5 Day Ave flow	HGV Ave flow	% HGVs
C2031 – at Hafod Farm **05/11/08 – 11/11/08**	Eastbound	71	13	18.3%
	Westbound	72	13	18.0%
	2 Way	143	26	18.15%

3.5.2 Llanerfyl A458 – 18th February to 3rd March 2013

The A458 is a trunk road. The U2319 is a minor road and results for this route are summated in Table 5 below. Complete data is included in Appendix C-2.

Table 5 - Llanerfyl C2031 Traffic Count Data

Location.	Direction	5 Day Ave flow	HGV Ave flow	% HGVs
C2031 – at junction OSGR: SJ 03464 09691 **18/02/13 – 24/02/13**	Eastbound	370	4	1%
	Westbound	303	10	3.3%
	2 Way	673	13	1.9%
C2031 – at junction OSGR: SJ 03464 09691 **25/02/13 – 03/03/13**	Eastbound	358	3	0.8%
	Westbound	286	4	1.4%
	2 Way	644	8	1.2%
Average Figures	AADT	661	11	1.6%

3.5.3 Talerddig A470 – 18th February to 11th March 2013

The A470 is a trunk road; the trunk route is covered within the sTMP. The U2319 is a minor road and results for this route are summated in Table 6 below. Complete data is included in Appendix C-3.

Table 6 - Talerddig U2319 Traffic Count Data

Location.	Direction	5 Day Ave flow	HGV Ave flow	% HGVs
U2319 – at junction OSGR: SH 93107 00204 **26/02/13 – 04/03/13**	Eastbound	59	5	8.4%
	Westbound	72	22	30.5%
	2 Way	131	29	22.1%
U2319 – at junction OSGR: SH 93107 00204 **04/03/13 – 11/03/13**	Eastbound	51	4	7.8%
	Westbound	61	24	39.3%
	2 Way	112	29	25.9%
Average Figures	AADT	106	28	26.4%

3.5.4 Summary of Traffic Data

The data from the three counts above show that the existing road is regularly used by heavy goods and agricultural vehicles with up to two vehicles per hour using the road. The Llanerfyl end of the road is the busiest due to the higher numbers of residential properties and the school at this location.

These traffic figures are used within Section 5.4 to consider the traffic impact.

3.6 Highway Structures

The Llanerfyl to Talerddig road has several locations at which the road crosses major and minor water courses between the A458 and the A470. These structures are shown within the scheme drawings in Appendix A. Visual inspections of the structures in Section 1 and 2 were undertaken in April and May 2011. A further inspection of the Gosen Bridge in Section 1 was undertaken in March 2013.

3.6.1 Section 1 – Llanerfyl A458 (Chainage 0m) to Llanbrynmair Site Access 1 (Chainage 8250m)

In Section 1 there are a total of five bridges along the route and these bridges are:

- Glen Menial Bridge, Llanerfyl, Ch 450 – Brick Masonry Arch,
- Diosg Bridge, Ch 950 – Stone Masonry Arch,
- Gosen Bridge, Ch 4500 – Stone Masonry Arch,
- Dolwen Isaf Bridge, Ch 7330 – Inverted T Beam and
- Dolwen Uchaf Bridge, Ch 7520 – Precast reinforced concrete.

These bridge constructions were identified during a site visit in April 2012 and were originally documented in Appendix C of the SEI4 LTMP. In addition to the structures above, there are also several culverts at minor watercourse crossings and drainage channels, which are detailed on the drawings in Appendix A. These structures are detailed within the Hydrology chapter of the Environmental Statement.

3.6.2 Section 2 – Llanbrynmair Site Access 1 (Chainage 8250m) to Llanbrynmair Site Access 4 (Chainage 12350m)

In Section 2 there is a single bridge and there are several culverts and cattle grids along the route:

- Neinthirion Bridge, Ch 9020 – Precast reinforced concrete,

Cattle Grids	Culverts
Cattle Grid – Neinthirion, Ch 9250,	Box Culvert – Ch 10620,
Cattle Grid – Ch 9940,	Pipe Culvert – Ch 10755,
Cattle Grid – Ch 10625,	Pipe Culvert – Ch 11402,
Cattle Grid –Ch 11400,	Pipe Culvert – Ch 11450,
Cattle Grid – Ch 11995 and	Pipe Culvert – Ch 11650,
Cattle Grid – Ch 12370.	Pipe Culvert – Ch 11700,
	Pipe Culvert – Ch 11930,
	Pipe Culvert – Ch 11990,

There are also several culverts at minor watercourse crossings and drainage channels. The locations of these are not explicitly stated above, but these are detailed on the drawings in Appendix A.

3.6.3 Section 3 – Llanbrynmair Site Access 4 (Chainage 12350m) to Talerddig A470 (Chainage 17510m)

In Section 3 there are two bridges as well as numerous cattle grids and culverts:

- Bridge over Afon Gam, Ch 12450 – Box culvert,
- Bridge , Ch 17450 – Precast reinforced concrete

Cattle Grids	Culverts
Cattle Grid – Ch 12750,	Pipe Culvert – Ch 15770,
Cattle Grid – Ch 13720,	Pipe Culvert – Ch 16000,
Cattle Grid – Ch 14300,	
Cattle Grid – Ch 14840,	
Cattle Grid – Ch 17090,	
Cattle Grid – Ch 17470.	

There are also several culverts at minor watercourse crossings and drainage channels. The locations of these are not explicitly stated above, but these are detailed on the drawings in Appendix A.

3.7 Earthworks and Slope Stability

The proposed highway works will have an impact on the existing ground profiles in several locations. These impacts will include the need for existing slopes to be extended as required or retained and these will use slopes that match or improve the existing embankment. In general, all slopes will be graded and blended back into the existing bank profiles to mirror the existing slopes where possible. Details of earthworks associated with the proposed highway works are shown on the drawings in Appendix A.

3.8 Utilities

Utility records have been obtained for the route corridor. Water mains, power lines and BT telecommunication cables are present along the valley, with some buried and some overhead sections of power lines and telecommunication cables. The overhead lines are shown on the drawings in Appendix A.

In Section 1, the BT and overhead power lines are located within the verge and adjacent land through the Nant Menial valley. The BT overhead lines follow the road closely, with overhead power diverging from the road in several locations, crossing the road intermittently. Other utility companies have confirmed they do not have any apparatus within the route corridor in these sections. There are three lighting columns on the eastern side of the road on the approach to the junction with the A458 at Llanerfyl. There is a single lighting column on the west side of the road associated with the start of the part time 20mph zone for Llanerfyl School. The remainder of the route is unlit.

Capabilities on project:
Transportation

There are no records available for existing highway drainage. The majority of Sections 1 to 3, other than the section through Llanerfyl, do not have a surface water conveyance or foul water sewerage system and instead rely on local drainage solutions to channel the limited surface water runoff into the verges and into the existing watercourses. At locations where there are existing gullies and drainage systems, notations have been included as to the use of these systems within the highway proposals in Appendix A.

4 Development Proposal

4 Development Proposal

4.1 Project Evolution

The original planning submission detailed a proposal for the Llanbrynmair Wind Farm comprising of 43 wind turbines with a hub height of 80m and a blade tip height of up to 126.5m, together with associated infrastructure.

In SEI 2 and 3 a total of 13 turbines were removed from the scheme, as well as a change in the project infrastructure layout which involved the amendment of the access tracks, crane hard standings and borrow pits. This design evolution is detailed within Section 3.3 of Environmental Statement.

The current scheme has 30 wind turbines, which is 13 wind turbines less than the previous proposal, with a hub height of 80m and a blade tip of up to 127m, with approximately 25.2km of new access tracks. The previous proposal was for four site entrance junctions off the Talerddig to Llanerfyl road and this has been reduced to three site accesses to minimise environmental impact by retaining greater internal site movements and utilising construction methods such as on-site borrow pits and concrete batching. The scheme is split with 11 turbines accessed from Site Access 1, 8 turbines accessed from Site Access 2 and 11 turbines from Site Access 3. Linkage between these three accesses is via the existing C2031 county road which is used and managed by the site contractor as a part of the site's construction access.

4.2 Life Cycle of the Wind Farm

The life span of the wind farm consists of a construction phase, an operational phase and a decommissioning and restoration phase at the end of the wind farm's life. Out of these three key life stages, the highest likely impact occurs during the construction phase when the wind turbines are brought to site and the internal and external infrastructure and enabling works are constructed. As such, the construction phase of the wind farm is the focus for this LTMP.

4.2.1 Construction of the wind farm

The construction of the wind farm and external works are proposed to occur over a two and a half year period. During the construction period the access routes to site for construction traffic will be utilised and the temporary construction traffic will be negated as the construction of the site demobilises. The traffic impact associated with the construction period is temporary.

4.2.2 Operation and Maintenance

Traffic during the operational period will be limited to intermittent visits by a maintenance team travelling in 4x4 vehicles or light vans. There may be an occasional need for HGVs to access the site for maintenance or repairs. It is also possible that individual components may require replacement during the life of the wind farm, which could lead to additional abnormal loads after the construction stage is completed. This need for future access by AILs throughout the lifespan of the project means that the enabling works for the AILs are permanent works. In total the operational traffic is intermittent in nature and the impact will be negligible. Any impact from any replacement component AILs will be governed by the methods within this LTMP. Delivery of these replacement AILs will be governed by the relevant legislative restrictions and authorisations.

4.2.3 Decommissioning and Restoration

The anticipated life of the wind farm is 25 years, after which time the turbines will either be decommissioned or the wind farm will be either fully decommissioned or repowered. During decommissioning, the majority of the wind farm components would be dismantled and disposed of offsite. The transportation impact during decommissioning would not be greater than during construction as most material for the construction of the tracks and hard standing areas would be retained in-situ. If a decision were taken to replace or refurbish the turbines, further assessment into the transportation impacts would be undertaken at that time. This could include a further TMP as required through consultation through the planning process.

4.3 Construction Programme

The Llanbrynmair is proposed to be delivered over a three year construction programme with an assumed start date of Jan 2016 and progresses until May 2018. The construction process will be undertaken in phases with the external works enabling access for construction vehicles to the three site accesses, completed first, before the internal works begin.

- Enabling Works on Sections 3, 2 and 1 – **January 2016 – September 2016**
    - Section 278 Works – A458 and A470 junction improvements,
    - Statutory Undertakers' Diversions,
    - Section 3 Works – Construction of Passing Bays and Construction Traffic Enabling works,

  - Section 2A Works Between Access 4 and Access 2 – Construction of Passing Bays, Laying of Grass Reinforcement, Culverts and Structures,
  - Section 2B Works between Access 2 and Access 1 – Construction of Passing Bays, Laying of Grass Reinforcement, Structures and Neinthirion Bypass,
  - Section 1A Works between Access 1 and Gosen Bridge – Construction of AIL widening, grass reinforcement, structural works to bridges and Gosen Bridge,
  - Section 1B Works between Gosen Bridge and Diosg – Construction of areas of AIL widening, grass reinforcement and bridge works at Diosg and Glen Menial,
- Phase 1 – Site Access 4 (South Access) – **September 2016 – June 2017**
- Phase 2 – Site Access 2 (Central Access) – **February 2017 – September 2017**
- Phase3 – Site Access 1 (North Access) – Internal Works – **May 2017 – January 2018**
- Commissioning of Substation, Testing of Turbines – **December 2017 to May 2018**

The phasing of the scheme has been defined on the basis of gradually opening up access along the Talerddig to Llanerfyl road for construction of the wind farm internals.

As the other site accesses are opened up, further compounds will be constructed to establish welfare and storage facilities to further reduce the distance travelled for construction vehicles and plant. Beyond Site Access 1, enabling works to provide access to the site from Llanerfyl for the AILs will be supported from the compound at Site Access 1 and temporary compounds situated at Dolwen and at Gosen.

For the purposes of the cumulative impact assessment in Section 5. It is assumed that the Mynydd Waun Fawr scheme is constructed in 2017.

5 Construction Traffic Operational Strategy

5 Construction Traffic - Operational Strategy

5.1 Construction Traffic – Introduction

General construction traffic will comprise of HGVs delivering construction components and materials, fuel tankers, staff vehicles, construction plant, cranage and vehicles associated with forestry clearance. A range of general building materials will be required to construct the Llanbrynmair Wind Farm, including concrete and steel reinforcement for turbine foundations, aggregate for access tracks and crane hard standings, power and instrumentation cabling, sand and other prefabricated construction materials. Construction traffic will also be required on the public highway to deliver materials and to construct the enabling works during the early stages of the scheme.

Passenger vehicles will be managed separately and a Travel Plan for the site will be utilised in order to best provide transport for personnel travelling to and around the Llanbrynmair wind farm and its associated enabling works. Passenger vehicles will use the A470 route to site.

For the purposes of constructing the site and the enabling works during the construction programme, Sections 1, 2 and 3 will be managed as an active construction site with Section 2, which is used and operated as a part of the internal site's access tracks, managed within the CDM boundary.

5.2 Routing of Construction Traffic

5.2.1 Routing Decisions

Access to the site for construction traffic via the Talerddig to Llanerfyl road is required due to the location of the proposal. Enabling works on the adjacent public highway are required due to the currently identified access points. A review has been undertaken to consider the routes to the site. The following options for routing construction traffic were considered:

- Shared access from the A458 via Carnedd Wen
- All traffic via A470, with access via Talerddig Junction;
- All traffic via A458 Llanerfyl Junction; and
- Split of traffic between the A458 Llanerfyl Junction and the A470 Talerddig Junction.

5.2.1.1 Shared Access Route

The shared access route with Carnedd Wen has been discounted. The reasoning for this decision was detailed in correspondence to PCC and NRW in July 2013 and is in Appendix B-10.

5.2.1.2 All Access via A470, with access via Talerddig Junction

This route along the A470 was previously considered and concluded as being not suitable for the transportation of AIL turbine components, without significant enabling works west of Carno rail bridge at Plas Llysen and west of Pont Bell rail bridge at Tirgmynach. The works are also recorded with the STMP (Section 5 paragraph 5.27) as being unlikely to conform to DMRB standards

The route to site via A470 and Talerddig would also require AILs to navigate the first 5.2km of the Talerddig to Llanerfyl road, referred to as Section 3 in the LTMP. This section of road is not suitable for AILs due to the vertical alignment of the road in the vicinity of Talerddig.

These areas will not be able to be mitigated without significant disruption to existing road users.

5.2.1.3 All Access via A458 Llanerfyl Junction

The previous access strategy indicated that all AIL and construction traffic would travel to and from the site via the A458 at Llanerfyl. This led to construction and the AIL traffic using the same route through Llanerfyl village. The original enabling works proposed along this route from Llanerfyl were considerable, particularly along the initial section to Access Point 1 which has been accepted to be 'generally narrow with a twisting horizontal and vertical alignment'. The works had the effect of focussing the impact of the construction traffic on sensitive sections of the road with respect to environment, visual impact, noise and vibration.

5.2.1.4 Split of traffic between the A458 Llanerfyl Junction and the A470 Talerddig Junction

This option diverts construction traffic away from the 'more populated', more environmentally and ecologically sensitive section of the county road (from Llanerfyl). The county road flow at Talerddig is approximately 100 two way trips per day with very few properties along this length and is more open in character. The county road flow at Llanerfyl is approximately 650 two way trips per day

Construction traffic would travel 5.2km from the Talerddig junction to Site Access point 4. The comparative distance to Site Access 1 from the Llanerfyl junction is 8.3km. The section between the access points is common to both routes and is 4.1km

This strategy requires a trunk road junction improvement at Talerddig with the A470 and a trunk road junction format for AILs only at Llanerfyl with the A458. These have been discussed and agreed with Welsh Government.

It was concluded that the 'split traffic option' was the most suitable. AILs will, therefore, continue to enter from the A458 with construction traffic travelling to/from the site from the A470 at Talerddig.

5.2.2 Alternatives to Road Transport

As a part the base reassessment of the LTMP, alternative forms of carrying bulk materials have been explored.

Options for rail freight at the Welshpool station terminal and at the Talerddig passing loop which is located less than a mile away from the A470 junction serving the Llanbrynmair Wind Farm were explored and it was concluded that signalling and line capacity upgrades would be required, as well as improvements to infrastructure at Welshpool and Talerddig to allow for the coupling/uncoupling of freight trains at these locations, as well as local highway upgrades to allow for a transfer of materials from rail freight to road freight at the termini. These improvements to the railway network are significant and would require co-ordination and agreement between landowners, Network Rail and local stakeholders.

This option has not been taken forward because of the timescales for delivery of the railway improvement works and the significant nature of them.

Water transport has not been considered as there are no facilities capable of carrying freight in the vicinity of the site.

5.3 Timing of Construction Traffic

The previous ES and LTMP detailed that private vehicles would operate between 07:00 and 19:00 Monday to Saturday, with HGV deliveries restricted to off-peak times due to the receptors at Llanerfyl, Llanerfyl School and Diosg. These reduced hours ensured that on weekdays during school term time, HGV deliveries would arrive at site before 08.00, between 10.00 and 14.30, or after 16.30 only. Based on a 07:00 to 19:00 operating time, this restricted the delivery of HGV traffic to 8 hours out of a possible 12.

The construction traffic routing for HGVs via A470 Talerddig removes these previous constraints on the delivery timeframes at Llanerfyl and Diosg allowing for delivery HGVs to visit the site between 07:00 and 19:00. Movement of general construction traffic including HGVs on and off the site is now restricted to between 07.00 and 19.00 Monday to Saturday.

5.4 Forecast Construction Traffic Flows

The proposed trip generation for the construction of the Llanbrynmair Wind Farm internal and external works have been detailed in Appendix F of this LTMP. This trip generation provides three scenarios for the construction of the internal site:

- Appendix F-1: Best Case Scenario – 94% of all aggregate is won on-site from borrow pits and excavations.
- Appendix F-2: Central Case Scenario – 60% of all aggregate is won on-site from borrow pits and excavations
- Appendix F-3: Worst Case Scenario – All materials are imported to site with no materials won on-site;

The external highway works on the public highway assume a 100% material import. The internal site scenario has three options which depend on the source of materials and aggregate. Although the central case is the most likely scenario, the worst case, which assumes a 100% importing of construction material, has been used to demonstrate the absolute worst case traffic impact. A similar procedure has been used for the cumulative impact assessment with the Mynydd Waun Fawr scheme.

Table 7 below demonstrates the baseline traffic levels used as a basis of comparison for the development traffic counts. Table 8 demonstrates the trip generation for the construction of the enabling works, the Llanbrynmair internal site (using the three

scenarios above), the Mynydd Waun Fawr scheme and the cumulative impact of the absolute worst case scenario whereby the Llanbrynmair worst case scenario and the Mynydd Waun Fawr are combined. Table 9 finally demonstrates the impact, as an absolute AADT change and a percentage change that the development traffic will have on the traffic levels on the road on each section.

Table 7 - Baseline Traffic Data in 2017 Development Year

DATA LOCATION	BASELINE				TEMPRO	DEV YEAR 2017	
	AADT	HGV	%HGV	YEAR	GROWTH FACTOR	AADT	HGV
A458 - FROM A495 TO B4395	4495	160	3.56%	2011	1.014	4558	163
C2031 - LLANERFYL - SECTION 1	661	11	1.66%	2013	1.016	672	12
C2031 - HAFOD FARM - SECTION 2 (1)	143	26	18.18%	2008	1.021	147	27
C2031 - TALERDDIG - SECTION 3	106	28	26.42%	2013	1.014	108	29
A470 BETWEEN CARNO AND CEMMAES	2089	245	11.73%	2011	1.014	2119	249

Table 8 - Development Trip Generation Scenarios

DAILY CONSTRUCTION TRAFFIC (2 – WAY FLOW)				
ENABLING WORKS	**SECTION 3**	**SECTION 2**	**SECTION 1**	**ALL**
AVERAGE MONTH	15	50	32	47
PEAK MONTH	15	79	40	92
BEST CASE - ALL PHASES	**SECTION 3**	**SECTION 2**	**SECTION 1**	**ALL**
AVERAGE MONTH	46	46	4	46
PEAK MONTH	58	58	10	58
CENTRAL CASE - ALL PHASES	**SECTION 3**	**SECTION 2**	**SECTION 1**	**ALL**
AVERAGE MONTH	64	64	4	64
PEAK MONTH	83	83	10	83
WORST CASE - ALL PHASES	**SECTION 3**	**SECTION 2**	**SECTION 1**	**ALL**
AVERAGE MONTH	89	89	4	89
PEAK MONTH	135	135	10	135
MYNYDD WAUN FAWR	**SECTION 3**	**SECTION 2**	**SECTION 1**	**ALL**
AVERAGE MONTH	90	90	90	90
PEAK MONTH	111	111	111	111
CUMULATIVE - MYNYDD WAUN FAWR AND LLANBRYNMAIR - WORST CASE	**SECTION 3**	**SECTION 2**	**SECTION 1**	**ALL**
AVERAGE MONTH	179	179	94	179
PEAK MONTH	246	246	121	246

Table 9 – Trip Generation and Impact

Key for Table 9 <10% 10% to 30% >30%	A470 BETWEEN CARNO AND CEMMAES	C2031 - TALERDDIG - SECTION 3	C2031 - HAFOD FARM - SECTION 2 (1)	C2031 - LLANERFYL - SECTION 1	A458 - FROM A495 TO B4395
DEVELOPMENT YEAR 2017 - AADT	**2119**	**108**	**147**	**672**	**4558**
ENABLING WORKS	**A470**	**Section 3**	**Section 2**	**Section 1**	**A458**
AVERAGE MONTH	2166	123	197	704	4558
	2.22%	13.89%	34.01%	4.76%	0.00%
PEAK MONTH	2211	123	226	712	4558
	4.34%	13.89%	53.74%	5.95%	0.00%
BEST CASE - ALL PHASES	**A470**	**Section 3**	**Section 2**	**Section 1**	**A458**
AVERAGE MONTH	2165	154	193	676	4562
	2.17%	42.59%	31.29%	0.60%	0.09%
PEAK MONTH	2177	166	205	682	4568
	2.74%	53.70%	39.46%	1.49%	0.22%
CENTRAL CASE - ALL PHASES	**A470**	**Section 3**	**Section 2**	**Section 1**	**A458**
AVERAGE MONTH	2183	172	211	676	4562
	3.02%	59.26%	43.54%	0.60%	0.09%
PEAK MONTH	2202	191	230	682	4568
	3.92%	76.85%	56.46%	1.49%	0.22%
WORST CASE - ALL PHASES	**A470**	**Section 3**	**Section 2**	**Section 1**	**A458**
AVERAGE MONTH	2208	197	236	676	4562
	4.20%	82.41%	60.54%	0.60%	0.09%
PEAK MONTH	2254	243	282	682	4568
	6.37%	125.00%	91.84%	1.49%	0.22%
MYNYDD WAUN FAWR	**A470**	**Section 3**	**Section 2**	**Section 1**	**A458**
AVERAGE MONTH	2209	198	237	762	4562
	4.25%	83.33%	61.22%	13.39%	0.09%
PEAK MONTH	2230	219	258	783	4568
	5.24%	102.78%	75.51%	16.52%	0.22%
CUMULATIVE - MYNYDD WAUN FAWR AND LLANBRYNMAIR - WORST CASE	**A470**	**Section 3**	**Section 2**	**Section 1**	**A458**
AVERAGE MONTH	2298	287	326	766	4562
	8.45%	165.74%	121.77%	13.99%	0.09%
PEAK MONTH	2365	354	393	793	4568
	11.61%	227.78%	167.35%	18.01%	0.22%

The available guidelines for the environmental assessment of road traffic focus predominantly on the long term increase in traffic flows as a result of a proposed development and do not specifically reference the temporary increase borne by construction activities.

The Guidelines for the Environmental Assessment of Road Traffic (IEA, 1993) is a guidance document that sets out a methodology for assessing potentially significant environmental effects where a proposed development is likely to give rise to changes in traffic flows. The IEA guidelines suggest that:

- Highway links are included where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%),
- Highway links in other specifically sensitive areas are included where traffic flows have increased by 10% or more.

Whilst the criteria relate to the operational impacts of development, they have been applied to assess the temporary construction phase. This is accepted best practice and considered a conservative approach in the absence of wholly applicable criteria.

Application of the IEA guidelines in relation to Table 9 indicates that:

- At Talerddig, on the A470, the maximum daily increase in the peak month with no borrow pit usage is 11.6% reducing to 3% with full borrow pit usage. The corresponding average month daily figures are 8.5% and 2% respectively.
- At Llanerfyl, on the A458, the percentage increases are less than 1% irrespective of the scenario.
- For Llanbrynmair, the impact on the most environmentally sensitive, and most populated, Section 1 is not significant with the maximum daily increase in the peak month during the enabling works period being 6%. The corresponding average month daily figure is 5%. These figures are the same at Llanerfyl when considering the cumulative impact with Mynydd Waun Fawr. It is only the part of Section 1 south of the access to the Mynydd Waun Fawr wind farm (which is 3 km from the A458 at Llanerfyl) does the cumulative impact increase to 18% in the peak month and 14% in the average month. No receptors have been identified in this southern part of Section 1.
- The impact on the less environmentally sensitive, and less populated, Sections 2 and 3 is significant with the maximum increase in the peak month for Llanbrynmair ranging between 54% and 125% on Section 3 and between 40% and 92% on Section 2 depending on borrow pit usage. The corresponding average month figures are 43% - 82% and 31% - 61% respectively.
- The cumulative impact of Llanbrynmair and Mynydd Waun Fawr increases the worst case impact to between 166% and 228% on Section 3 and 122% and 167% on Section 2. However, this analysis has assumed the worst case scenario of both developments occurring at the same time.

Application of the IEA Guidelines to the county road defines the impact as significant on Sections 2 and 3, but not the Diosg and Llanerfyl parts of Section 1. This potential of significance informed the access strategy and design process which removed traffic from Section 1 and led to the highway modifications proposed for Sections 2 and 3 to mitigate traffic impact.

5.5 Communication and Signage

The strategy below details the methods for communicating traffic movements with other road users during the construction programme.

5.5.1 Signage Strategy for HGVs, Cars and Vans

The route of construction traffic is fixed with access from the westbound A470 at Talerddig to service the Llanbrynmair wind farm site and the enabling works construction. This route will be stipulated in all supply contracts for the scheme and will be controlled by RES during the delivery of the construction contract.

5.5.2 Signage for Site Traffic

To assist with the enforcement of the construction traffic routing, signage will be placed at strategic points along the construction traffic routes into site. These signs will be installed by the Site Contractor on the trunk road network from Welshpool to the site entrance to direct suppliers' traffic along the prescribed route into the site above.

An example of the types of signs to be used to direct construction traffic and deliveries (in accordance with the Traffic Signs and Road General Directions 2002) are shown in Figure 2 below. These signs will need to be located, installed and designed by the Site Contractor prior to works commencing at the wind farm. These signs will be installed on existing lighting columns, on temporary sign posts or on new single/double signposts as required as approved by the relevant highway authority. The locations of these signs will be subject to approval by Powys County Council and by the Welsh Government.

Warning signs will be used to advise road users of permanent or temporary site accesses along the route used for construction traffic. These accesses will be denoted by temporary signage warning road users of “Slow Plant Turning Ahead” and “Emerging Traffic” as required.

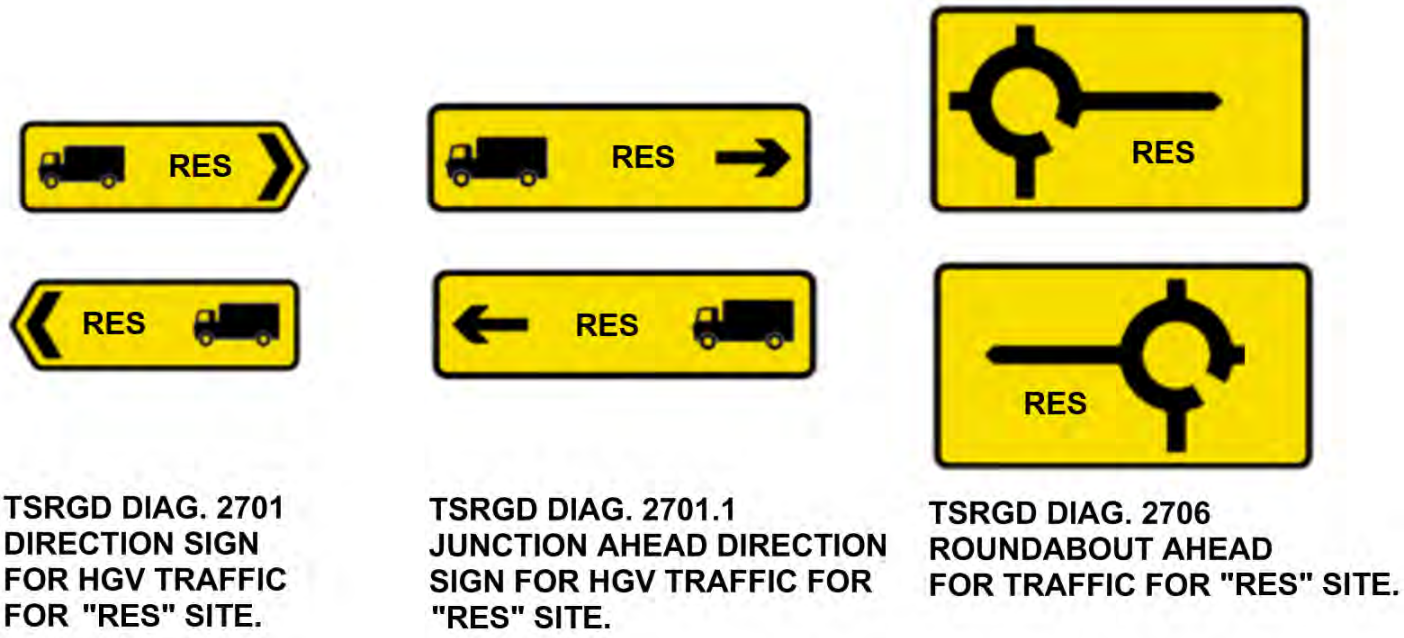


Figure 2 - Construction Traffic Routing Signage

5.5.3 Communication Strategy for HGVs, Cars and Vans

The communication strategy used for the AIL deliveries will be replicated so that it applies to the general construction traffic for the site and enabling works. Local groups will be notified and made aware of the construction programme and key activities along the route such as bridge works, diversions, resurfacing etc.

All vehicles servicing Llanbrynmair Wind Farm will be marked with a standard livery or marker sticker so that they can be readily identified. All drivers delivering to the site will be briefed fully on health and safety and considerate driving policies and a maximum site speed limit of 20mph on public roads will be enforced.

5.5.4 Communication with Residents

RES is committed to ensuring that all local residents, businesses and landowners are fully aware of the movements of construction traffic at the Llanbrynmair Wind Farm. The purpose of this communication will be to reduce inconvenience on residents and businesses, but also to reduce the quantity of traffic using the road during the delivery window detailed above. Each convoy will be centrally co-ordinated, scheduled and booked through the Transport Tool process within the sTMP and co-ordinated with the other wind farm developments.

RES, through its public relations and site team, will inform local communities of the movements of all AILs to the site via multiple communication mediums.

Communication methods will likely involve the use of social networking, dialogue and publications within the community and parish council, liaison with the Llanerfyl Church in Wales school board, email and SMS text messaging and through publication via the internet and other social media services.

5.5.5 Communication with PROW users

During the construction of the enabling works and the works within the site, the existing public rights of way (PROW) along the route will be managed with the use of communication and limited closures and diversions.

For the general road in general all site traffic will be mindful and respectful for non-motorised road users and existing PROW will be signposted clearly so that construction vehicles know of the location of all crossings and accesses.

In the vicinity of construction works for the internal site and the enabling works, PROW will be managed using traffic management and banksmen.

These closures will be notified through the posting of notices for the delivery programmes at the accesses to the PROW. Where these PROW meet the road, access will be temporarily suspended through the use of banksmen at the entrances and if required, users will be asked to wait a short while the AILs pass along the road. After the road is cleared of traffic and it is safe for crossing to recommence, the PROW will be fully reopened until the next delivery.

6 Construction Traffic – Mitigation Proposals

6 Construction Traffic – Mitigation Proposals

6.1 Philosophy and Phasing of Construction Traffic Mitigation

6.1.1 Overview

The Llanerfyl to Talerddig road has been sub-divided into three sections to assist in the referencing of the existing road conditions and the referencing of the works along the route. Each of these three sections have different traffic impacts from the Llanbrynmair wind farm and are designed using differing philosophies to suit these traffic impacts. These sections are as follows:

- Section 1 – Llanerfyl A458 (Chainage 0m) to Llanbrynmair Site Access 1 (Chainage 8250m) – 8250m in length. This section is proposed to be used for AILs only. These works are detailed on drawings 60283248-D-001 to 014 in Appendix A.
- Section 2 – Llanbrynmair Site Access 1 (Chainage 8250m) to Llanbrynmair Site Access 4 (Chainage 12350m) – 4150m in length. This section is used for both AILs and construction traffic arriving to site from Talerddig A470 and between the site accesses. These works are detailed on drawings 60283248-D-015 to 022 in Appendix A.
- Section 3 – Llanbrynmair Site Access 4 (Chainage 12350m) to Talerddig A470 (Chainage 17510m) – 5100m in length. This section is used for construction traffic only arriving to site from Talerddig A470. These proposals are detailed on drawings 60283248-D-040 in Appendix A.

The philosophy behind these proposals is as follows:

- Minimising works in environmentally sensitive areas,
- Constructing highway improvements from materials which, over time, will blend into the natural features of the road and promote growth of new vegetation.
- Providing community benefit by introducing improved areas of infrastructure.
- Maintaining road safety by ensuring intervisibility between passing bays and along the highway.
- Avoiding asphalt widening as much as possible to reduce impact on the character of the road.
- Minimising impact on local residents by designing the works so that they can be principally managed while not closing the road.

6.1.2 Phasing of Works

The construction programme and phasing for the works are detailed in Section 4 of this document.

The construction of the external works and the internal site works are delivered in series, so that the traffic impact is reduced as much as possible.

The external works on the public highway are delivered from the A470 at Section 3, eastbound to Section 1.

As the works progress east bound from Section 3 to Section 1, the enabling works will allow access to the new site accesses. As each site access is made available for construction traffic use, material storage and a shorter supply chain becomes available, reducing the distance travelled by construction vehicles along the public highway and reducing the intensity of trips.

6.1.3 Transport of materials, equipment and personnel

As part of this eastward progression of construction works it will become necessary to set up material stores, welfare stations and small temporary compounds along the route. These will be initially limited to the compound areas at the site accesses which will later provide local co-ordination and logistics for the internal site construction. The compound at site access 4 is proposed to be the principal site compound for all of the works along the route with a new concrete batching plant installed for the duration of the construction period to remove the need for hauling ready mix concrete across the wider highway network.

As the works progress eastwards and the site accesses become available for construction traffic, compounds will be setup at each site access. These compounds will be used for material storage and welfare for the works progressing eastwards

As the construction enters Section 1, temporary compounds will be setup at Dolwen Isaf, Gosen Bridge and Diosg to provide facilities for the construction of the enabling works on Section 1. These three temporary compounds will be removed after the external works have been delivered.

Capabilities on project:
Transportation

6.2 Buildability of the Proposals

The Buildability of the mitigation works is detailed further within the Appendices and includes reports for the detailed elements of the scheme such as at the Gosen Bridge (Appendix J) and the Glen Menial Bridge (Appendix I) which give information on how these areas can be constructed. General guidance on Buildability issues is provided below and in a summated Buildability report in Appendix K.

6.3 Mitigating the Impact of Construction Traffic Constructing the Public Highway Works

6.3.1 General Mitigation

The mitigation methodologies for general construction traffic will be presented as a series of general method statements which will be applicable to the enabling works along the Llanerfyl to Talerddig road. These methods are general statements based on the width of the road and the location of works in an aim to simplify the overall strategies used for managing construction traffic on the road.

All of the proposals within the public highway employ traffic management techniques detailed within the Department for Transport's Traffic Signs Manual: Chapter 8. The most common use of this guidance document is in the provision of safety signage around works in the public highway used when works are undertaken in the verge and the road is kept open. An example of the road arrangement from Chapter 8 of the Traffic Signs Manual is shown in Figure 1 below. This methodology is employed across the scheme is best practice. The main purpose of using this methodology is to keep the existing traffic moving along the road and to minimise the need for closures and disruption to existing road users.

General technical details for standard practices including the installation of permanent and temporary signage, drainage and temporary works are included in Appendix M of this LTMP.

6.3.2 Road Safety Auditing

The proposed highway works have been the subject of an independent Stage 1 Road Safety Audit along the full length of the route and at the junctions with the trunk road network. These audits are provided in Appendix G-1.

The audits found a few minor issues with specific details of the proposals which were responded to in the Designers' Responses in Appendix G-2. The overall access strategy was considered by the Safety Audit Team. The impact of construction safety and journey times was considered. They concluded that they believe the distances and passing place philosophy was suitable and that the route is suitable in road safety terms.

6.3.3 Mitigation where the public highway is less than 4.5m in width

At locations where there is less than 4.5m of working space within the highway and the verges, mitigation will be constructed offline from third party land outside of the highway boundary within the red line boundary of the scheme. Additional working space outside of the highway boundary is being obtained for these works.

These areas of works will be constructed and accessed from outside the highway boundary, with a minimum road width of 3.0m being provided with a 0.5m working width on the public highway adjacent to the works. This will be delineated using temporary traffic management signage in accordance with Chapter 8 of the Traffic Signs Manual. An example of an appropriate road arrangement from Chapter 8 of the Traffic Signs Manual is shown in Figure 3 below.

The construction process for these works will include:

- Preparation of an off-road access route and temporary storage area outside the highway;
- Vegetation and Site Clearance, removal of topsoil;
- Open up access to public highway;
- Construct works up to road edge with traffic management;
- Construct back off-line; Reinstate and close up the public highway access; and
- Reinstate affected areas, e.g. fields, vegetation, coppicing, hedgerows, verges etc.

When the works are completed in this area, the temporary traffic management signage is removed.

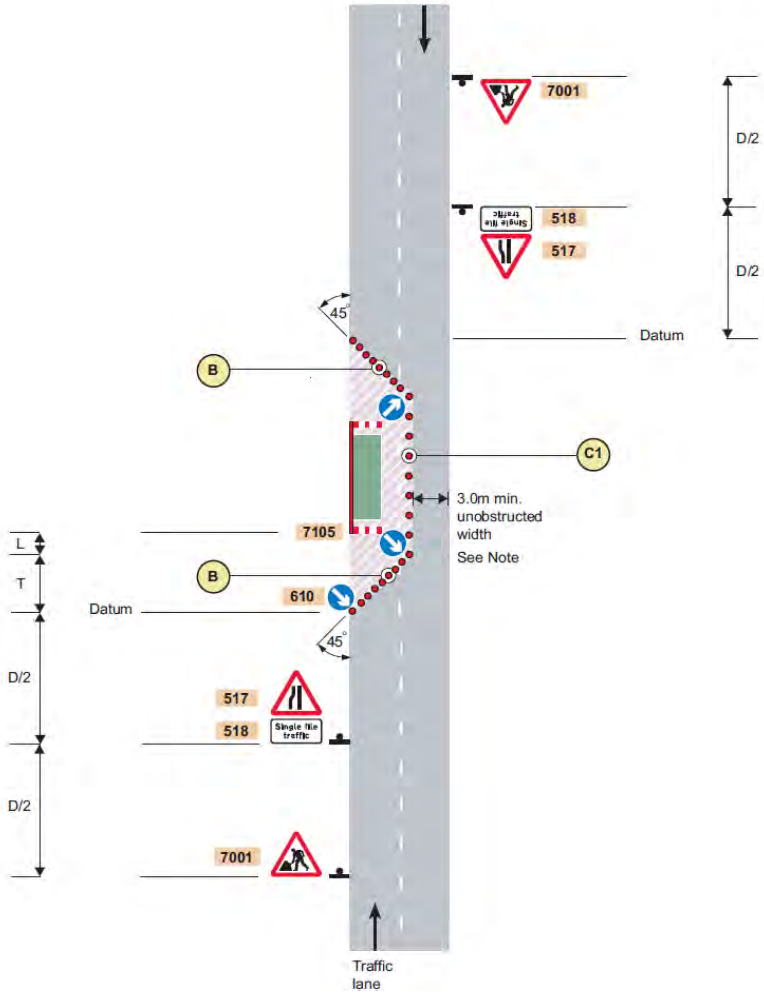


Figure 3 - Example of Traffic Management from Chapter 8 of the Traffic signs Manual

6.3.4 Mitigation where the public highway is more than 4.5m in width

At locations where the road is wider than 4.5m and there is an excess of 4.5m working width within the highway boundaries, the construction works will be able to be undertaken wholly within the highway with temporary traffic management installed on the road to ensure safe operation. An example of the road arrangement from Chapter 8 of the Traffic Signs Manual is shown in Figure 2 above.

A number of areas are considered small in nature and in these locations the construction methodology anticipates the use of small plant (e.g. mini-rollers rather than, for example, a JCB) in accordance with the scale of the works. For the larger sections of work, the space has been made available for larger machinery and equipment. This takes in to account safety and of road workers and the general public.

The works in the public highway will be undertaken to ensure that any detritus from the works will not impact passing vehicles or non-motorised users.

During the public highway works a minimum road width of 3.0m will be provided with a 0.5m working width between plant and passing traffic. A method of construction, using banksmen, reduced size plant or manual labour will be chosen depending on the working area available.

The construction process for these works will include:

- Vegetation and Site Clearance, removal of topsoil to allow vehicles to work and stop within the verge.
- Construct works up to road edge with traffic management;
- Reinstate affected areas, e.g. fields, vegetation, coppicing, hedgerows, verges etc.

When the works are completed in this area, the temporary traffic management signage is removed.

6.3.5 Temporary Road Closures and Management

The highway improvements and traffic management measures have been designed to minimise the need to close the route for everyday traffic. It is proposed to incorporate early contractor involvement during the detailed design stage to ensure that closures are minimised both in number and duration.

It is anticipated that Gosen Bridge will require road closures. At this stage of the design process the following short term closures are provisionally anticipated. These are related to:

1. Construct new retaining wall to west of bridge;
2. In-fill between new retaining walls and existing road;
3. Erection of bridge beams ;
4. Completion including parapet facing and carriageway surfacing ;

The short term impact to nearby residents requires to be balanced with the long term community benefit of a widened Gosen Bridge.

Most other works along the route are anticipated to be able to be undertaken using local traffic management techniques and available land adjacent to the highway.

It is anticipated, however, that there may be an additional need for a small number of other closures depending on the development of detailed design. The contractor involvement during the detailed design process will assist in minimising the number. A temporary road closure will be applied for in each case to allow these works to be undertaken so that through everyday traffic can be diverted using the alternative routes available below.

Temporary closures will only significantly impact on everyday traffic requiring access to properties or facilities along the 'other' section of the county road.

For many of the trips undertaken during a closure period, which are associated with longer distance trips such as shopping, it is anticipated that the impact of a closure would not be significant.

The construction programme for the works will allow advanced notice, including alternative routing, to be communicated to local residents so that they will be aware of what route to take.

The temporary closures for highway works will consist of a short day inter-peak closure between 09:30 and 15:30 or of an over-night closure between 20:00 and 06:00 if the works can be undertaken at night time hours. A closure would not necessarily be for the full time period indicated as this relates to the time period available for the works.

These hours are the times of the day with the lowest traffic flows, as demonstrated by the traffic counts in Appendix C and summated below:

- Daytime inter peak shift (09:30 – 15:30) Average Traffic Count - 10 Vehicles / Hour
- Overnight shift (20:00 – 06:00) Average Traffic Count – 1 Vehicles / Hour

The potential for daytime or night time closure is retained at present for flexibility in terms of consideration of the local residents.

6.3.6 Alternative Routes for of Through Traffic

Automated variable message signage will be temporarily installed to inform drivers on the Llanerfyl to Talerddig route of both the presence of AIL deliveries and temporary road closures and inform drivers of alternative routes.

Alternative routes are available and run parallel using valleys to the north and south of the Nant Menial valley to connect between the A458 and A470...

As a benchmark, the current Llanerfyl to Talerddig road is 17.5km or 10.6 miles in length, with a journey time of approximately 25 minutes.

- Southern Route via Carno and Llanfair Caereinon
    - Continue south on the A470 until Carno at 2.5 miles, Turn left on minor road heading towards Llanfair Caereinon for 11.5 miles,
    - Turn left onto the B4389 in Llanfair Caereinon for 0.6 miles,
    - Turn left onto the A458 westbound for 5 miles.
    - Total Distance = 19.5 miles,
    - Total Journey Time = 34 minutes.
- Northern Route via Llanbrynmair:
    - Continue north on the A470 until Llanbrynmair for 2.8 miles,
    - Turn right (north) onto the Pandy Road for 6.8 miles,
    - Turn right (east) onto the A458 towards Llanerfyl for 10.4 miles.
    - Total Distance = 20 miles.
    - Total Journey time = 30 minutes.

Any signage will be in accordance with the Traffic Signs Manual, Chapter 8 and an example of this signage is detailed in Figure 4 below.

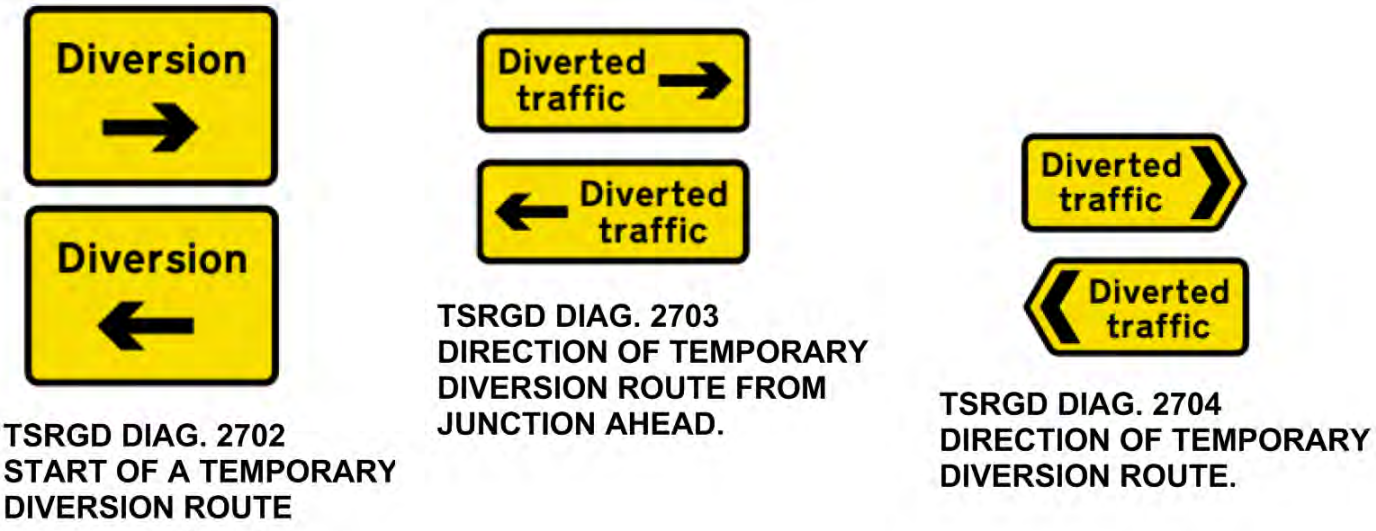


Figure 4 – Alternative Route Signage

Capabilities on project:
Transportation

6.3.7 Management of Impacts on Public Rights of Way and Maintaining Access

Following discussion with PCC Countryside Services, specific mitigation measures with respect to Public Rights of Way would include the following:

- There are some locations where public rights of way terminate adjacent to the Llanerfyl to Talerddig road. At these locations (and all locations throughout the development area) it would be a requirement that no operations impact upon the rights of way and at no time would any materials be placed or stored on the rights of way. Any damage caused to the surface condition is proposed to be made good to its prior condition or better. Should any operations look to impact upon a right of way to the extent where a temporary closure is required prior to works taking place, Countryside Services at PCC would be contacted directly as soon as possible.
- At other locations where the public rights of way pass directly across the Talerddig to Llanerfyl road, without a break in the line, the public rights would continue right across the road and would be considered in design proposals for operations at these points. It is proposed to utilise a person on-site to ensure path users could cross the line of the road on the public right of way safely, without being impeded by any ongoing operations. Any temporary closures would be discussed with Countryside Services as soon as possible in advance.
- In terms of management of rights of way it is recognised that any users of the rights of way network have a right to access the paths unhindered and as such the management of the scheme is proposed to include the consideration of path users.
- Should any of the proposed mitigation works on the Llanerfyl to Talerddig road look to impact directly upon a public right of way, Countryside Services would be contacted to discuss and agree the best solution, prior to any ground works taking place.
- The Glyndwr's Way (GDW) is a national trail along the Llanerfyl to Talerddig road from Dolwen to Dolau-ceimion. Traffic management for any road improvement works along GDW would consider public access for the duration of the works and, as a result, accessibility for non-motorised users along this route is proposed to be maintained at all times during the enabling works programme.
- A specific management plan for that section of the GDW which runs along the Talerddig to Llanerfyl road is proposed to be produced to cover the operation period, so that all users would be able to access the route at all times un-impeded.

6.4 Specific Mitigation Measures

6.4.1 Llanerfyl A458 Junction – Section 1 – Chainage 0 – Drawing 60283248-D-041

This scheme has two designs. The first, which is the construction period arrangement, allows for the free movement of AIL vehicles from the A458 to the C2031. Post construction and AIL delivery, the junction will be modified again to install a fence line across the access track to prevent use by members of the public.

At Llanerfyl, all of the works will be constructed from an existing field located to the south east of the existing road junction. The new off-road track will be wholly constructed with minimal traffic management installed onto the C2031 or the A458 except for warning signs.

At this location, materials for the construction of the works will be brought in from the A458 east in order to remove traffic from the C2031.

6.4.2 Glen Menial Bridge – Section 1 – Chainage 450 – Drawing 60283248-D-002

The proposal for the Glen Menial Bridge includes the removal and replacement of the existing parapets with a removable system or for a bridge widening proposal.

It is envisaged that these works would be undertaken via a series of short possessions or closures when the existing bridge is accessible for works these works would be undertaken from both the road, the river banks and from the neighbouring footbridge. For residents crossing the bridge overnight, an alternative route would be available via Llangadfan and the A458 to the north.

A report detailing the works undertaken at this bridge has been included in Appendix I of this LTMP. At this location, materials for the construction of the works will likely be brought in from the A458 as the works on the bridge are only minor and the numbers of trips to deliver this work low.

Capabilities on project:
Transportation

6.4.3 Diosg Bridge – Section 1 – Chainage 950 – Drawing 60283248-D-002

The proposals for Diosg Bridge include for a widened bridge which will be built offline and is for the use of the AILs accessing the site. Existing plant crossing the existing bridge will be diverted, with plant and lifting equipment required to install the new bridge located in the field to the north east.

6.4.4 Gosen Bridge – Section 1 – Chainage 4450 - Drawing 60283248-D-008-001

The Gosen Bridge work, including the widening of the bridge, construction of the new retaining structures and the widening of the road are a multi phase series of construction works spanning a number of months. The works at Gosen Bridge will be supported by the construction of the enabling works in Section 1A from Site Access 1 east. The works at Gosen Bridge will take place as a part of the works ongoing to Section 1B to the east towards Diosg.

The construction of Gosen Bridge will require the establishment of three working areas as shown on drawing 60283248-D-008. These three areas will allow materials to be brought to site, works to be undertaken within the existing river valley and for the installation of plant and new retaining infrastructure along the banks of the Afon Gam. The aim of these compounds will be to allow traffic to use the public highway through the works. The road through Gosen Bridge will be managed within a controlled site boundary. The road will be used as a haul route for materials as well as to transfer personnel and plant.

During the construction of the new bridge and the retaining walls the road will require closures to allow cranage to be setup and pre-fabricated bridge sections to be lifted into place.

Further closures of the road will be required to install parapets and to surface the road, but these will be reduced as much as possible with works occurring in parallel. The majority of the works on the bridge will be undertaken off-line and accessed via the river bank through the use of temporary access solutions.

Post construction, the area will be replanted and restored as detailed on drawing 60283248-D-008-003 A detailed report demonstrating the engineering processes at the Gosen Bridge is included in the LTMP.

To the south of Gosen Bridge is a new off-road access track which bypasses existing topographical constraints and acts as a passing place for construction traffic. This infrastructure will be in place prior to the works at Gosen Bridge and will service as a haul road for the Gosen Bridge works. This access track will be constructed from third party land without requirement for closure or encroachment on the public highway, except for drainage and tie in works.

6.4.5 Dolwen Isaf – Section 1 – Chainage 7350 - Drawing 60283248-D-012

The Dolwen Isaf Bridge is a structure which requires remedial work to its parapets to accommodate AIL traffic as well as large areas of over-run to the south of the bridge. The delivery of these works requires construction traffic to occupy the road space during the excavation of an existing slope to the south of the bridge. The road will not be closed during these works with traffic managed to use the new over-run areas constructed during the excavation of the southern slope. During the works on the bridge itself, these will be delivered via a closure of the footways on the bridge which will occur independently, in order to keep the right of way across the bridge open.

The off-road access track works to the north of the bridge will be constructed from outside of the highway boundary.

6.4.6 Site Accesses and Neinthirion Bypass

Five access junctions are required for the Site Accesses and the Neinthirion Bypass. For the bypass a further 1km of off-road access track with structures is required.

These works will be constructed from outside the highway boundary and tied into the public highway.

These works will impact existing public rights of way. Site Access 1 will be constructed along the route of Glyndwr's Way which follows the Llanerfyl to Talerddig road at that point. The construction works will be undertaken so as not to close this public right of way and to manage the flow of construction traffic when pedestrians and walkers are present. This will be done so using banksmen controlling construction traffic, giving right of way to pedestrians and other non-motorised users.

For the accesses to the Neinthirion Bypass, a similar process will be used, but in addition to the public right of way impact at the access junctions, the bypass crosses an existing right of way. At this location a new crossing has been proposed with gates provided on either side of the proposed bypass, tying into the existing wall and fence lines. These gates will inform walkers of the construction route and to be aware of crossing traffic. These gates will only be in place during the construction programme.

During the construction of the bypass, at no point will this public right of way is closed, instead, short term diversions will be employed to ensure safe passage during the construction of the bypass.

At Site Access 2, where Glyndwr's Way leaves the public highway and follows the site access road, a widened verge/footway will be constructed, with a managed crossing point at the proposed gate across the access junction used to ensure that non-motorised users are safe during the operation of this access. A possible temporary footpath diversion, routing the public right of way via a new footpath behind the proposed construction compound, may be proposed. The purpose of this will be to segregate construction traffic and non-motorised users to ensure that enjoyment of Glyndwr's Way is not compromised during the construction period.

6.5 Mitigating the Impact of Construction Traffic for the Internal Site Works

The construction of the Wind Farm will take place after the enabling works on Section 3 and 2 are completed and operational. The phased development of the internal site works are detailed in Section 4, with the proposed average daily HGV and Non-HGV Trips detailed on the trip scenarios in Section 5.5 and in Appendix F.

6.5.1 Management of Construction Traffic using Section 3 of the Highway Network

The proposals along the 5.2km Section 3 part of the Llanerfyl to Talerddig Road include for the provision of 21 existing, upgraded or new passing bays where HGVs or non-site traffic can pass construction traffic delivering material to site from the A470 using grass reinforcement.

These passing bays are provided at intervisible locations so that oncoming vehicles will have time to pull over into a passing bay to give way to construction vehicles delivering material to site.

6.5.2 Management of Construction Traffic using Section 2 of the Highway Network

The proposals along the 4.1km Section 2 part of the Llanerfyl to Talerddig Road include for widening the existing road using grass reinforcement up to a minimum of 4.5m, with many sections and new passing bays proposed already being wider than this, for its entire length. Six new passing bays will be provided for permanent use on this section of road. The purposes of this widening are firstly to meet the requirement of the turbine manufacturer's working widths and to ensure that the available road width is wide enough to give opportunity for construction traffic to pass.

The widened sections of Section 2 are all intervisible and are detailed on the drawings in Appendix A. Due to the widening required for the AIL movements, there is plenty of opportunities available for construction traffic to safely pass on this section of the road.

7 Abnormal Indivisible Loads Operational Strategy

Capabilities on project:
Transportation

7 Abnormal Indivisible Loads Operational Strategy

7.1 Abnormal Indivisible Loads (AIL)

The Llanbrynmair Wind Farm has been designed on the basis of equipping the site with horizontal axis wind turbines that are between 2 and 3 MW at a hub height of 80m. These wind turbines are constructed from a series of components which are pre-fabricated off-site and assembled on site. The standard components of a wind turbine include:

- Towers – Steel towers are pre-fabricated into three or four tapering sections. The total length of all three or four sections equalling the hub height of the turbine. The number of and size of sections vary between turbine manufacturers.
- Nacelle – The nacelle is the shell which contains the electromechanical apparatus for the wind turbine and encloses the gearbox, clutches, braking, power generation and control mechanisms for the wind turbine.
- Blades – The turbines proposed all have three blades. These blades are pre-fabricated off-site and arrive as a single component up to a maximum of 45.2m in length.
- Foundation, Hub and other miscellaneous components – Depending on the turbine manufacturer, other components are sometimes required to be installed separately to those above. These may include external or base mounted transformer units, foundation caps, hub mounts and nacelle mountings. Normally all of these components are brought in on standard HGVs and are not considered to be abnormal loads.

For each turbine, there are between seven and eight abnormal loads, with additional standard HGV loads required to transport the other miscellaneous components to site. For a site of 30 turbines, based on between seven and eight AILs per turbine, there will be between 210 and 240 AILs taken to site. The eventual number will depend on the preferred supplier for the wind turbines for the site.

7.2 Routing of AILs

The sTMP identifies the preferred route to potential wind farms in the northern part of SSA B is M53 – A55 – A483 – A5 – A483 to Welshpool, through Welshpool town centre on the B4381 then west on the A458 past Llanerfyl. Turbine components associated with the Llanbrynmair Wind Farm will leave the trunk road network at Llanerfyl and turn south along the C2031 and then the U2319 towards the site access points.

There are three separate site entrances proposed to access the Llanbrynmair Wind Farm from land on the northern side of the Llanerfyl to Talerddig road. These points of access are required as the topography of the site does not permit a connecting track between the various sections of the wind farm. Each site entrance is based around an existing access track and junction which will be upgraded to accept AILs and HGVs. The locations of the site entrances are shown on Drawing 60283248-D-000 and drawings 60283248-D-042, 043 and 044 in Appendix A.

7.3 Strategic Traffic Management Plan

The sTMP Chapters 1 to 3 governs the movement of AILs on the highway network between Ellesmere Port and the North West England strategic road network and the Welsh strategic road network to the A458 at Llanerfyl. Chapters 1 to 3 of this document has been approved by the Welsh Government in full as detailed in the letter in Appendix B-5. On this basis, the sTMP will be adhered to during the delivery of AILs to the Llanbrynmair Wind Farm.

The sTMP has been adopted for the Llanbrynmair Wind Farm

7.4 Candidate Turbines and Size of Vehicles

A range of vehicles has been reviewed for assessment of the enabling works required on the local road for access by the AILs. This assessment provides a robust analysis for the alignment of the local road (when compared with the strategic road network) and the subsequent knowledge that enabling works proposed on the local road will be suitable for a range of turbines.

The enabling works for the site have been designed to allow the movement of the candidate turbines below in Table 10. There are a wide range of turbine manufacturers that manufacture turbines between 2MW and 3MW, hub heights up to 80m and blade lengths up to 45.2m. Although not an exhaustive list, the following is a list of turbines which have been used to design the enabling works for AILs on the C2031 towards the Llanbrynmair Wind Farm.

Capabilities on project:
Transportation

Table 10 - Llanbrynmair Wind Farm Candidate Turbine Component and Transport Size

TURBINE / COMPONENT	COMPONENT DIMENSIONS (m)					TRAILER DESCRIPTION
	LENGTH	TOP DIMENSION		BOTTOM DIMENSION		
		WIDTH	HEIGHT	WIDTH	HEIGHT	
SIEMENS S93 - 80m H/H						
45m BLADE	45	3.5	2.3			Extensible low loader
80m IEC2 TOP TOWER	36	4.2	4.2	2.392	2.392	Single clamp with dolly
80m IEC2 MIDDLE TOWER	26.88	4.2	4.2			Double clamp
80m IEC2 BOTTOM TOWER	15.66	4.2	4.2	4.5	4.5	Double clamp
VESTAS V90						
45m BLADE	45.16	3.3	2.39			Extensible low loader
80m IEC2 TOP TOWER 4	23.285	2.316	2.319	2.773	2.773	Double clamp / low loader
80m IEC2 TOP TOWER 3	20.5	2.773	2.773	3.284	3.284	Double clamp
80m IEC2 TOP TOWER 2	20.355	3.284	3.284	3.807	3.807	Double clamp
80m IEC2 BASE SECTION	13.35	38.07	38.07	4.19	4.19	Double clamp
NORDEX N90 - IEC2						
44m BLADE	44	3.2	2.9			Extensible low loader
80m IEC2 TOP TOWER 4	21.66	4.02	4.02	2.96	2.96	Double clamp
80m IEC2 TOP TOWER 3	17.88	4.02	4.02	4.02	4.02	Double clamp
80m IEC2 TOP TOWER 2	20.86	4.02	4.02	4.03	4.03	Double clamp
80m IEC2 BASE SECTION	16.51	4.03	4.03	4.3	4.3	Double clamp
REPOWER MM92						
45.2m BLADE	4	3	3			Extensible low loader
MM92 - TOP TOWER	27.76	3.45	3.45	2.96	2.96	Double clamp
MM92 - MIDDLE TOWER	26.62	3.92	3.92	3.45	3.45	Double clamp
MM92 - BOTTOM TOWER	21.77	4.3	4.3	3.92	3.92	Double clamp
MM92 - FOUNDATION SECTION	4.3	4.3	3.5			Low loader

These turbines were chosen as they all share common features:

- Blade lengths are all similar (Between 44m and 45.2m).
- Hub heights of all of the turbines are circa 80m.
- Maximum width up to 4.5m.
- Maximum dimensions of the components are within those assessed by the sTMP.
- All turbines share a common transport methodology, using extensible low loaders for the blades and double clamp trailers for the towers.

The vehicles modelled along the route from Llanerfyl to Access 4 and into each of the three site accesses are:

- 45.2m Blade Transport – This vehicle and associated blade is the longest out of those listed above.
- REPower MM92 Top Tower – This tower component has the longest rigid length out of those listed above using the normal means of transport using a double clamp trailer.

Swept path analysis, using the Savoy Autotrack 10 software has been undertaken along the route from Llanerfyl to Access 4 using the vehicles above. The analysis was based on topographical survey data of the existing highway corridor between Llanerfyl and the site entrances. The analysis considered AILs travelling towards the site, as the trailers of the transporter vehicles would be reduced to the same length as a normal articulated HGV for the return trip, exiting via Talerddig and the A470 once the loads have been delivered. The enabling works along the route between Llanerfyl and Access 4 have been designed based on these swept path analyses.

7.4.1 Validation of the Swept Path Analysis and the AIL Design

Validation of the LTMP and the design proposals by Collett and Sons Ltd was undertaken in June 2013. During this process, Collett and Sons Ltd independently ran swept path analyses using towers and blades for the candidate turbines above using automatic steering to validate the extents of the works designed by AECOM. Their findings and identification of key risks and issues are presented in a Review Report which is included in Appendix L.

This report by Collett and Sons Ltd concluded that the route was generally acceptable with regard to the candidate turbines and the current turbine manufacturer guidelines. It highlighted locations where further investigation was required and highlighted possible risks to transport including cross fall and alignment elements along the route. These elements were incorporated and the design included these comments within the LTMP drawings in Appendix A.

7.5 Programming of AIL Deliveries

The programming of deliveries will be co-ordinated with the sTMP and will be governed by the restrictions imposed by the sTMP. These are detailed in Volume 1, Sub-chapter 7 of the sTMP in Appendix D.

- Day 1 – Depart from port and arrive at the Mile End or Pool Quay layover before lunchtime.
- Day 2 – Depart from mile end to pass through Welshpool before lunchtime and the afternoon peak. Continue along the A458 to Llanerfyl to arrive at the A458/C2031 junction before 2pm.

These timeframes are based upon the restrictions on Severn Road in the centre of Welshpool and the restrictions on movement of vehicles. Movement at night will not be possible due to restrictions imposed by the Police. However movements may be possible either during weekdays or weekends, to suit the Llanbrynmair site operating hours.

The delivery of convoys will be co-ordinated through the sTMP Transport Tool which will dictate the programming of the deliveries for the SSA B and C schemes. This transport tool allows for 40 minutes from the A483 at Welshpool to the A458 at Llanerfyl and the C2031.

The Llanerfyl Church in Wales Primary School is located 500m from the A458 and is on the AIL route. School is normally in session 190 days of the year, with term timed detailed on the Powys County Council website. The school is in session between 8:30 and 3pm. In order to ensure that the road is clear of waiting parents, it is envisaged that the latest a convoy could pass the school would be 2:30pm.

Other than those detailed above, there are no other time constraints on the programming of AIL deliveries on the route.

Therefore, the AIL deliveries can be expected on the Llanerfyl to Talerddig road between the hours of 12:00pm and 2:30pm on weekdays and weekends.

7.6 Traffic Management of AILs

7.6.1 Speed of AIL Convoys

The sTMP assumes an average speed of 20mph along the trunk road network for the AIL deliveries.

It has been assumed that an average speed of 10mph (16.1kph) along the C2031 would be more suitable. This assumption is also based on feedback from Collett and Sons Ltd who have undertaken independent validation of the LTMP proposals.

The speed of the convoys is used to calculate the journey times and, consequently, the location and provision of passing places for oncoming traffic. The speed of 10mph is a conservative estimate and the April 2008 dry run concluded that speeds greater than 10mph were observed. Therefore, on this basis, the journey times presented are robust.

7.6.2 AIL Journey Time

The STMP uses a philosophy referred to as the '10 minute rule' which states that traffic held by escorts will be delayed by a maximum of 10 minutes along the entire leg of a journey. However, this is a rule associated with the higher traffic levels associated with the strategic road network.

The county road carries much less traffic the strategic road network to seek to minimise disruption to local road traffic regardless of the low traffic levels. For example the A458 at Llanerfyl has a daily two way flow of 4495 whilst the minor road at Llanerfyl has a daily two way flow of 661.

The total distance from the A458 Llanerfyl to the furthest Site Access 4 is 12.9km.

A calculation of the travel times has been calculated in Table 11 below:

Table 11 - Calculation of AIL Journey Times along Sections 1 and 2 to the Site Accesses

Location	Start Ch (m)	End Ch (m)	Spd (mph)	Time (mm:ss)	Addn Time (mins)	Leg Time (hh:mm:ss)	CumTotal (hh:mm:ss)	Comments
Llanerfyl to Diosg	0	950	10	00:03:33	0	00:03:33	00:03:33	
Diosg to Gosen	950	4450	10	00:13:03	0	00:13:03	00:16:35	
Gosen Bridge	4450	4600	3	00:01:52	0	00:01:52	00:18:27	Assume max speed of 3mph through Gosen Bridge.
Passing Place 1 – Gosen to Sychtyn Access Track – Chainage 4750 – 20 minutes into journey								
Gosen Bridge to Dolwen Isaf	4600	7200	10	00:09:42	0	00:09:42	00:28:09	
Dolwen Isaf	7200	7450	3	00:03:06	0	00:03:06	00:31:15	Assume speed of 3mph through Dolwen Isaf Bridge.
Passing Place 2 – Dolwen Isaf to Dolwen Uchaf Access Track – Chainage 7500 – 33 minutes into journey								
Dolwen Isaf to Site Access 1	7450	8250	10	00:02:59	0	00:02:59	00:34:14	**Total time to Site Access 1 – 35 Minutes 45 Seconds**
Site Access 1 to Neinthirion Bypass	8250	8950	10	00:02:37	0	00:02:37	00:36:51	
Neinthirion Bypass	0	1000	10	00:03:44	0	00:03:44	00:40:35	
Passing Place 3 – Neinthirion Bypass – Chainage 8950 – 9550, 40 minutes into journey.								
***Neinthirion Bypass to Site Access 2**	9550	10150	10	00:02:14	0	00:02:14	00:42:49	**Total time to Site Access 2 – 44 Minutes 20 Seconds**
Site Access 2 to Site Access 4	10150	12350	10	00:08:12	0	00:08:12	00:51:01	**Total time to Site Access 3 – 52 Minutes 30 Seconds**

*Note: Two small passing places are located between Neinthirion and Site Access 2 at Chainage 9,900 and 10,000. Due to their proximity to the access and the Neinthirion bypass, they have not been listed above.

To summarise:

- Between the Llanerfyl and Gosen Bridge passing places the journey time is approximately 18.5 minutes.
- Between the Gosen and Dolwen passing places the travel time is approximately 13 minutes
- Between the Dolwen and Neinthirion passing places the travel time is approximately 10 minutes.
- From Neinthirion passing place to Site Access 4 the travel time is approximately 10.5 minutes
- The total distance from the A458 Llanerfyl to the furthest Site Access 4 is 12.9km, including off-road tracks. It would take up to 51 minutes for the AIL convoys to arrive at Site Access 4

7.6.3 Use of the Full Width of the Road and Provision of Passing Places

The AILs will require the full width of the available carriageway along most of the length of the road between Llanerfyl and Site Access 4. Oncoming traffic will therefore need to be managed at specific locations along the route to allow them to pass the AILs safely. These locations are referred to as “Passing Places” in which the AILs can be temporarily held to allow traffic to pass. The locations of the main Passing Places are detailed in Table 12 above.

There are locations between Llanerfyl and Site Access 4 where the AIL convoy is taken off the C2031 to allow this passing to occur. These are located at:

- Llanerfyl Off-Road track – Chainage 0
- Gosen Bridge to Sychtyn Off-Road Access Track – Chainage 4650.
- Between Dolwen Isaf and Uchaf Bridges – Chainage 7450.
- Neinthirion Bypass – Chainage 8950.
- A further two small areas at Chainage 9900 and 10000.

Based on the available traffic data it is calculated that at most there will be a maximum of between 2 and 3 vehicles waiting at any of these passing places throughout the delivery period, with up to 3 to 5 vehicles following the convoy.

7.7 Communication and Signage for Abnormal Indivisible Loads

7.7.1 Communication with Road Users and Residents

RES is committed to ensuring that all local residents, businesses and landowners are fully aware of the movements of construction traffic at the Llanbrynmair Wind Farm. The purpose of this communication will be to reduce inconvenience on residents and businesses, but also to reduce the quantity of traffic using the road during the delivery window detailed above. Each convoy will be centrally co-ordinated, scheduled and booked through the Transport Tool process within the sTMP and co-ordinated with the other wind farm developments.

RES, through its public relations and site team, will inform local communities of the movements of all AILs to the site via multiple communication mediums.

Communication methods will likely involve the use of social networking, dialogue and publications within the community and parish council, liaison with the Llanerfyl Church in Wales school board, email and SMS text messaging and through publication via the internet and other social media services.

7.7.2 Communication to Public Rights of Way Users

During the transportation of the turbine components, public rights of way (PROW) along the route will be managed. Where these PROW meet the road, access will be temporarily suspended through the use of banksmen at the entrances and if required, users will be asked to wait a short while the AILs pass along the road. After the road is cleared of traffic and it is safe for crossing to recommence, the PROW will be fully reopened.

8 Abnormal Indivisible Loads – Mitigation Proposals

8 Abnormal Indivisible Loads – Mitigation Proposals

8.1 Philosophy and Phasing of AIL Mitigation

8.1.1 Overview

The proposed mitigation for the AIL deliveries is along Sections 1 and 2 of the public highway as these sections are those which are used for the delivery of the turbine components. The delivery of these turbine components is a temporary occurrence, monitored and managed on a strategic level by the sTMP and it's Transport Tool.

The mitigation proposed for the AIL deliveries includes:

- Llanerfyl A458 Junction – A new off-road track will be constructed to the east of the existing junction, avoiding impact on the existing trees and the existing junction and providing a means for AILs to leave the trunk road network prior to embarking on the C2031 towards the Llanbrynmair Wind Farm. This junction is detailed on drawing 60283248-D-041 in Appendix A. The delivery of the construction works at this location has been covered in Section 6.1 of this LTMP.
- Section 1 – The proposed works are designed to allow for the AIL movements and to provide a minimum road width of 4.5m with the widening delivered using permeable grass reinforcement. At corners and constrained areas, over-run using grass reinforcement is provided for the AILs to manoeuvre. Passing places are provided as well as structural improvements at four locations. These works are detailed on drawings 60283248-D-001 to 014 in Appendix A. The delivery of the construction works at this location has been covered in Section 6.1 of this LTMP.
- Section 2 – The proposed works are designed to allow for the AIL movements and to provide a minimum road width of 4.5m with the widening delivered using permeable grass reinforcement. At corners and constrained areas, over-run using grass reinforcement is provided for the AILs to manoeuvre. These works are detailed on drawings 60283248-D-015 to 022 in Appendix A. The delivery of the construction works at this location has been covered in Section 6.1 of this LTMP.

8.1.2 Construction Programme, Phasing of Works and Extents of Impact

The construction of the works associated with the AIL mitigation will be undertaken during same time period as the construction traffic mitigation works described in Section 6.1 of this LTMP. These works will take place within the first 9 months of the construction programme and this will be phased to take place in series from Section 3, eastbound to Section 1, using the philosophy detailed in Section 6.1.2 of this LTMP.

The delivery of the turbine components is scheduled to occur over a 30 week (5 month) period between December 2017 and May 2018. This will be co-ordinated with the programming and timing of the sTMP works which need to have been fully implemented before this date. The deliveries of the turbines have been programmed to match up to the grid connection date in Q1 2018. There is, therefore, no conflict with construction traffic in Section 2, during the delivery of the turbine components.

8.2 Mitigating the impact of the AIL Deliveries

The general traffic management procedures and communications protocols will be employed as the AILs convoys are deployed along the sTMP and as they turn onto the C2031 at Llanerfyl. The communication strategy is detailed in Appendix M.

The AIL convoys will be escorted from the Port and the Layover on the sTMP with the assistance of a combination of Police and private escorts. The Police escorts will be used to stop, manage and direct traffic and manage the operation of the AIL delivery. The private escorts are used as pilots and as warning vehicles. The procedure for this escort process is detailed within the sTMP Volume 1, which is detailed in Appendix D of this LTMP.

The permanent mitigation works construction to enable access to the Llanbrynmair Wind Farm site for AILs will be a permanent road feature. After the deliveries of the turbines have been completed, these widened areas will be available for use by users of the road either as permanent passing features or car parking. However, in order to maintain future access, no permanent obstructions or features will be installed within the over-run areas and if required, any temporary features may be relocated at a later date as required for access by replacement turbine component delivery contractors.

Capabilities on project:
Transportation

The mitigation works have been designed in a way so that over a period of months after the completion of the works, the grass reinforcement will allow for the growth of vegetation and blend into the existing verge. An example of the grass reinforcement after a growing period of 12 to 18 months is shown below in Photographs 23 and 24.

Elsewhere, other mitigation such as the planting of new hedgerows and hedge banks, decorative retaining walls and new trees has been proposed to assist with softening the permanent impact of the works.

After the deliveries have been completed, the temporary signage used to communicate the works to residents, public right of way users and other users of the local road will be removed. Should further deliveries be required during the operation of the wind farm to replace damaged components, this signage may be temporarily reinstated.

Photograph 23 - Grass Reinforcement at the University of York, approximately 18 months old.

Photograph 24 - Grass Reinforcement at the University of York, approximately 18 months old

8.3 Long Term Community Benefits

There are locations where local community benefit is provided by the highway enabling works. These include:

- Entirety of the route – A number of the highway works may be adopted by PCC providing improved passing potential whilst retaining the character of the road.
- Glen Menial Bridge – The new parapets or the option for a widened bridge will offer an improved situation at this location.
- Diosg Bridge – The new over-run area and the widened bridge will provide an additional parking area and community space away from the road for local residents.
- Gosen Bridge – The widened bridge structure and retaining walls will:
    - Allow for two-way traffic movement where currently only one-way movement is possible;
    - Offer increased vegetation cover and stabilisation to existing slopes which are showing signs of localised slippage;
    - Improve gradients and visibilities at the existing road junction;
    - Providing improved safety features at the existing bridge and replacing the existing restraint systems with a more visually friendly solution;
- Dolwen Isaf Bridge – The widening and bridge works will:
    - provide a passing bay and improved visibility for passing vehicles at this location;
- Talerddig – An enhanced junction which provides two way HGV and passing facilities at a junction presently used by forestry and farm traffic.

9 Summary

Capabilities on project:
Transportation

9 Summary

9.1 Local Traffic Management Plan Summary

This Local Traffic Management Plan and its Appendices have detailed the works to be undertaken on the Llanerfyl to Talerddig Road in order to accommodate the transportation of turbine components and site infrastructure deliveries from the strategic road network at the A458 for the AILs and the A470 for the construction traffic.

These works have been designed in collaboration with the production of the ecology, landscape and visual and hydrology components of the Environmental Statement in order to ensure that the impacts are mitigated. Continuous consultation with statutory consultees at the Welsh Government, Powys County Council and Natural Resources Wales has been undertaken through the development of the LTMP and the highway proposals.

The proposals for the road have identified receptors to traffic impact and minimised the likelihood of traffic impact on these receptors. The LTMP has identified the public rights of way along the route and has established means of maintaining these public rights of way during the period of temporary construction traffic impact while minimising the impact on enjoyment of these routes.

For local residents this LTMP demonstrates that the disruption to traffic flow will be managed and minimised through the use of traffic management methods and off-line working. For areas where closures are required, they are minimised and restricted to off-peak times. Alternative routes have been identified and impact analysed.

This LTMP demonstrates that the impact from the construction of the Llanbrynmair wind Farm is temporary in nature. This temporary impact is mitigated through the provision of, principally, small scale improvement works along the road from Talerddig to enable passing of construction traffic and AIL traffic .

The aim of this LTMP was to deliver a scheme which would enable access to the Llanbrynmair for temporary construction traffic and enable permanent access for turbine components, while providing a solution which is sympathetic of the needs of local residents, road users, the environment and the landscape.

10 Appendices

10 Appendices

10.1 Appendix A – Proposed Highway Works

- Appendix A-0: Overall Layout
    - Drawing 60283248-D-000.
- Appendix A-1: Section 1
    - Drawing 60283248-D-001;
    - Drawing 60283248-D-002;
    - Drawing 60283248-D-003;
    - Drawing 60283248-D-004;
    - Drawing 60283248-D-005;
    - Drawing 60283248-D-006;
    - Drawing 60283248-D-007;
    - Drawing 60283248-D-008-001;
    - Drawing 60283248-D-008-002;
    - Drawing 60283248-D-008-003;
    - Drawing 60283248-D-009;
    - Drawing 60283248-D-010;
    - Drawing 60283248-D-011;
    - Drawing 60283248-D-012-002;
    - Drawing 60283248-D-013;
    - Drawing 60283248-D-014; and
    - Drawing 60283248-D-042.
- Appendix A-2: Section 2
    - Drawing 60283248-D-015;
    - Drawing 60283248-D-016;
    - Drawing 60283248-D-017;
    - Drawing 60283248-D-018;
    - Drawing 60283248-D-019;
    - Drawing 60283248-D-020;
    - Drawing 60283248-D-021;
    - Drawing 60283248-D-022;
    - Drawing 60283248-D-043;
    - Drawing 60283248-D-044; and
    - Drawing 60283248-D-045 – Neinthirion Bypass.
- Appendix A-3: Section 3
    - Drawing 60283248-D-023;
    - Drawing 60283248-D-024;
    - Drawing 60283248-D-025;
    - Drawing 60283248-D-026;
    - Drawing 60283248-D-027;
    - Drawing 60283248-D-028;
    - Drawing 60283248-D-029; and
    - Drawing 60283248-D-030.
- Appendix A-4: Junction Improvements and Gosen Bypass Option
    - Drawing 60283248-D-040, Talerddig Junction with A470;
    - Drawing 60283248-D-040-1, Talerddig Junction with A470 – Visibility Splays;
    - Drawing 60283248-D-041-1, A458 Access Junction – AIL Only Option;
    - Drawing 60283248-D-042, Site Access Junction 1;
    - Drawing 60283248-D-043, Site Access Junction 2; and
    - Drawing 60283248-D-044, Site Access Junction 4;
- Appendix A-5: Standard Details – SD 001 to 005.

10.2 Appendix B – Supporting Documentation - Consultation

- Appendix B-2: SEI6 – Welsh Government Letter Andrew Cochran, 15th March 2013, A470 and A458 Junction Arrangements
- Appendix B-3: RES, AECOM, PCC Site Visit and Workshop at Metropole Hotel, Llandrindod Wells – 17th and 18th April 2013
- Appendix B-4: RES, AECOM, NRW Site Visit and Workshop at Metropole Hotel, Llandrindod Wells – 2nd May 2013
- Appendix B-5, Welsh Government Letter Andrew Cochran, 22nd April 2013, Strategic Traffic Management Plan for Mid Wales Wind Farms – Approval of sTMP Chapters 1 to 6.
- Appendix B-6, Drainage Assessment of impacts of the scheme on Flooding and Drainage.
- Appendix B-7, PCC Public Rights of Way, comments on the scheme with respect to public rights of way.
- Appendix B-8, Ecology, comments on the proposals with respect to Ecology and the Environment
- Appendix B-9, NRW and Landscape and Visual, comments on the proposals with respect to landscape and visual impact of the scheme.
- Appendix B-10, PCC and RES, letter detailing Carnedd Wen access arrangements

10.3 Appendix C – Traffic Data

- Appendix C-1: Hafod Farm – November 2008 – Traffic Counts
- Appendix C-2: Llanerfyl Road (C2031) at A458 Give Way sign – 18th February to 3rd March 2013 – Traffic Counts
- Appendix C-3: U2319 at A470 Give Way sign – 18th February to 11th March 2013 – Traffic Counts

10.4 Appendix D – Strategic Traffic Management Plan, Volumes 1 to 3

10.5 Appendix E – Public Rights of Way Mapping

10.6 Appendix F – Trip Generation

- Appendix F-1: Proposed Best Case Scenario (94% Aggregate from On-site Borrow Pits)
- Appendix F-2: Proposed Central Case Scenario (60% Aggregate from On-site Borrow Pits)
- Appendix F-3: Proposed Worst Case Scenario (0% Aggregate from On-site Borrow Pits)

10.7 Appendix G – Road Safety Audits and Designers Responses

- Appendix G-1 – Stage 1 Road Safety Audits for the route and A458/A470 junctions – TMS Consultancy
- Appendix G-2 – LTMP Designers' Responses to the Stage 1 Road Safety Audits

10.8 Appendix I – Glen Menial Bridge Report

10.9 Appendix J – Gosen Bridge Report

10.10 Appendix K – Buildability Document

10.11 Appendix L – Collett and Sons Ltd – Route Review: A458 to Site Access 4

Capabilities on project:
Transportation

10.12 Appendix M - Technical Details for Permanent and Temporary Enabling Works

Enabling works are defined as those highway works external to the site which are required to provide access for construction vehicles.

10.12.1 Over-run Area Construction

There are several areas of road widening required to accommodate the construction vehicles. The design of those areas has been undertaken to be sympathetic to the existing landscape, the ecology and hydrology of the area.

The over-run areas specified within the verge are to be constructed from a 40mm grass reinforced geo-grid surface with topsoil and seed infill, capable of taking abnormal loads placed over a 500mm Type 1 sub-base. In areas where the underlying CBR is greater than 15 and the underlying verge is in good condition, it will be retained and the grass reinforcement will be rolled into the verge surface.

The grass reinforced geo-grid surface will need to have a minimum biaxial tensile strength of 12kN/m^2 in order to accommodate the abnormal vehicle axle loadings and the product detailed within the planning drawings is based on a polypropylene interlocking mesh distributed by Perfo UK Ltd. A similar product may be acceptable based on the above loading requirements. It is the responsibility of the enabling works contractor to design a suitable system based on these requirements.

The installation of the over-run area is completed in two stages. The first stage is to install the 500mm type 1 sub-base which will be used as the traction surface for the abnormal load deliveries. Following completion of the deliveries, the second stage involves installation of the 40mm grass reinforcement geogrid. The geogrids will be infilled with a mix of topsoil and grass seed in the voids which will create a more natural looking area still capable of permitting abnormal load vehicles in the case of component replacement during the life of the wind farm.

10.12.2 Passing Places

Existing passing places are maintained and widened, where required, by incorporating an overrun strip using extension of cross falls. New verges, where required, are proposed to be seeded with grass found in the local area, resulting in new construction in harmony with the existing landscape.

Widening for HGVs is generally proposed with grass reinforcement, where possible, to minimise new asphalt construction. The areas of asphalt construction which are proposed are planned to improve existing facilities for community benefit; these areas are sized for car movements.

10.12.3 Vegetation – Maintenance, Pruning, Removal and Relocation

Impediment on existing hedgerows is proposed to be avoided where possible. Some localised passing places and widening works would however inevitably touch on existing vegetation. It is proposed to relocate existing hedgerows or provide new hedgerows behind the new carriageway channel lines where proposed passing places and widening works are within areas of existing hedgerow. Any new hedgerows required are proposed to be of the same type as those currently abundant in the local area. In all cases it is considered that proposed works would maintain or enhance the existing vegetation within the local area. The maintenance of such vegetation would remain with those with the existing responsibility.

Pruning will be required along the route in order to provide a minimum clearance envelope of 5m height by 5m width along the delivery route. Trees should not be pruned outside of the adopted highway boundary and where a tree lies within private property, the property owner should be notified prior to works being implemented.

10.12.4 Drainage Provision

The existing drainage systems are proposed to be maintained and any carriageway widening which is required is proposed to be designed with extension of existing cross falls where possible to maintain the existing hydrological flow patterns in the local area. Sustainable drainage solutions are to be used, utilising methods such as attenuation and infiltration to reduce the quantity of infrastructure to be installed.

10.12.5 Road Markings

Road markings are proposed to be minimised to maintain the character of the road. Existing road markings, if damaged, will be replaced. .

10.12.6 Splitter Island, Footway and Verge Protection

Splitter islands, footways and verges affected by the over-run of the wheels from the AILs will require protection, which is to be undertaken as detailed below:

- Ramps will be installed along kerb lines to enable vehicles to mount the kerb and over-run the verge, footpath or island. Existing paving, manhole covers and duct boxes within traffic islands and the footways will be protected with steel plating to prevent damage to the underlying plant.
- Street furniture affected by the abnormal load delivery vehicle will be removed and set aside for the duration of the delivery. The street furniture will be reinstated following the delivery.
- Once the delivery has been completed, the splitter island, verge or footway will be reinstated after the ramps and plates have been removed and the area inspected for damage.
- If damage to the footway or the island has been identified, then the damage will be repaired. A Local Authority approved condition survey will be made available prior to any deliveries commencing as a record to be used as a review at a later date.

10.12.7 Ramps

In order for the wheels of the AILs to mount the kerbs, ramps will be required. There are several construction options and materials that are available to create ramps adjacent to the kerb line. Some examples of these are:

- Sand bags. Sand bags are to be filled and located adjacent to the kerb to allow the tyres to traverse the kerb check height. The bags are packed tightly enough to prevent slippage and movement of the bags when mounted by the tyres of the abnormal load vehicle.
- Asphalt. Temporary asphalt is laid adjacent to the kerb to allow a 1 in 3 ramp for the vehicle tracks to traverse the kerb height. The asphalt is to be removed and disposed of after the delivery has concluded.
- Steel plates. Short steel plates will be located so they will bridge between the top of kerb and the carriageway. These plates should be bedded using asphalt to prevent slippage.

10.12.8 Plating

Steel plates will be used to protect existing footway paving and surfacing from damage by the wheel loads of the abnormal load delivery vehicle. In locations where statutory undertakers plant is located within the area to be over-run, steel plates will be required to bridge over existing covers, ducts and duct boxes buried beneath footways and verges.

It is recommended that the plating works be undertaken prior to the delivery day to avoid disruption to traffic. Plating works for ramps should not be undertaken prior to delivery day for road safety reasons.

An assessment of the statutory undertakers' plant will be conducted by the enabling works contractor, prior to any abnormal load deliveries or enabling works in accordance with the New Roads and Street Works Act. The owning utility will be consulted prior to any enabling works or excavations undertaken in the vicinity of these manholes due to the unknown depths of ducts, pipes and cables.

Based on the outcome of this assessment weaker manholes and duct boxes will be given additional reinforcement and protection. This protection is best provided by utilising steel plates to spread the load, but will be subject to final approval of the contractors' proposals.

With regard to the loading capacity of this equipment, manhole covers located within the footway and verge are normally designed to take footway loading and light vehicular loading in accordance with BS EN 124 Class B125 and C250 and any ducts or chambers located within the footway and verge should state compliance with these standards as a bare minimum.

Carriageway covers are generally designed for higher loading capacities and any manholes within the carriageway should state compliance with BS EN 124 Class D400 or E600. Loading significantly greater than what is prescribed within these standards will cause damage to the chamber and frame of the manholes and duct boxes.

10.12.9 Street Lighting and Illuminated Signage

10.12.9.1 Temporary Street Lighting

Lighting will not be installed on a permanent basis, but it may be necessary, in order to reduce impact on traffic, to install some works within night-time hours. To allow works to continue into these hours, portable lighting and infrastructure will be provided to suit the contractors.

10.12.9.2 Illuminated Bollards

Illuminated bollards within traffic islands will need to have their plastic/fibreglass covers removed and then protected using a blanking plate which will tie into the steel plating used to protect the overall island.

10.12.9.3 Illuminated Signage

In order to accommodate the swept path of the abnormal load delivery vehicles the following works will need to be undertaken on the designated illuminated signs.

- Obtain approval from the local authority/statutory undertaker to secure permission to undertake works on the electrical system at the designated sign. Design is to include details of how the signs are to be isolated safely prior to relocation.
- Electrical connection will need to be fitted with external switches to allow safe disconnection of the sign from the electrical circuit.
- The sign will need to be fitted with a suitable square socketed post, which will allow the sign to be set aside or temporarily removed when required and then reinstalled.
- Prior to the movement of the abnormal load, the sign will need to be disconnected and stored safely for the duration of the delivery. A non-illuminated temporary sign will need to be located in the same position. This sign will then need to be moved aside during the delivery and relocated to its former position after each convoy has passed. Once all the deliveries have been completed, the original socketed sign will be reinstalled and re-illuminated.

10.12.9.4 Non-illuminated signage

In order to accommodate the swept path of the abnormal load delivery vehicles the following works will need to be undertaken on the designated non-illuminated signs.

- Obtain approval from the local authority/statutory undertaker to undertake works on the sign post.
- The sign will need to be fitted with a suitable socketed post, which will allow the sign to be set aside or temporarily removed when required and then reinstalled.
- Prior to the movement taking place, the sign will need to be stored for the duration of the delivery. A temporary sign will need to be located in the same position. This sign will then need to be moved aside during the delivery and relocated to its former position after each convoy has passed. Once all the deliveries have been completed, the original socketed sign can be reinstalled.

APPENDIX 10.1 - A: TRANSPORT DRAWINGS

DOLWEN FARM (CH 7660)

DOLWEN ISAF & UCHAF BRIDGES (CH 7250)

GOSEN BRIDGE (CH 4440)

LLANERFYL

DIOSG (CH 950)

SITE ACCESS 1 (CH 8250)

GOSEN ACCESS TRACK (CH 4620)

NEINTHIRION BYPASS START (CH 8900)

SYCHTYN FARM (CH 5050)

NEINTHIRION (CH 9250)

HAFOD FARM (CH 6200)

SITE ACCESS 2 (CH 10150)

NEINTHIRON BYPASS FINISH (CH 9650)

SITE ACCESS 4 (CH 12300)

NANT YR ESGAIR WEN FARM (CH 14200)

PANTGLAS FARM (CH 16480)

TALERDDIG (CH 17150)

P-001 P-002 P-003 P-004 P-005 P-006 P-007 P-008 P-009 P-010 P-011 P-012 P-013 P-014 P-015 P-016 P-017 P-018 P-019 P-020 P-022 P-023 P-024 P-025 P-026 P-027 P-028 P-029 P-030

A458 A470

NOTES

Rev	Date	Detail	Made	Chk'd	Appr'd
A	07/08/2013	REVISED WITH CORRECTED PLACE NAMES	SR	SR	SC
--	06/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBYRNMAIR WIND FARM POWYS

Title: OVERALL LAYOUT PLAN

Design: JC	CAD: JC
Chk'd: SR	Appr'd: SC
Date: 08/02/2013	Scale: 1:1500

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No. 60283248-D-000 Rev: A

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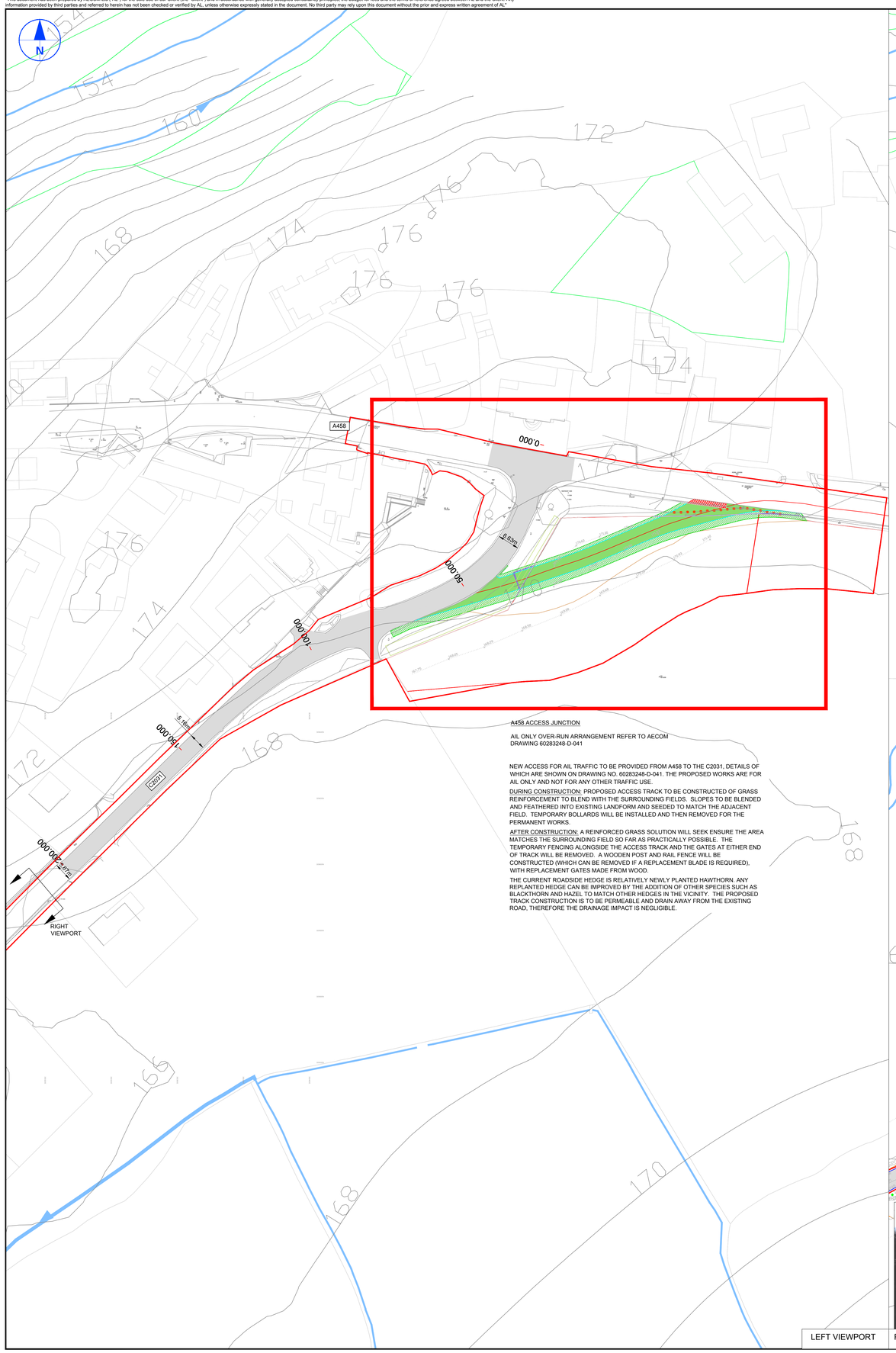

A458 ACCESS JUNCTION

AIL ONLY OVER-RUN ARRANGEMENT REFER TO AECOM DRAWING 60283248-D-041

NEW ACCESS FOR AIL TRAFFIC TO BE PROVIDED FROM A458 TO THE C2031, DETAILS OF WHICH ARE SHOWN ON DRAWING NO. 60283248-D-041. THE PROPOSED WORKS ARE FOR AIL ONLY AND NOT FOR ANY OTHER TRAFFIC USE.

DURING CONSTRUCTION: PROPOSED ACCESS TRACK TO BE CONSTRUCTED OF GRASS REINFORCEMENT TO BLEND WITH THE SURROUNDING FIELDS. SLOPES TO BE BLENDED AND FEATHERED INTO EXISTING LANDFORM AND SEEDED TO MATCH THE ADJACENT FIELD. TEMPORARY BOLLARDS WILL BE INSTALLED AND THEN REMOVED FOR THE PERMANENT WORKS.

AFTER CONSTRUCTION: A REINFORCED GRASS SOLUTION WILL SEEK ENSURE THE AREA MATCHES THE SURROUNDING FIELD SO FAR AS PRACTICALLY POSSIBLE. THE TEMPORARY FENCING ALONGSIDE THE ACCESS TRACK AND THE GATES AT EITHER END OF TRACK WILL BE REMOVED. A WOODEN POST AND RAIL FENCE WILL BE CONSTRUCTED (WHICH CAN BE REMOVED IF A REPLACEMENT BLADE IS REQUIRED), WITH REPLACEMENT GATES MADE FROM WOOD.

THE CURRENT ROADSIDE HEDGE IS RELATIVELY NEWLY PLANTED HAWTHORN. ANY REPLANTED HEDGE CAN BE IMPROVED BY THE ADDITION OF OTHER SPECIES SUCH AS BLACKTHORN AND HAZEL TO MATCH OTHER HEDGES IN THE VICINITY. THE PROPOSED TRACK CONSTRUCTION IS TO BE PERMEABLE AND DRAIN AWAY FROM THE EXISTING ROAD, THEREFORE THE DRAINAGE IMPACT IS NEGLIGIBLE.

EXISTING BRIDGE GLEN MENIAL BRIDGE IMPACTED

EXISTING HEDGEROW REMOVED AND NEW HEDGE AT BACK OF OVER-RUN AREA

EXISTING PEDESTRIAN FOOTBRIDGE

CONTINUES ON REDRAWN D-057

LEFT VIEWPORT | RIGHT VIEWPORT

1.1 - OVER-RUN AREA AND GLEN MENIAL BRIDGE PARAPET WORKS

CH 460 - 590

GLEN MENIAL BRIDGE

THE EXISTING STONE PARAPETS ON THE BRIDGE ARE TO BE REPLACED TO INCREASE THE ROAD TO MINIMUM WITH OF 4 METRE THROUGH THE BRIDGE FOR AILS. NEW PARAPETS ARE TO BE CONSTRUCTED AND INSTALLED ON THE BRIDGE FOR PERMANENT WORKS, WITH FACING STONE TO MATCH EXISTING. IT IS PROPOSED THAT THE PARAPETS BE PRE-FABRICATED OFF SITE TO MINIMISE TRAFFIC AND THE IMPACT OF THEIR INSTALLATION ON LLANERFYL VILLAGE.

OVER-RUN

THE OVER-RUN AREA REQUIRED IN THE NORTHERN VERGE AFTER THE GLEN MENIAL BRIDGE IS TO BE OF GRASS REINFORCEMENT CONSTRUCTION. THIS WILL MINIMISE THE VISUAL IMPACT. MINIMAL EARTHWORKS WILL BE REQUIRED DUE TO THE LEVELS BEING SIMILAR TO THOSE IN THE VERGE. THERE WILL BE MINIMAL IMPACT ON DRAINAGE AS THE PROPOSED OVER-RUN AREA IS OF POROUS GRASS REINFORCEMENT AND DRAINS AWAY FROM THE CARRIAGEWAY BACK INTO THE FIELD. THE EXISTING HEDGE WILL BE REPLANTED AT THE REAR OF THE PROPOSED OVER-RUN AREA WITH A MIX OF HAWTHORN, BLACKTHORN, HAZEL AND CHERRY TO MATCH THE EXISTING MIX OF SPECIES. IN ADDITION, THE SOIL FROM THE EXISTING HEDGE BASE WILL BE USED TO FORM A SMALL MOUND INTO WHICH THE NEW HEDGE IS PLANTED TO MAINTAIN EXISTING GROUND FLORA.

HEDGEROW REMOVED = 70M

HEDGEROW REPLANTED = 73M

THERE WILL BE AN IMPACT ON THE OVERHEAD BT LINE WHICH WILL NEED TO BE RELOCATED TO BEHIND THE PROPOSED HEDGE LINE - TWO POLES IMPACTED.

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS.
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	10/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

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Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 1 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 0 TO 590

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@ A0 - NTS@ A3

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No. 60283248-D-001 Rev: G

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1.2 - OVER-RUN AREA-
CH 720 - 740

AN OVER-RUN AREA IS REQUIRED IN THE SOUTHERN VERGE OPPOSITE THE EXISTING JUNCTION. THE AREA OF PROPOSED OVER-RUN IS TO BE CONSTRUCTED USING ASPHALT CONSTRUCTION FOR AN AREA OF LESS THAN 0.5 METRES.

THE EXISTING HEDGE BANK IS IMPACTED BY THE WIDENING AND THE EXISTING HEDGEROW WILL BE REMOVED AND A NEW MIXED HEDGE REPLANTED APPROXIMATELY 1.5 METRES TO THE SOUTH USING A MIX OF SPECIES WHICH REFLECT THE EXISTING MIX OF SYCAMORE, HAWTHORN AND BLACKTHORN.

HEDGEROW REMOVED = 35M
HEDGEROW REPLANTED = 32M

THERE WILL BE A MINIMAL EARTHWORKS IMPACT DUE TO THE LEVELS IN THE FIELD TO THE SOUTH BEING SIMILAR TO THOSE ALONG THE ROAD CHANNEL LINE. THE PROPOSED ASPHALT OVER-RUN AREA WILL NOT INCREASE THE IMPERMEABLE ROAD AREA SIGNIFICANTLY AND WILL NOT IMPACT THE EXISTING DRAINAGE. ACCESS FOR THE CONSTRUCTION WORKS IS AVAILABLE VIA FIELD ACCESS TO THE NORTH.

1.3 - OVER-RUN AREA AND BRIDGE STRUCTURE
CH 875 - 950

AN OVER-RUN AREA IS REQUIRED IN THE NORTHERN VERGE ALONG THE BEND TO ALLOW AILS TO ALIGN PRIOR TO THE WIDENED DIOSG BRIDGE. AN ADDITIONAL TEMPORARY COMPOUND AREA IS TO BE PROVIDED FOR CONSTRUCTION TRAFFIC AND FOR THE CONSTRUCTION OF THE NEW BRIDGE ADJACENT TO THE EXISTING STRUCTURE. THE PROPOSED OVERRUN AREA IS TO BE CONSTRUCTED USING GRASS REINFORCEMENT TO MINIMISE THE LANDSCAPE AND VISUAL IMPACT.

ROAD WIDENING WILL BE REQUIRED ON THE APPROACH TO THE DIOSG BRIDGE AND IT WILL BE NECESSARY FOR THE NORTHERN BRIDGE PARAPET AND SERVICES DUCTS CROSSING THE WATERCOURSE TO BE REMOVED AND RELOCATED.

THE EXISTING HEDGE IS IMPACTED BY THE WIDENING AND A NEW MIXED HEDGE WILL BE PLANTED. THE EXISTING FIELD ACCESS ADJACENT TO THE DIOSG BRIDGE IS TO BE RELOCATED INTO THE NEW HEDGE LINE WHICH WILL COMPRISE A MIX OF SPECIES REFLECTING THE EXISTING HEDGE OF SYCAMORE, BLACKTHORN, HAWTHORN, HOLLY ASH AND HAZEL.
HEDGEROW REMOVED = 50M
HEDGEROW REPLANTED = 50M

IN ADDITION, THE OVERHEAD BT LINE WILL BE IMPACTED AND IT IS PROPOSED THAT THIS IS RELOCATED TO BEHIND THE PROPOSED HEDGE LINE - TWO POLES ARE IMPACTED. THE VERTICAL CLEARANCE FROM THE AILS TO THE OVERHEAD LINES WILL NEED TO BE CHECKED POST-PLANNING.

THERE WILL BE MINIMAL EARTHWORKS IMPACT DUE TO LEVELS IN THE FIELD TO THE NORTH BEING SIMILAR TO THOSE ALONG THE ROAD CHANNEL LINE. THE PROPOSED WORKS WILL DRAIN AWAY FROM CARRIAGEWAY INTO EXISTING VERGE AND FIELD AREA. WORKS ARE TO BE CONSTRUCTED FROM THE FIELD WITH A TEMPORARY COMPOUND AREA TO ENABLE OTHER WORKS IN THE VICINITY.

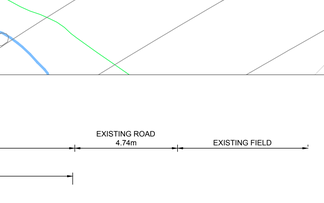
EXISTING BRIDGE
DIOSIG BRIDGE. (REF 2537)

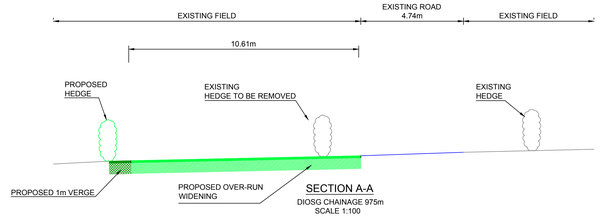
1.4 - OVER-RUN AREA
CH 1050-1070
A SMALL AREA OF OVER-RUN IS REQUIRED IN THE NORTHERN VERGE. THE EXISTING VERGE IS TO BE EXCAVATED TO A DEPTH OF 0.15M AND BACKFILLED WITH CRUSHED STONE TO PROVIDE A TEMPORARY OVER-RUN AREA FOR AILS, WITH THE EXCAVATED TOPSOIL AND SUBSOIL ARE TO BE STOCKPILED FOR RE-USE. FOLLOWING COMPLETION OF THE WORKS, STONE IS TO BE REMOVED AND THE EXCAVATED TOPSOIL REINSTATED IN THIS LOCATION.

1.5 - OVER-RUN AREA
CH 1045 - 1080
AN OVER-RUN AREA OF 1 METRE MINIMUM WIDTH IS REQUIRED IN THE NORTHERN VERGE AND WILL COMPRISE OF GRASS REINFORCEMENT TO MINIMISE THE VISUAL IMPACT.
THE EXISTING HEDGE IS NOT IMPACTED BY THE WIDENING, ALTHOUGH MAY REQUIRE TO BE TRIMMED. THE PROPOSED OVER-RUN AREA WILL NOT IMPACT EXISTING DRAINAGE AS IT IS WITHIN THE EXISTING VERGE AREA. WORKS ARE TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT USED.

1.6 - OVER-RUN AREA
CH 1130 - 1175
AN OVER-RUN AREA OF 1 METRE MINIMUM WIDTH IS REQUIRED IN THE SOUTHERN VERGE AND WILL BE CONSTRUCTED OF GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT.

THE EXISTING HEDGE IS NOT IMPACTED BY THE WIDENING, ALTHOUGH IT MAY NEED TO BE TRIMMED.





NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S.
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- WORKING AREA/CONSTRUCTION COMPOUND

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC, 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 2 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 590 TO 1200

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-002 Rev: G

A0

DRG Path: I:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-001-01-02.dwg - Layout Tab: 002 - a1aer - RESDN - Plot time: 19/07/2013 @ 11:10 AM

N

1.8 - OVER-RUN AREA
CH 1380 - 1450
AN OVER-RUN AREA OF 2 METRES WIDTH IS REQUIRED WITHIN THE SOUTHERN VERGE AND A 1 METRE OVER-RUN OF THE TRAFFIC ISLAND LOCATED OPPOSITE THE EXISTING PROPERTY WILL BE NECESSARY. THE OVER-RUN OF THE TRAFFIC ISLAND IS TO BE CONSTRUCTED FROM ASPHALT AND THE OVER-RUN IN THE VERGE OF GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT. ALTHOUGH THERE WILL BE NO IMPACT ON THE SMALL TREES, COPPICING AND LAYING THESE TREES INTO A HEDGE WILL IMPROVE LANDSCAPE CONDITION AND AVOID CONFLICT WITH RELOCATED POLES. CURRENTLY THIS IS A TALL, UNMANAGED HEDGE COMPRISING SPINDLY HAZEL AND HAWTHORN THAT WOULD LEND ITSELF FAVOURABLY TO LAYING.

IMPROVEMENT WORKS WITHIN THE ISLAND WILL NOT SIGNIFICANTLY IMPACT THE EXISTING DRAINAGE ARRANGEMENTS AND WILL BATTER BACK TO THE EXISTING ROAD LEVELS. THE GRIT BIN LOCATED TO THE SOUTH OF THE ISLAND IS TO BE RELOCATED OUTSIDE OF THE PROPOSED OVER-RUN AREAS. THE PROPOSED OVER-RUN AREA WILL DRAIN BACK INTO THE EXISTING HEDGEROW AT THE BOTTOM OF THE EARTHWORKS.

ACCESS TO THE WORKS IS TO BE UNDERTAKEN ON-LINE USING TRAFFIC MANAGEMENT.

1.7 - EXISTING ACCESS
CH 1240 - 1250
EXISTING ACCESS JUNCTION INTO A PROPERTY IS AVAILABLE AT THIS LOCATION FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS, IF REQUIRED.

1250.000
1.4m
7.97m
CONTINUED ON 60283248-D-004
1300.000
4.32m
1350.000
1400.000
1.28m
1.7m
1450.000
1500.000
4.10m
1550.000
RIGHT VIEWPORT

LEFT VIEWPORT | RIGHT VIEWPORT

N

LEFT VIEWPORT
1550.000
4.77m
1600.000
4.10m
1650.000
1700.000
4.16m
1750.000
1800.000
1850.000
4.57m
1900.000
CONTINUED ON 60283248-D-004

NOTES
1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED. EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	Appr'd
G	14/01/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	07/06/2012	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2012	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2012	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2012	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2012	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/02/2012	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2012	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAYS WORKS SECTION 1 SHEET 3 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 1200 TO 1900

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-003 | Rev: G | A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-001-01451.dwg Layout Tab: 003 User: RESIN Plot time: 19/07/2013 @ 11:10 AM

1.9 - OVER-RUN AREA
CH 1950 - 2000
AN ASPHALT CONSTRUCTION OVER-RUN AREA OF UP TO 0.5 METRES IN WIDTH IS REQUIRED IN THE SOUTHERN VERGED IT IS PROPOSED TO WIDEN THE ROAD WHERE AN EXISTING HEDGE BANK IS LOCATED. APPROXIMATELY 0.8 METRES TO THE SOUTH, THE HEDGE WILL BE COPPICED BACK AND IF LOSS IS UNAVOIDABLE, A NEW HEDGE WILL BE PLANTED TO MATCH EXISTING AND TIE IN WITH THE EXISTING.

A SINGLE BT OVERHEAD LINE WILL BE IMPACTED BY THE WORKS AND WILL REQUIRE TO BE RELOCATED.

MINIMAL EARTHWORKS IMPACT IS ENVISAGED DUE TO LEVELS IN THE FIELD TO THE SOUTH BEING SIMILAR TO THOSE ALONG THE ROAD CHANNEL LINE. THE PROPOSED WIDENING OF THE ROAD WILL NOT IMPACT ANY EXISTING GULLIES AS THE EXISTING ROAD DRAINS INTO THE VERGE OR INTO GULLIES LOCATED IN THE NORTHERN CHANNEL.

WORKS ARE TO BE CONSTRUCTED ON-LINE USING TRAFFIC MANAGEMENT.

CONTINUED ON 60283248-D-003

1900.000

4.57m

1950.000

4.48m

2000.000

2050.000

4.58m

2100.000

4.23m

2150.000

2200.000

4.53m

2250

RIGHT VIEWPORT

1.10 - EXISTING ACCESS
CH 2055 - 2090
THE EXISTING ACCESS JUNCTION INTO A PRIVATE PROPERTY IS AVAILABLE FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS, IF REQUIRED.

1.11 - EXISTING ACCESS
CH 2300 - 2340
THE EXISTING ACCESS JUNCTION INTO A PRIVATE PROPERTY IS AVAILABLE FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS, IF REQUIRED.

LEFT VIEWPORT

PLANNING APPLICATION IN PLACE TO IMPROVE EXISTING JUNCTION AND ACCOMMODATE HGV'S.

1.12 - OVER-RUN AREA
CH 2400 - 2575
AN OVER-RUN AREA OF APPROXIMATELY 1 METRE WIDTH IS REQUIRED TO THE NORTH-WEST OF THE ROAD TO AVOID THE LOSS OF TREES. ANY LOSS OF TREES WILL BE REPLACED WITH STANDARD ASH TREES. THE OVER-RUN AREA IS TO BE CONSTRUCTED USING GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT.
THE HEDGE WILL BE COPPICED BACK TO ALLOW AIL VEHICLES TO PASS AND IF HEDGE LOSS IS UNAVOIDABLE, A NEW HEDGE TO MATCH THE EXISTING WILL BE PLANTED AND TIE IN WITH THE EXISTING.

THERE IS A POTENTIAL IMPACT ON EXISTING TREE ROOTS TO THE SOUTH AT CH 2515 ADJACENT TO TWO ELECTRICITY POLES. EXISTING DRAINAGE IS NOT IMPACTED BY THE WORKS AND ALL WORKS WILL BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.

1.13 - EXISTING ACCESS
CH 2580 - 2630
THE EXISTING ACCESS JUNCTION INTO A PRIVATE PROPERTY IS AVAILABLE FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS, IF REQUIRED.

CONTINUED ON 60283248-D-005

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	Appr'd
G	16/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	26/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 4 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 1900 TO 2650

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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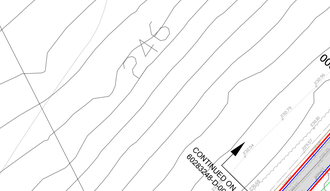
No. 60283248-D-004 Rev. G

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-001-01-h01.dwg Layout Tab: 004 ♦ User: REDSN Plot time: 19/07/2013 @ 11:11 AM



1.14 - OVER-RUN AREA
CH 2970 - 3050
AN AREA OF PROPOSED OVER-RUN ON SOUTHERN VERGE UP TO 2 METRES WIDE IS TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IVISUAL IMPACT . A SECTION OF APPROXIMATELY 45 METRES IN LENGTH OF THE EXISTING COPPICE (CURRETLY A SOLID ROW OF MAINLY HAZEL WHICH HAS BEEN PREVIOUSLY COPPICED ALONG WITH OCCASIONAL ELDER AND HAWTHORN) WILL BE LOST AS A CONSEQUENCE OF THE ENABLING EARTHWORKS. THE COPPICE WILL BE REPLANTED ON THE NEW BANK ONCE EARTHWORKS ARE COMPLETE AND IT MAY BE POSSIBLE TO LEAVE THE EXISTING ROOTSTOCK OF THE ROW WHILST UNDERTAKING EARTHWORKS, ALLOWING THIS TO RE-GROW THROUGH THE NEW BANK, WITH NEW PLANTING TO FILL ANY GAPS - THIS AREA HAS SURVEYED FOR DORMOUSE PREVIOUSLY WHICH REPORTED NO SIGNS OF HABITAT.
ONE BT POLE IS TO BE RELOCATED. WORKS WILL FALL AWAY FROM THE EXISTING HIGHWAY TOWARDS A WATERCOURSE TO THE SOUTH, WITH ADDITIONAL DRAINAGE FOR THE EMBANKMENT TO BE LOCATED AT FOOT OF THE EARTHWORKS, FEEDING INTO THE EXISTING WATERCOURSE.
ACCESS FOR THESE WORKS IS TO BE FROM THE EXISTING ROAD TO THE EAST, SOME ON-LINE WORKS WILL REQUIRE THE USE OF TRAFFIC MANAGEMENT.

1.14 - OVER-RUN AREA
CH 2960 - 3050
AN AREA OF PROPOSED OVER-RUN ON SOUTHERN VERGE UP TO 2 METRES WIDE IS TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IVISUAL IMPACT . A SECTION OF APPROXIMATELY 45 METRES IN LENGTH OF THE EXISTING COPPICE (CURRENTLY A SOLID ROW OF MAINLY HAZEL WHICH HAS BEEN PREVIOUSLY COPPICED ALONG WITH OCCASIONAL ELDER AND HAWTHORN) WILL BE LOST AS A CONSEQUENCE OF THE ENABLING EARTHWORKS. THE COPPICE WILL BE REPLANTED ON THE NEW BANK ONCE EARTHWORKS ARE COMPLETE AND IT MAY BE POSSIBLE TO LEAVE THE EXISTING ROOTSTOCK OF THE ROW WHILST UNDERTAKING EARTHWORKS, ALLOWING THIS TO RE-GROW THROUGH THE NEW BANK, WITH NEW PLANTING TO FILL ANY GAPS - THIS AREA HAS SURVEYED FOR DORMOUSE PREVIOUSLY WHICH REPORTED NO SIGNS OF HABITAT.
ONE BT POLE IS TO BE RELOCATED. WORKS WILL FALL AWAY FROM THE EXISTING HIGHWAY TOWARDS A WATERCOURSE TO THE SOUTH, WITH ADDITIONAL DRAINAGE FOR THE EMBANKMENT TO BE LOCATED AT FOOT OF THE EARTHWORKS, FEEDING INTO THE EXISTING WATERCOURSE.
ACCESS FOR THESE WORKS IS TO BE FROM THE EXISTING ROAD TO THE EAST, SOME ON-LINE WORKS WILL REQUIRE THE USE OF TRAFFIC MANAGEMENT.

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S.
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	16/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED.	SR	SC	KM
B	15/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 5 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 2650 TO 3200

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-005 | Rev: G | A0

DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-001-0145.dwg Layout Tab: 005 • User: RESSN Plot time: 19/07/2013 @ 11:11 AM

3550.000

RIGHT VIEWPORT

3.84m

3500.000

3450.000

B

3400.000

4.86m

4.86m

3350.000

4.72m

3300.000

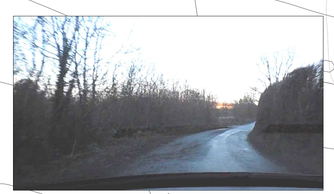
3250.000

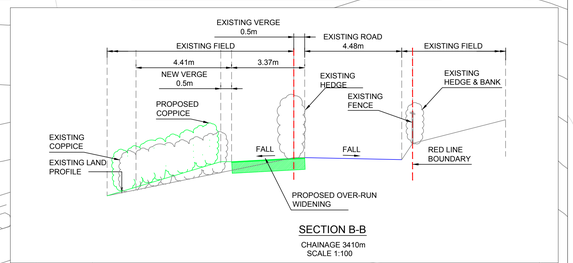
CONTINUED ON 60283348-D-005

1.15 - OVER-RUN AREA AND PASSING BAY
CH 3340 - 3450
AN AREA OF PROPOSED OVER-RUN UP TO 3 METRES WIDE WITHIN THE VERGE TO THE SOUTH WEST OF THE EXISTING BEND IS TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE VISUAL IMPACT. A SECTION OF APPROXIMATELY 107 METRES IN LENGTH PART OF THE EXISTING COPPICE (CURRENTLY A SOLID ROW OF MAINLY HAZEL WHICH HAS BEEN PREVIOUSLY COPPICED ALONG WITH OCCASIONAL ELDER AND HAWTHORN) WILL BE LOST AS A CONSEQUENCE OF THE ENABLING EARTHWORKS. THE COPPICE WILL BE REPLANTED ON THE NEW BANK ONCE EARTHWORKS ARE COMPLETE AND IT MAY BE POSSIBLE TO LEAVE THE EXISTING ROOTSTOCK OF THE ROW WHILST UNDERTAKING EARTHWORKS, ALLOWING THIS TO RE-GROW THROUGH THE NEW BANK, WITH NEW PLANTING TO FILL ANY GAPS - THIS AREA HAS SURVEYED FOR DORMOUSE PREVIOUSLY WHICH REPORTED NO SIGNS OF HABITAT.

THE PROPOSED WORKS WITHIN THE VERGE WILL DRAIN AWAY FROM THE EXISTING CARRIAGEWAY AND NEW DRAINAGE IS TO BE PROVIDED FOR EARTHWORKS AND TO INTERCEPT ROAD RUN-OFF PRIOR TO EXISTING WATERCOURSE.

ACCESS IS TO BE MADE FROM THE EXISTING VERGE AND HIGHWAY AND ALSO FROM THE EXISTING ROAD TO THE NORTH OF THE WORKS. TRAFFIC MANAGEMENT WILL BE REQUIRED ON BEND OF THE ROAD.





SECTION B-B
CHAINAGE 3410m
SCALE 1:100

3950.000

EXISTING HEDGE TO BE REMOVED

3900.000

1.16 - IMPROVEMENTS TO EXISTING ACCESS
CH 3870 - 3930
AREA OF PROPOSED OVER-RUN TO BE PROVIDED ON THE EASTERN SIDE OF THE ROAD IN AN AREA OF EXISTING OVERGROWN HEDGEROW ON APPROACH TO THE EXISTING ACCESS JUNCTION. OVER-RUN AREA PROVIDED TO MINIMISE IMPACT ON EXISTING TREES THROUGH THIS CORNER. NEW HEDGEROW, 58M IN LENGTH, TO BE PLANTED ALONG THE REAR OF THE OVER-RUN AREA USING THE SAME PLANT SPECIES (HAWTHORN, HAZEL AND BLACKTHORN) TO MITIGATE THE LOSS OF 52M OF HEDGEROW. ACCESS FOR CONSTRUCTION FROM FIELD TO THE EAST. THE SOIL REMOVED FOR THE WORKS WILL BE RETAINED AND RE-USED TO ENSURE GROUND COVER RETURNS. ACCESS FOR WORKS TO BE MADE FROM THE FIELD TO THE NORTH EAST OF THIS AREA.

C

3850.000

3.80m

C

1.17 - OVER-RUN AREA
CH 3875 - 4090
AN AREA OF PROPOSED OVER-RUN WITHIN THE SOUTHERN VERGE OF UP TO 2 METRE IN WIDTH IS TO BE PROVIDED USING GRASS REINFORCEMENT AND THE EXISTING HAZEL HEDGE IS TO BE TRIMMED BACK TO ALLOW FOR AIL OVER-RUN.

3800.000

3750.000

3.80m

3700.000

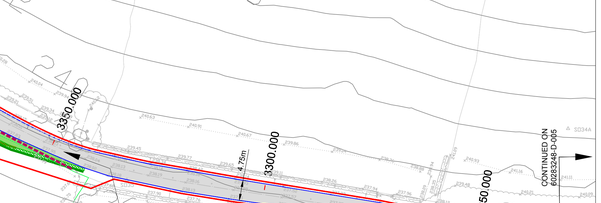
3650.000

3600.000

3.86m

LEFT VIEWPORT

3550



SECTION C-C

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

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C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED.	SR	SC	KM
B	03/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 6 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 3200 TO 3950

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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A0

DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-001-010.dwg Layout Tab: 006 User: RESSN Plot time: 19/07/2013 @ 11:12 AM

1.18 - OVER-RUN AREA
CH 3950-4200
AREA OF PROPOSED OVER-RUN OF VARIABLE WIDTH, UP TO 4M WIDE IN THE SOUTH EASTERN VERGE AND INTO THE ADJACENT FIELD. TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMACT ON THE CHARACTER OF THE ROAD. 208M OF EXISTING HAWTHORN AND HAZEL HEDGEROW ON A LOW BANK WILL NEED TO BE TRANSLOCATED TO THE NEW LOCATION. EARTHWORKS TO BE BLENDED INTO THE EXISTING LANDFORM TO LOOK AT NATURAL AS POSSIBLE AND SEEDED TO MATCH ADJACENT AREAS.

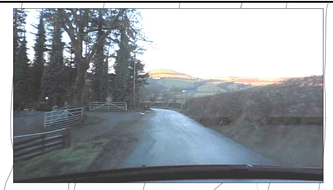
ONE LARGE ASH TREE AT CHAINAGE 3960 TO BE FELLED AND REPLACED WITH NEW ASH TREES. ANOTHER ASH, AN OAK AND SYCAMORE AT THIS LOCATION ARE TO BE RETAINED. THE IMPACTED ASH, SHOWN ON THE DRAWINGS, IN POOR CONDITION WILL BE LOST AND IT WILL BE REPLACED BY AN EXTRA HEAVY STANDARD OF THE SAME SPECIES

EXISTING OVERHEAD BT TELEGRAPH POLES WILL NEED TO BE RELOCATED OUTSIDE OF THE WORKS INTO THE FIELD AT THE REAR OF THE HEDGEROW. PROPOSED OVER-RUN DOES NOT IMPACT ANY EXISTING IDENTIFIED DRAINAGE FEATURES AND DRAINS AWAY FROM THE PROPOSED HIGHWAY. NEW DRAINAGE TO BE PROVIDED TO SUPPORT EARTHWORKS, TO BE DEFINED POST PLANNING. WORKS ACCESSIBLE FROM FIELD TO THE SOUTH, WITH TRAFFIC MANAGEMENT EMPLOYED FOR WORKS ADJACENT TO THE CARRIAGEWAY.

1.20 - OVER-RUN AND PASSING PLACE
CH 4135 - 4430
AN OVER-RUN AREA IS REQUIRED IN THE NORTHERN VERGE TO ACCOMMODATE HGV PASSING DURING THE CONSTRUCTION OF THE GOSEN BRIDGE. THE OVER-RUN AREA IS TO BE CONSTRUCTED IN THE AREA OF EXISTING SEMI HARD STANDING AND EXTENDED INTO THE ADJACENT FIELD USING GRASS REINFORCEMENT TO MINIMISE THE VISUAL IMPACT. THE NORTHERN CORNER OF THE FIELD WILL BE USED AS A CONSTRUCTION COMPOUND FOR THE GOSEN BRIDGE WORKS TO THE SOUTH AND A TEMPORARY COMPOUND FOR MATERIAL STORAGE AND PLANT. THIS WILL CONTAIN TEMPORARY WELFARE FACILITIES FOR THE OTHER ENABLING WORKS ALONG THE ROAD. THE COMPOUND WILL BE CONSTRUCTED FROM GRASS REINFORCEMENT ON TOP OF THE EXISTING FIELD.

A SECTION OF HEDGEROW OF 58M LENGTH WILL NEED TO BE REMOVED AND REPLACED WITH 120M OF NEW SYCAMORE, HAZEL AND HAWTHORN HEDGE TO FOLLOW THE CURVE OF THE ROAD, AROUND THE PROPOSED CONSTRUCTION COMPOUND AND TIE INTO THE EXISTING HEDGEROWS. FENCES WILL BE REPLACED WITH THOSE SIMILAR TO EXISTING AND THE EXISTING FIELD ACCESS IS TO BE RELOCATED BACK INTO THE FIELD, WITH NEW WOODEN GATES. THE OBJECTIVE OF THESE WORKS IS TO IMPROVE THE CONDITION AND CHARACTER OF THIS SECTION OF THE ROAD.

MINIMAL EARTHWORKS ARE ENVISAGED, BUT WORKS TO THE EXISTING DRAINAGE CHANNELS WILL BE REQUIRED. ALL WORKS WITHIN THE HIGHWAY ARE DESIGNED TO EXISTING LEVELS WITH WORKS CONSTRUCTED FROM THE ADJACENT FIELD. THE PROPOSED WORKS ARE TO DRAIN INTO AN EXISTING DITCH AND THE EXISTING CULVERT IS TO BE CONFIRMED BETWEEN THE EXISTING DITCHES AND IS TO BE REINFORCED AND REPLACED TO SUIT PROPOSED LOADING - THIS IS TO BE DETAILED POST PLANNING.



1.19 - OVER-RUN AREA
CH 4235 - 4315
AN AREA OF PROPOSED OVER-RUN IS OF VARIABLE WIDTH (UP TO 1.5M WIDE) WITHIN THE NORTHERN VERGE IS TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE VISUAL IMPACT. A LENGTH OF 70 METRE OF HEDGEROW WILL NEED TO BE REMOVED AND WILL BE REPLACED WITH 73 METRE OF A RICH MIXED SPECIES HEDGE TO REFLECT EXISTING MIX OF DOMINANT HAZEL WITH OCCASIONAL HAWTHORN AND BLACKTHORN AND WILL TIE INTO EXISTING HEDGES. NEW FENCE LINES WILL REPLACE THE EXISTING AND EARTHWORKS ARE TO BE BLENDED INTO THE EXISTING LANDFORM TO LOOK AS NATURAL AS POSSIBLE AND SEEDED TO MATCH ADJACENT AREAS.

THE PROPOSED WORKS WILL DRAIN INTO THE FOOT OF THE EARTHWORKS WITH NEW DRAINAGE PROVIDED ALONG THE PROPOSED EMBANKMENT; THIS IS TO BE DETAILED POST PLANNING. ACCESS FOR THE WORKS WILL BE FROM THE FIELD ACCESSES TO THE WEST AT LOCATION 1.20.

1.21 - OVER-RUN AREA
CH 4390 - 4450
OVER-RUN AREA REQUIRED OF VARIABLE WIDTH, UP TO 6.5M, IN THE EASTERN VERGE. WORKS TO BE CUT INTO THE BANK AT 1:1 TO MINIMISE AREA AFFECTED BY WORKS. OVER-RUN AREA TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD.

70M OF HEDGEROW WILL NEED TO BE REMOVED. THIS WILL BE REPLACED BY 78M OF NEW MIXED HEDGE CONSISTING OF SYCAMORE, HAWTHORN AND BLACKTHORN, TO FOLLOW THE CURVE OF THE ROAD AND TIE INTO THE EXISTING HEDGEROWS. THIS IS SHOWN ON SECTION C-C. TWO CONIFERS WILL BE LOST FROM THIS AREA, BUT THESE ARE NOT NOTABLE LANDSCAPE FEATURES AND IT IS CONSIDERED THAT THERE IS NO NEED TO REPL

REFER TO DRAWING 60283248-D-008-02 TYPICAL SECTIONS; C2-C2, D-D, E-E, F-F.

LEVELS DESIGNED TO ALLOW FOR DRAINAGE IN ROAD GULLIES. EXISTING DRAINAGE INFRASTRU BE MAINTAINED.PROPOSED OVER-RUN AREA WILL DRAIN TOWARDS THE HIGHWAY. EXISTING ROAD GULLIES WITHIN EXTENT OF WORKS TO BE REINFORCED TO SUIT THE PROPOSED LOADING. EXISTING GULLIES TO THE NORTH TO BE RETAINED AND CONNECTED INTO NEW CARRIER SYSTEM CONSTRUCTED WITH ATTENUATION INTO THE PROPOSED BRIDGE WIDENING.

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- WORKING AREA/CONSTRUCTION COMPOUND

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--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 7 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 3950 TO 4450

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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A0

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AFON GAM

1.22 - GOSEN BRIDGE: ROAD WIDENING, ROAD RETENTION AND NEW SECTION OF BRIDGE
CH 4440 - 4540
ROAD IS TO BE WIDENED TO THE NORTH AND THROUGH GOSEN BRIDGE FOR THE AIL MOVEMENTS. A SERIES OF SEPARATE WORKS ARE PROPOSED TO PROVIDE A NEW BRIDGE CROSSING, WIDENING OF THE ROAD AND STRUCTURES THROUGH THE EXISTING VALLEY TO SUPPORT THIS INFRASTRUCTURE.

THE WORKS WILL NECESSITATE THE REMOVAL OF 30M OF HEDGEROW COMPRISING OF BLACKTHORN, HAWTHORN, ASH AND HAZEL, TO THE WEST OF THE EXISTING BRIDGE, AND APPROXIMATELY LESS THAN 20 TREES ON THE EMBANKMENTS AND RIVER BANK TO THE NORTH. THESE TREES ARE SPINDLY TREES AND A MIX OF HAZEL, BIRCH AND ASH. THERE IS LITTLE GROUND FLORA UNDER THE TREES. RECENT WINDS HAVE CAUSED SEVERAL TREES TO FALL OPENING UP THE BANK TO THE NORTH, DE-STABILISING THE SOIL AT SOME POINTS.

NONE OF THE MATURE TREES ADJACENT TO THE EXISTING PROPERTY AND OUTSIDE OF THE IMMEDIATE HIGHWAY WORKS TO THE NORTH EAST OF THE BRIDGE WILL BE FELLED AND THIS AREA WILL BE MANAGED TO MINIMISE IMPACT ON EXISTING TREES DURING CONSTRUCTION.

AN OTTER SURVEY WAS CARRIED OUT WITHIN THE RIVER AND NO SIGNS OF OTTER WERE FOUND. THIS WILL BE REPEATED IMMEDIATELY PRIOR TO CONSTRUCTION. NO FELLING OR HEDGE CLEARANCE WILL BE CARRIED OUT DURING THE BIRD BREEDING SEASON (MARCH - AUGUST).

FOLLOWING THE WORKS A SELECTION OF TREES WILL BE REPLANTED AT THE TOP OF THE NEW RETAINING WALL. THESE WILL BE OF A SIMILAR SPECIES MIX TO THOSE LOST. THE TREES WILL BE PLANTED FAIRLY CLOSE TOGETHER, AND MANAGED BY COPPICING TO KEEP A DENSE COVER AND TO PREVENT THEM GETTING TOO SPINDLY CAUSING FUTURE WIND BLOW PROBLEMS. THE HEDGE WILL BE REPLANTED AT THE TOP OF THE NEW RETAINING WALL AND WILL USE THE SAME SPECIES PREVIOUSLY IN THE HEDGE, SOURCED FROM LOCAL PROVENANCE.

THE FOLLOWING NOTES REFER TO SPECIFIC ELEMENTS OF WORK WITHIN THE GOSEN BRIDGE PROPOSAL.

CHAINAGE 4440 - 4455 - NORTH
ASPHALT ROAD WIDENING TO BE PROVIDED ON THE NORTHERN CORNER ADJACENT TO EXISTING PROPERTY. WIDENING TO BE LOCATED IN AREA OF VERGE AT FOOT OF EMBANKMENT. NEW DRAINAGE CHANNEL PROVIDED TO BACK OF WORKS ALONG EDGE OF NEW ROAD WIDENING INTO OUTFALL TO THE NORTH OF THE BRIDGE.

CHAINAGE 4455 - 4500 - NORTH
AREA OF ROAD WIDENING UP TO NEW BRIDGE STRUCTURE SPANNING THE EXISTING RIVER. RETAINING STRUCTURES TO TIE INTO NEW BRIDGE ALIGNMENT AND CONSTRUCTED INTO ROCK FACE. NEW DRAINAGE PROVISIONS TO BE PROVIDED FOR BRIDGES AND CONSTRUCTION DETAILS TO BE DEFINED POST-PLANNING. WORKS TO BE CONSTRUCTED FROM AREA TO THE NORTH, ACCESSED FROM A TRACK BEHIND THE EXISTING PROPERTY AND IS ACCESSIBLE FROM THE EASTERN COMPOUND. MINIMAL ACCESS FROM THE EXISTING HIGHWAY. ACCESS FOR RETAINING STRUCTURE TO BE MADE FROM THE RIVER BANK VIA A TEMPORARY CRASH PLATFORM. MINIMAL WORKS IN THIS AREA DUE TO EXISTING TREES WHICH ARE TO BE RETAINED.

GOSEN BRIDGE WIDENING
NEW SECTION OF BRIDGE TO BE PROVIDED ADJACENT TO THE EXISTING BRIDGE SPANNING THE RIVER. PROPOSED BRIDGE HAS A SPAN OF UP TO 15M AND IS FOUNDED ON NEW ABUTMENTS. BRIDGE DECK TO BE THE SAME LEVEL AS THE EXISTING GOSEN BRIDGE AND IS TO TIE INTO THE EXISTING BRIDGE DECK AND ROAD LEVELS. CONSTRUCTION DETAILS AND FURTHER STRUCTURAL DETAILS ARE TO BE DETAILED POST PLANNING.

NEW BRIDGE AND RETAINING WORKS TO UTILISE THE STONE REMOVED FROM THE EXISTING BRIDGE PARAPETS AND OTHER LOCAL STONE FOR FASCIAS AND PARAPETS. DRAINAGE OF THE ROAD AT GOSEN BRIDGE AND FOR THE NEW SECTION OF BRIDGE STRUCTURE TO BE PROVIDED VIA NEW ATTENUATED CARRIER SYSTEM DESIGNED INTO THE NEW RETAINING AND BRIDGE STRUCTURE TO REPLACE THE EXISTING CARRIER SYSTEM. THIS WILL BE FURTHER DETAILED POST PLANNING.

CHAINAGE 4500 - 4560
AREA OF ROAD WIDENING FROM NEW SECTION OF BRIDGE STRUCTURE TO THE EXISTING RETAINING STRUCTURE SUPPORTING THE ROAD ADJACENT TO THE ROAD DOWN TOWARDS AFON GAM TO THE WEST. WIDENING WILL REQUIRE A NEW RETAINING STRUCTURE WITH STONE CLAD FASCIA LOCATED ALONG THE RIVER BED, SUPPORTING ENGINEERED FILL SUPPORTING THE PARAPET ALONG THE WIDENED SECTION OF ROAD.

ROAD TO THE WEST TO BE RE-GRADED TO SUIT THE LEVELS FOR THE WIDENED ROAD SECTION AND THE WORKS AT LOCATION 1.23. WORKS TO BE CONSTRUCTED FROM THE TEMPORARY CONSTRUCTION PLATFORMS AT RIVER BED LEVEL. NEW DRAINAGE PROVISIONS TO BE PROVIDED FOR BRIDGES AND EXACT CONSTRUCTION DETAILS TO BE DEFINED POST-PLANNING.

AT CHAINAGE 4450 TO 4460, EXISTING EMBANKMENT IS SHEER DOWN TO THE EXISTING RIVER BED AND NEW RETAINING STRUCTURE TO BE PROVIDED TO SUPPORT WORKS AT THIS JUNCTION ALONG WITH THE PROVISION OF A NEW STONE WALL AT THE TOP OF THE STRUCTURE.

CHAINAGE 4470 - 4540 - SOUTH
EXISTING VEHICLE RESTRAINT SYSTEM TO BE EXTENDED AND REPLACED WITH A SAFETY PARAPET. PROPOSED SYSTEM TO BE DETAILED POST PLANNING.

CENTRAL CONSTRUCTION COMPOUND ACCESS ROUTE

NORTH CONSTRUCTION COMPOUND (A)

4350.000

4400.000

4450.000

4500.000

4600.000

3.10m

12.30m

11.16m

4.27m

SECTION 1 CONTINUED ON 60283248-D-007

TWYNEDD GOSEN FARM

CENTRAL CONSTRUCTION COMPOUND (B)

SOUTH CONSTRUCTION COMPOUND (C)

EXISTING FENCE-LINE, HEDGEROW AND CRASH BARRIER TO BE REMOVED

CLEDAN

C1

C2

D

E

F

GOSEN BRIDGE

GOSEN CHAPEL

EXISTING POST BOX TO BE RELOCATED

AFON GAM

AFON GAM CROSSING

1.22 - GOSEN BRIDGE: ROAD WIDENING, ROAD RETENTION AND NEW SECTION OF BRIDGE
CH 4540 - 4560
ROAD WIDENING FOR AIL OVER-RUN IS REQUIRED ACROSS AN AREA BETWEEN THE TWO EXISTING ROADS. THE EXISTING LAND IS TO BE CUT BACK AND VEGETATION CLEARED WITH THE AREA BETWEEN THE ROADS CONSTRUCTED IN ASPHALT WITH A NEW RETAINING STRUCTURE TO MATCH THE CHARACTER OF THE EXISTING RETAINING STRUCTURE. JUNCTION IMPROVEMENTS ARE TO BE PROVIDED IN ADDITION TO A WHITE LINING SCHEME THROUGH GOSEN BRIDGE TO REDUCE FUTURE TRAFFIC CONFLICT AT THIS LOCATION.

EXISTING VEGETATION WILL BE CLEARED TO ALLOW FOR CONSTRUCTION, WHICH WILL BE UNDERTAKEN FROM THE MINOR ROAD TO THE NORTH USING TRAFFIC MANAGEMENT. EMBANKMENTS WILL BE RESEEDED WITH A LOCAL SEED MIX.

"THE NEW AREA OF ASPHALT, WHICH HAS BEEN MINIMISED AS FAR AS IS REASONABLY POSSIBLE, WILL BE DRAINED USING THE SUSTAINABLE TECHNIQUES. THIS WILL INVOLVE ROUTING RUNOFF TO A NEW FILTER TRENCH FROM WHICH INFILTRATION WILL BE POSSIBLE. FLOWS ALONG THE DRAIN WILL BE SLOWED AND STORAGE CREATED BY CONSTRUCTING SMALL CHECK DAMS AT INTERVALS ALONG THE FILTER TRENCH. IT IS ESTIMATED THAT THIS WILL CREATE APPROXIMATELY 48M3 OF STORM WATER STORAGE WHICH ALONG WITH THE INFILTRATION LOSSES SHOULD BE SUFFICIENT TO AVOID ANY SIGNIFICANT CHANGES IN RUNOFF."

3 NUMBER EXISTING TREES TO BE REMOVED

SECTION 1 CONTINUED ON 60283248-D-009

1.20 - OVER-RUN AREA AND PASSING PLACE
CH 4335 - 4430
AN OVER-RUN AREA IS REQUIRED IN THE NORTHERN VERGE TO ACCOMMODATE HGV PASSING DURING THE CONSTRUCTION OF THE GOSEN BRIDGE. THE OVER-RUN AREA IS TO BE CONSTRUCTED IN THE AREA OF EXISTING SEMI HARD STANDING AND EXTENDED INTO THE ADJACENT FIELD USING GRASS REINFORCEMENT TO MINIMISE THE VISUAL IMPACT. THE NORTHERN CORNER OF THE FIELD WILL BE USED AS A CONSTRUCTION COMPOUND FOR THE GOSEN BRIDGE WORKS TO THE SOUTH AND A TEMPORARY COMPOUND FOR MATERIAL STORAGE AND PLANT. THIS WILL CONTAIN TEMPORARY WELFARE FACILITIES FOR THE OTHER ENABLING WORKS ALONG THE ROAD. THE COMPOUND WILL BE CONSTRUCTED FROM GRASS REINFORCEMENT ON TOP OF THE EXISTING FIELD.

A SECTION OF HEDGEROW OF 58M LENGTH WILL NEED TO BE REMOVED AND REPLACED WITH 120M OF NEW SYCAMORE, HAZEL AND HAWTHORN HEDGE TO FOLLOW THE CURVE OF THE ROAD, AROUND THE PROPOSED CONSTRUCTION COMPOUND AND TIE INTO THE EXISTING HEDGEROWS. FENCES WILL BE REPLACED WITH THOSE SIMILAR TO EXISTING AND THE EXISTING FIELD ACCESS IS TO BE RELOCATED BACK INTO THE FIELD, WITH NEW WOODEN GATES. THE OBJECTIVE OF THESE WORKS IS TO IMPROVE THE CONDITION AND CHARACTER OF THIS SECTION OF THE ROAD.

MINIMAL EARTHWORKS ARE ENVISAGED, BUT WORKS TO THE EXISTING DRAINAGE CHANNELS WILL BE REQUIRED. ALL WORKS WITHIN THE HIGHWAY ARE DESIGNED TO EXISTING LEVELS WITH WORKS CONSTRUCTED FROM THE ADJACENT FIELD. THE PROPOSED WORKS ARE TO DRAIN INTO AN EXISTING DITCH AND THE EXISTING CULVERT IS TO BE CONFIRMED BETWEEN THE EXISTING DITCHES AND IS TO BE REINFORCED AND REPLACED TO SUIT PROPOSED LOADING - THIS IS TO BE DETAILED POST PLANNING.

1.21 - OVER-RUN AREA
CH 4390 - 4450
OVER-RUN AREA REQUIRED OF VARIABLE WIDTH, UP TO 6.5M, IN THE EASTERN VERGE. WORKS TO BE CUT INTO THE BANK AT 1:1 TO MINIMISE AREA AFFECTED BY WORKS. OVER-RUN AREA TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD.

70M OF HEDGEROW WILL NEED TO BE REMOVED. THIS WILL BE REPLACED BY 78M OF NEW MIXED HEDGE CONSISTING OF SYCAMORE, HAWTHORN AND BLACKTHORN, TO FOLLOW THE CURVE OF THE ROAD AND TIE INTO THE EXISTING HEDGEROWS. THIS IS SHOWN ON SECTION C-C. TWO CONIFERS WILL BE LOST FROM THIS AREA, BUT THESE ARE NOT NOTABLE LANDSCAPE FEATURES AND IT IS CONSIDERED THAT THERE IS NO NEED TO REPLACE THESE.

LEVELS DESIGNED TO ALLOW FOR DRAINAGE INTO EXISTING ROAD GULLIES. EXISTING DRAINAGE INFRASTRUCTURE TO BE MAINTAINED.PROPOSED OVER-RUN AREA WILL DRAIN TOWARDS THE HIGHWAY. EXISTING ROAD GULLIES WITHIN EXTENT OF WORKS TO BE REINFORCED TO SUIT THE PROPOSED LOADING. EXISTING GULLIES TO THE NORTH TO BE RETAINED AND CONNECTED INTO NEW CARRIER SYSTEM CONSTRUCTED WITH ATTENUATION INTO THE PROPOSED BRIDGE WIDENING.

REFER TO DRAWING
60283248-D-008-02
TYPICAL SECTIONS;
C2-C2. D-D. E-E. F-F.

NOTES
1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY
- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- WORKING AREA/CONSTRUCTION COMPOUND

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	17/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	03/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: GOSEN BRIDGE WORKS SECTION 1 SHEET 8 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 4450 TO 4600

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:250@A0 - NTS@A3

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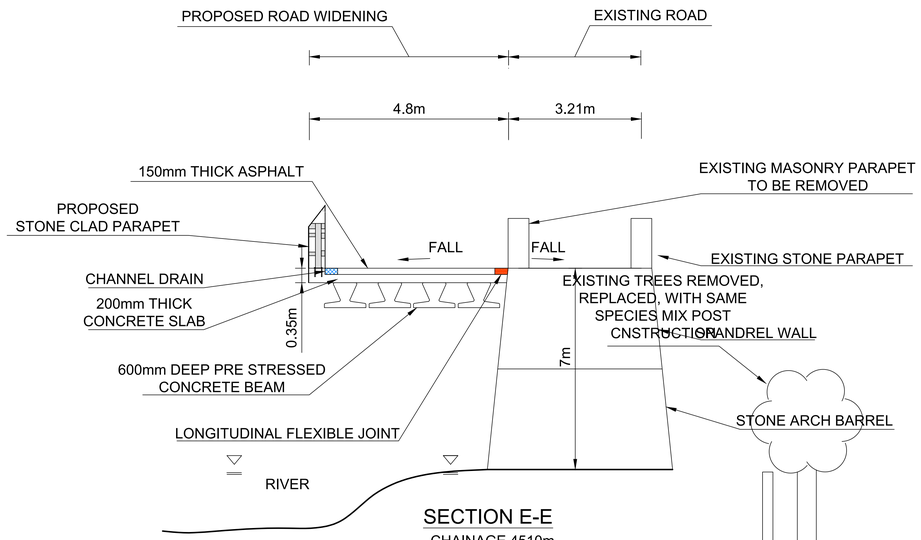
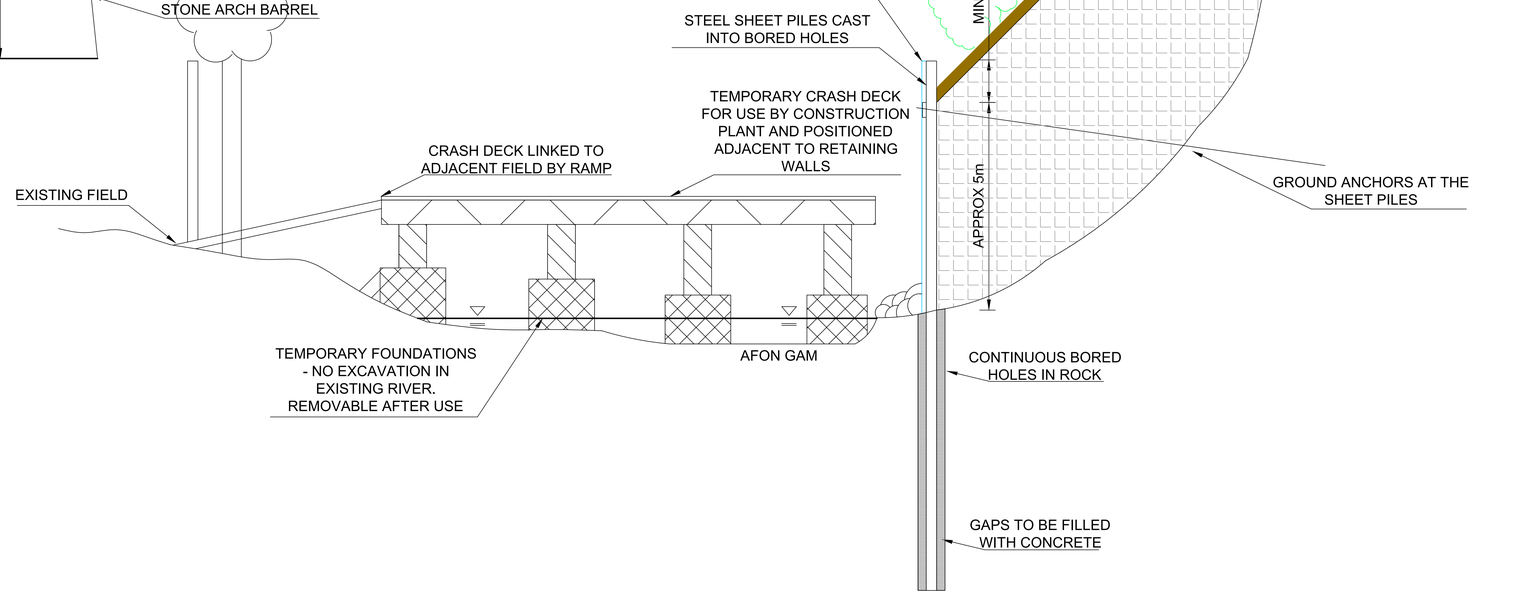
No. 60283248-D-008-001 Rev: G

A0

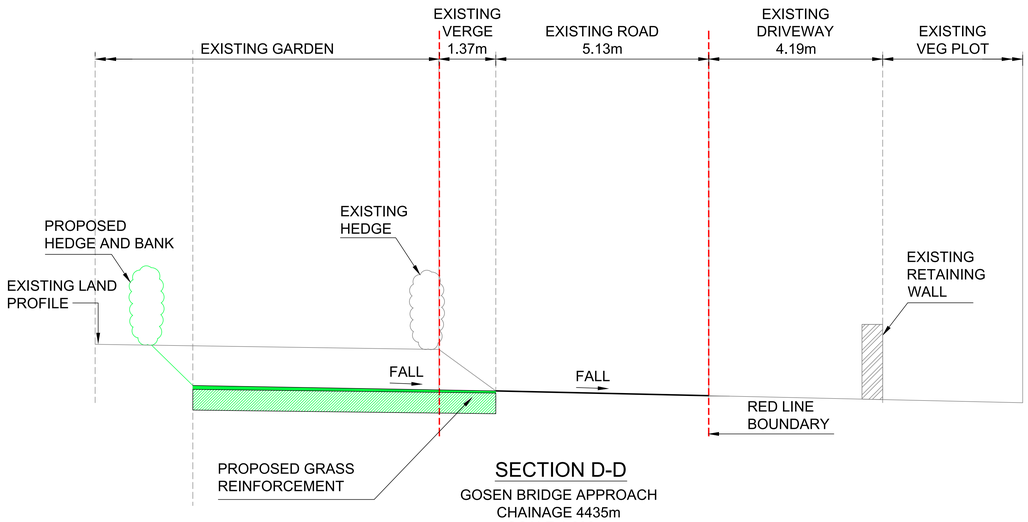
GRID Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWG\AECOM\PLAYOUT\60283248-D-001-010.dwg • Layout Tab: 008-001 • User: RESDN Plot time: 19/07/2013 @ 11:13 AM



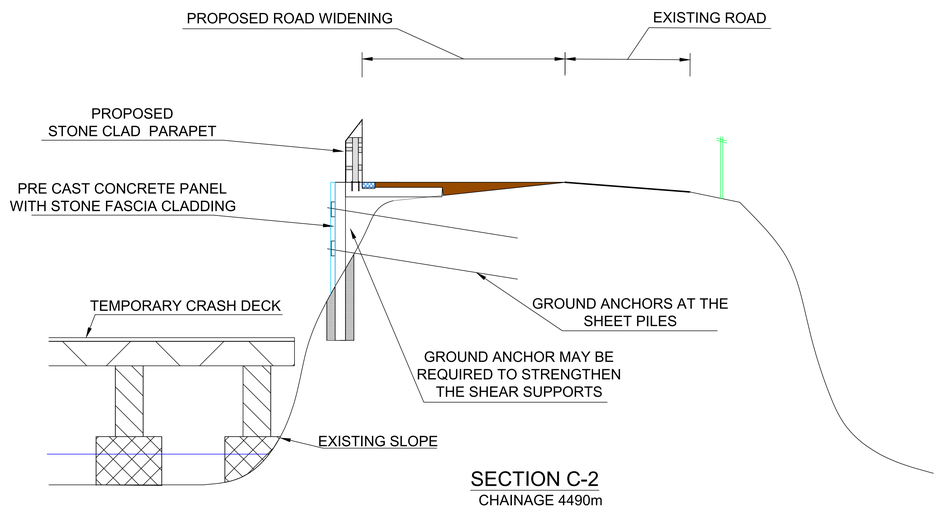
SECTION E-E
CHAINAGE 4510m
SCALE 1:200



SECTION F-F
CHAINAGE 4525m
SCALE 1:200



SECTION D-D
GOSEN BRIDGE APPROACH
CHAINAGE 4435m
SCALE 1:200



SECTION C-2
CHAINAGE 4490m
SCALE 1:250

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

Rev	Date	Detail	Made	Chk'd	Appr'd
A	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC AND NRW	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SK

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: FOR CONSTRUCTION SECTION 1 SHEET 8 OF 14 LLANERFYL TO ACCESS 1

Design: SR	CAD: RT
Chk'd: SR	App'd: SC
Date: 04/02/2013	Scale: AS SHOWN

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No. 60283248-D-008-002 Rev: A

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DWG Path: I:\PROJECTS\Development - Llanbrynmair Wind Farm\ENGINEERING\CAD\PLAN\OUTPUTS\60283248-D-001-1H40.dwg Layout Tab: 008-002 ♦ User: THACKSR Plot time: 08/08/2013 @ 1:14 PM

AFON GAM

NORTH CONSTRUCTION COMPOUND (A)

4350.000

4400.000

4450.000

4500.000

4550.000

4600.000

0.000

4.27m

13.10m

12.30m

11.16m

3.50m

TWYNEDD GOSEN FARM

CENTRAL CONSTRUCTION COMPOUND (B)

SOUTH CONSTRUCTION COMPOUND (C)

CLEDAN

GOSEN BRIDGE

GOSEN CHAPEL

AFON GAM CROSSING

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GERTH, MIN 4m TALL.

KEY

- CARRIAGEWAY
- AIL OVER-RUN. GRASS REINFORCEMENT.
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES
- RETAINING STRUCTURE OR OTHER WORKS
- HEDGEROW
- FENCE LINE OR GATE
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- VEGETATION

Rev	Date	Detail	Made	Chk'd	Appr'd
A	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC AND NRW	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: GOSEN BRIDGE SECTION 1 SHEET 8 OF 14 OVERWIEW OF GOSEN BRIDGE POST CONSTRUCTION

Design:	SR	CAD:	RT
Chk'd:	SR	Appr'd:	SC
Date:	04/02/2013	Scale:	1:250@A0 - NTS@A3

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No. 60283248-D-008-003 Rev: A

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\2WOS\AECOM\PLAYOUT\60283248-D-001-0145.dwg - Layout Tab: 008-003 • User: REIDSN, Plot time: 19/07/2013 @ 11:14 AM

SECTION 1 CONTINUED ON 60283248-D-008

3 NUMBER EXISTING TREES TO BE REMOVED

NEW FENCELINE AND GATE

NEW FENCELINE AND GATE

EXISTING FARM ACCESS

RIGHT VIEWPORT

LEFT VIEWPORT

1.24 - ROAD WIDENING FOR OVER-RUN
CH 4550 - 4640
OVER-RUN AREA REQUIRED IN THE EASTERN VERGE AT CHAINAGE 4520 TO LEAD INTO THE GOSEN TO SYCHTYN OFF-ROAD TRACK. AREA OF PROPOSED ROAD WIDENING IS UP TO 4.5M WIDE AND TO BE CONSTRUCTED OF ASPHALT AS PERMANENT ROAD IMPROVEMENTS. CONSTRUCTION WILL RESULT IN LOSS OF SOME SCRUB VEGETATION AND 3 SMALL TREES (BIRCH AND HAWTHORN). A NEW MIXED HEDGE WITH HEDGEROW OAK AND BIRCH TREES WILL BE PROVIDED ALONG A FORMER HEDGE LINE WITH NEW HEDGE TREES TO HELP SCREEN VIEWS OF THE GOSEN ACCESS TRACK.

EXISTING GULLY TO BE REPLACED WITH NEW ALONG THE REAR OF NEW CHANNEL LINE ON THIS CORNER. ACCESS FOR CONSTRUCTION WORKS TO BE PHASED WITH THE GOSEN WIDENING SO THAT THIS ADDITIONAL ROAD AREA CAN ASSIST WITH TRAFFIC MANAGEMENT AT GOSEN BRIDGE. ACCESS FOR CONSTRUCTION MADE FROM WITHIN ADJACENT FIELD TO THE EAST.

GOSEN ACCESS TRACK
Ch 4620 TO 4970
NEW 350M LENGTH OF OFF-ROAD TRACK TO BE PROVIDED TO AVOID THE VERTICAL CONSTRAINTS ON THE EXISTING ROAD AND ALLOW AILS TO BYPASS THE EXISTING ROAD, AND FOR A PASSING PLACE FACILITY. THE AIM HAS BEEN TO MAKE LANDFORMS AS GENTLE AS POSSIBLE TO BLEND THE LANDFORMS INTO THE EXISTING FIELD WHILE PROVIDING A SAFE RUNNING PLATFORM FOR THE AILS.

OFF-ROAD TRACK WILL HAVE A SHORT STRETCH OF ASPHALT CARRIAGEWAY AT EITHER END TO PROVIDE TRACTION FOR THE AIL VEHICLES. ACCESS TO BE SECURED USING WOODEN GATES CONTROLLING ACCESS AND EGRESS. THE TRACK WILL BE CONSTRUCTED OF CRUSHED STONE DURING THE CONSTRUCTION PERIOD, WITH THE SURFACE REINSTATED USING GRASS REINFORCEMENT AND LOCAL SEED TOPSOIL INFILL IN THE PERMANENT WORKS.

A NEW HEDGEROW WILL BE PLANTED ALONG THE EDGE OF THE EXISTING ROAD TO ENHANCE THE CHARACTER OF THE ROAD AND MINIMISE VISIBILITY OF THE PROPOSED OFF-ROAD TRACK. THE HEDGE WILL REFLECT THE GENERAL SPECIES MIX OF HEDGES IN THE AREA AND COMPRISE HAWTHORN, BLACKTHORN, ASH AND HAZEL. DRAINAGE FOR THE PROPOSED OFF-ROAD TRACK TO BE DEFINED POST PLANNING. CONSTRUCTION OF THESE WORKS WILL NOT IMPACT TRAFFIC FLOW ON THE EXISTING ROAD.

REFER TO DRAWING 60283248-D-008-02 TYPICAL SECTIONS G-G

1.28 - OVER-RUN AREA
CH 5175 - 5315
A 1 METRE WIDE OVER-RUN AREA CONSTRUCTED FROM REINFORCED GRASS IS TO BE LOCATED IN THE NORTHERN VERGED AND WILL AFFECT 73M OF HEDGEROW COMPRISING OF HAZEL WITH A FEW HAWTHORN AND BLACKTHORN BUSHES. THESE ARE LOCATED ON A LOW BANK AND WILL BE TRANSLOCATED AT THE REAR OF THE VERGE LINE BEFORE THE EARTHWORKS PROFILE.

ALL WORKS ARE LOCATED IN THE VERGE AND FIELD. THE ROAD DRAINS INTO THE NORTHERN VERGE ALONG THIS SECTION AND THE EXISTING DRAINAGE IS TO BE RETAINED AND RELOCATED TO THE BACK OF THE NEW OVER-RUN AREA - TO BE DEFINED POST PLANNING.

OVERHEAD BT POLES ARE IMPACTED BY THE WORKS AND ARE TO BE RELOCATED.

1.25 - ROAD WIDENING
CH 4970 - 5040
WIDENING OF 1.5M WIDTH OVER A LENGTH OF APPROXIMATELY 70M IS REQUIRED AFTER THE EGRESS FROM THE OFF-ROAD ACCESS TRACK. WIDENING IS TO BE CONSTRUCTED FROM ASPHALT AS A PERMANENT ROAD IMPROVEMENT. THE EXISTING ACCESS TO SYCHTYN FARM WILL REQUIRE RE-GRADING AND RESURFACING ACROSS THIS AREA OF OVER-RUN TO TIE INTO THE PROPOSED LEVELS WITH ADDITIONAL HIGHWAY DRAINAGE PROVIDED ALONG THE BACK OF THE VERGE. WORKS ARE TO BE UNDERTAKEN IN THE EXISTING AREA OF WIDE VERGE WITHIN HIGHWAY BOUNDARY AND VEGETATION LOSS WILL BE AVOIDED AS FAR AS POSSIBLE; ANY UNAVOIDABLE LOSS OF VEGETATION WILL BE REPLACED. THERE WILL BE AN IMPACT ON A SINGLE OVERHEAD POLE WHICH WILL NEED TO BE RELOCATED.

CONSTRUCTION OF THESE WORKS IS TO BE UNDERTAKEN ON-LINE USING TRAFFIC MANAGEMENT.

EARTHWORKS RETAINED

POLE TO BE RELOCATED

1.26 - ROAD WIDENING
CH 5050 - 5110
WIDENING OF 1.5M WIDTH OVER A LENGTH OF APPROXIMATELY 70M IS REQUIRED WITHIN AREA OF VERGE AND INCLUDING A TRAFFIC ISLAND IN THE VICINITY OF THE ACCESS LEADING INTO THE SYCHTYN FARM BUILDINGS. THE ROAD WIDENING INTO THE ISLAND IS TO BATTERED BACK TO EXISTING LEVELS EITHER USING ENGINEERED FILL, REINFORCED EARTH OR OTHER APPROVED RETAINING SOLUTION - TO BE DETAILED POST PLANNING. ROAD WIDENING IS TO BE CONSTRUCTED FROM ASPHALT AS A PERMANENT ROAD IMPROVEMENT.

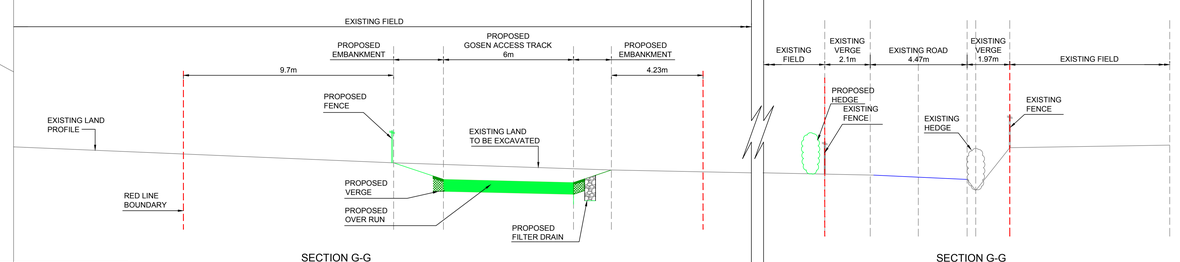
THE EXISTING DRAINAGE IN NORTHERN VERGE IS NOT IMPACTED BY THE WORK AND WILL BE RETAINED.

1.27 - OVER-RUN AREA AND WALL REMOVAL
CH 5130 - 5180
THE EXISTING WALL AT CH 5130 IS TO BE RELOCATED PERMANENTLY AND AN OVER-RUN AREA TO BE CONSTRUCTED IN ITS PLACE FROM GRASS REINFORCEMENT. THERE WILL BE AN IMPACT TO THE EXISTING HEDGEROW ADJACENT TO THE WALL WHICH WILL REQUIRE REMOVAL; THE LOCATION OF REPLACEMENT HEDGEROW IS TO BE DETAILED POST PLANNING, HOWEVER, ADDITIONAL LENGTHS CAN BE INCORPORATED INTO THE WIDENING AT LOCATIONS 1.28 AND 1.29.

THE PROPOSED OVER-RUN AREA IS TO BE POROUS AND GRADED AWAY FROM THE EXISTING HIGHWAY AND THE EXISTING DRAINAGE PROVISION WILL NOT BE IMPACTED.

EXISTING OVER-HEAD CABLE POLES ARE LOCATED ON BOTH SIDES OF THE CARRIAGEWAY AND WILL REQUIRE TO BE REMOVED AND RELOCATED.

WORKS ARE TO BE CONSTRUCTED BOTH ON-LINE USING TRAFFIC MANAGEMENT AND FROM THE EXISTING FIELD ADJACENT TO THE WORKS TO THE SOUTH.



SECTION G-G
CHAINAGE 170m
SCALE 1:100

SECTION G-G
CHAINAGE 4750m
SCALE 1:100

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION.	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	10/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 9 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 4600 TO 5350

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-009 Rev: G

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-001-010.dwg • Layout Tab: 009 • User: RESDN Plot time: 19/07/2013 @ 11:15 AM

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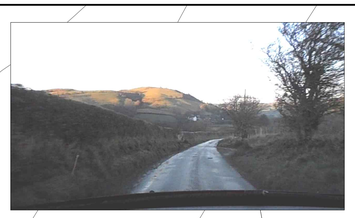

BOTTOM VIEWPORT

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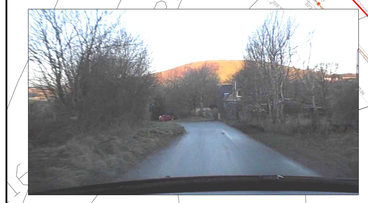
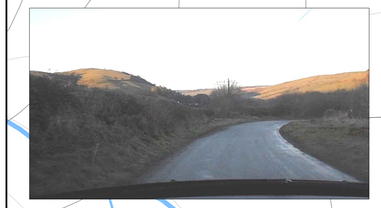
1.31 - OVER-RUN AREA
CH 5770 - 5880
OVER-RUN LOCATED IN THE WESTERN VERGE ON BEND OPPOSITE EXISTING PROPERTY. EXISTING VERGE IS MOUNDED AND WIDE WITH AN AREA OF SCRUB LOCATED TO THE BACK OF THE VERGE. PROPOSED OVER-RUN TO BE IN VERGE AREA ONLY WITH MINIMAL IMPACT ON EXISTING TREES EXCEPT FOR PRUNING. OVER-RUN TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD.

PROPOSED POROUS OVER-RUN IN EXISTING VERGE TO FALL TOWARDS EXISTING CHANNEL ALONG WHICH EXISTING GULLIES ARE LOCATED. GULLIES TO BE UPGRADED TO SUIT PROPOSED AIL LOADING. WORKS CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.





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FIELD ACCESS

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1.30 - OVER-RUN AREA AND PASSING BAY
CH 5430 - 5700
AN OVER-RUN AREA IS LOCATED IN THE WESTERN VERGE ON THE BEND OPPOSITE AN EXISTING PROPERTY. THE VERGE IS MOUNDED WITH AN AREA OF SCRUB LOCATED TO THE REAR. THE PROPOSED OVER-RUN AREA IS TO BE IN THE VERGE AREA USING REINFORCED GRASS TO MINIMISE THE VISUAL IMPACT; ONLY MINIMAL IMPACT ON THE EXISTING TREES IS ENVISAGED, EXCEPT FOR PRUNING.

THE PROPOSED OVER-RUN IN THE VERGE IS TO BE POROUS AND FALL TOWARDS THE EXISTING CHANNEL ALONG WHICH EXISTING GULLIES ARE LOCATED. GULLIES ARE TO BE UPGRADED TO SUIT THE PROPOSED AIL LOADING.
WORKS ARE TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.

1.29 - OVER-RUN AREA
CH 5330 - 5430
AN OVER-RUN AREA LOCATED IN THE SOUTHERN VERGE IS TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE THE VISUAL IMPACT . A LENGTH OF 30M OF HEDGE LOCATED 0.5M ABOVE ROAD LEVEL WILL BE IMPACTED. THE HEDGE IS OF OLD PREVIOUSLY LAYERED HAZEL AND HAWTHORN AND CONSIDERED NOT VIABLE TO BE TRANS-LOCATED AND THEREFORE A NEW MIXED SPECIES HEDGE OF MAINLY HAZEL AND HAWTHORN WILL BE PLANTED AT THE REAR OF THE VERGE AT THE FOOT OF NEW CUT EARTHWORKS.
THE EXISTING DRAINAGE GULLIES LOCATED IN THE VERGE ARE TO BE UPGRADED TO SUIT THE PROPOSED LOADING AND RETAINED AS A PART OF THE PROPOSED SCHEME - DRAINAGE WORKS ARE TO BE DEFINED POST PLANNING, ALTHOUGH THE EXISTING DRAINAGE TO THE NORTH IS NOT IMPACTED
TWO OVERHEAD BT POLES ARE IMPACTED BY THE WORKS AND WILL NEED TO BE RELOCATED.
WORKS ARE TO BE CONSTRUCTED FROM THE ADJACENT FIELD TO MINIMISE IMPACT ON THE ROAD.

SECTION 1
CONTINUED ON
60283248-D-009

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4.5m

3.5m

NOTES

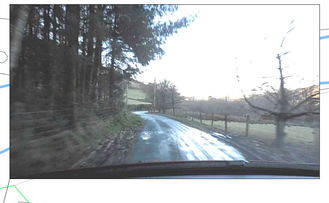
1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

N

TOP VIEWPORT



SECTION 1
CONTINUED ON
60283248-D-011

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TOP VIEWPORT

1.34 - OVER-RUN AREA
CH 6350 - 6480
AN OVER-RUN AREA OF 1.5M WIDTH LOCATED IN THE VERGE SOUTH OF THE CARRIAGEWAY IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, WITH EARTHWORKS UNDERTAKEN UP TO THE FOOTING OF THE EXISTING EARTHWORK PROFILE ALONG THE EDGE OF VERGE.

THE EXISTING HEDGEROW AND VEGETATION TO THE SOUTH IS TO BE TRIMMED BACK TO ENABLE WORKS TO BE UNDERTAKEN. NO IMPACT ON THE EXISTING DRAINAGE IS EXPECTED DUE TO WORKS BEING WITHIN THE VERGE; THE EXISTING ROAD DRAINS TO CHANNELS BOTH NORTH AND SOUTH.

WORKS ARE TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.

BOTTOM VIEWPORT

1.33 - OVER-RUN AREA
CH 6090 - 6325
A NEW OVER-RUN AREA (MINIMUM WIDTH OF 1M, UP TO A WIDTH OF 3.5M) WILL BE LOCATED IN AN AREA OF FIELD TO THE NORTH, OPPOSITE THE HAFOD FARM ACCESS. THE OVER-RUN AREA IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE VISUAL AND THE EXISTING FENCE LINES AND OVERHEAD POLES ARE TO BE RELOCATED OUTSIDE OF THE PROPOSED WORKS INTO THE ADJACENT FIELD, WITH THE EXISTING CULVERT ALONG THE ROAD TO BE WIDENED BENEATH THE OVER-RUN AREA.

THERE WILL BE UNAVOIDABLE LOSS OF EIGHT TREES (ONE SYCAMORE AND FOUR BEECHES) AND THESE WILL BE REPLACED WITH 15 ROOT BALLED EXTRA HEAVY STANDARD BEECH TREES. A NEW MIXED SPECIES HEDGE WILL BE PLANTED ALONG THE NEW OVER-RUN AREA TO ENHANCE THE CHARACTER OF THIS SECTION OF ROAD IN THE LONG-TERM. FOUR OVERHEAD BT POLES WILL BE IMPACTED AND WILL NEED TO BE RELOCATED.

THE OVER-RUN AREA WILL BATTER BACK INTO THE EXISTING LEVELS WITH FILL AND NEW DRAINAGE IS TO BE PROVIDED AT THE BACK OF THE OVER-RUN AREA.
WORKS ARE TO BE CONSTRUCTED FROM WITHIN THE FIELD TO THE NORTH VIA A FIELD ACCESS OPPOSITE HAFOD FARM.

EXISTING ACCESS JUNCTION HAFOD FARM

1.32 - OVER-RUN AREA
CH 6060 - 6115
A 1.8M WIDE OVER-RUN LOCATED IN THE SOUTHERN VERGE ADJACENT TO AN EXISTING PASSING BAY IS REQUIRED AND WILL BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE THE VISUAL IMPACT. THE EXISTING VEGETATION AND COPPICE IS TO BE TRIMMED BACK/COPPICED WHERE NECESSARY.

THE PROPOSED OVER-RUN IN THE VERGE IS TO BE POROUS AND FALL TOWARDS THE EXISTING CHANNEL ALONG WHICH EXISTING GULLIES ARE LOCATED. GULLIES ARE TO BE UPGRADED TO SUIT THE PROPOSED AIL LOADING.
WORKS ARE TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.

Rev	Date	Detail	Made	Chk'd	Appr'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	26/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 10 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 5350 TO 6400

Design:	SR	CAD:	RT
Ck'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-010 Rev. G

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-S1-001-01-HD.dwg Layout Tab: 010 ♦ User: RESDN Plot time: 19/07/2013 @ 11:15 AM







BOTTOM VIEWPORT

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SECTION I CONTINUED ON DRG NO 60283248-D-012

1.37 - OVER-RUN AREA
CH 6730 - 6950
WIDENING OF 1METRE, OVER APPROXIMATELY 220M OF LENGTH ALONG THE NORTHERN VERGE IS REQUIRED USING GRASS REINFORCEMENT. THERE WILL BE SOME IMPACT ON THE EXISTING HEDGEROW DUE TO THE PROPOSED FILL EARTHWORKS AND IN ALL CASES, NEW HEDGEROW WILL BE PLANTED TO THE BACK OF THE PROPOSED WORKS TO MATCH EXISTING HEDGEROW (COMPRISING OF HAZEL AND HAWTHORN). THE EXISTING HEDGEROW IS CURRENTLY SPARSE AND THE NEW HEDGEROW WILL BE AN IMPROVEMENT WHICH WOULD BE PLANTED PRIOR TO THE EARTHWORK PROFILE INTO THE FIELD TO THE SOUTH.

THE EXISTING FIELD ACCESS AT CH 6825 IS TO BE USED FOR ACCESS INTO THE FIELD TO THE SOUTH FOR CONSTRUCTION WORKS.

THERE ARE NO GULLIES LOCATED IN THE AFFECTED AREA TO THE NORTH AND IT IS ASSUMED THAT THE ROAD DRAINS INTO THE EXISTING VERGE AND THE PROPOSED POROUS GRASS REINFORCEMENT OVER-RUN AREA. NEW DRAINAGE IS TO BE PROVIDED TO THE BACK OF THE PROPOSED EARTHWORKS AS REQUIRED - TO BE DEFINED POST PLANNING.

1.36 - OVER-RUN AND PASSING PLACES
CH 6530 - 6770
TWO EXISTING PASSING PLACES AND AN ACCESS AT CH 6550 TO THE SOUTH ARE TO BE IMPROVED AND WIDENED USING GRASS REINFORCEMENT. ADDITIONAL ROAD WIDTH WILL BE ACHIEVED BY CUTTING INTO THE EXISTING SLOPE AND CONSTRUCTING A NEW HEDGE BANK AT THE REAR OF THE WORKS, WITH A NEW MIXED SPECIES HEDGEROW LOCATED ON TOP OF THE EMBANKMENT WHICH WILL IMPROVE THE CHARACTER OF THIS SECTION OF ROAD.

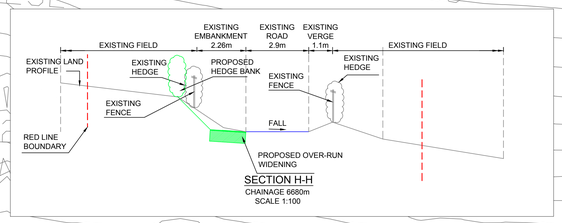
EXISTING GULLIES ALONG THIS VERGE ARE TO BE IMPROVED TO SUIT AIL LOADING, WITH NEW DRAINAGE FEATURES TO BE DETAILED POST PLANNING. ALTHOUGH SOME WORKS CAN BE UNDERTAKEN OUTSIDE OF THE HIGHWAY VIA THE FIELD TO THE SOUTH, SOME WORKS WILL BE REQUIRED WITHIN THE HIGHWAY WHICH WILL BE MANAGED WITH TRAFFIC MANAGEMENT.

EXISTING OVERHEAD LINES ARE CONFLICT WITH THESE WORKS AND WILL BE RELOCATED FURTHER INTO THE FIELDS.

H

H

EXISTING FIELD ACCESS



SECTION H-H
CHAINAGE 6680m
SCALE 1:100

1.35 - PASSING BAY
CH 6560 - 6580
WIDENING OF 1 METRE OVER APPROXIMATELY 75M OF LENGTH ON THE NORTHERN SIDE OF THE ROAD IS REQUIRED WITHIN THE VERGE USING GRASS REINFORCEMENT. THE EXISTING HEDGEROW LOCATED ON A BANK TO THE NORTH OF THE ROAD WILL BE IMPACTED AND WILL BE REPLACED WITH NEW MIXED SPECIES HEDGEROW. THERE ARE NO GULLIES LOCATED IN THE AFFECTED AREA TO THE NORTH AND IT IS ASSUMED THAT THE ROAD DRAINS INTO THE EXISTING VERGE. NEW DRAINAGE IS TO BE PROVIDED AT THE BACK OF THE PROPOSED EARTHWORKS AS REQUIRED AND THIS TO BE DEFINED POST PLANNING.

THE EXISTING FIELD ACCESS AT CH6625 IS TO USED FOR ACCESS INTO THE FIELD TO THE SOUTH FOR CONSTRUCTION WORKS.

TOP VIEWPORT

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SECTION I CONTINUED ON DRG NO 60283248-D-012

RIVER

EXISTING PIPE CULVERT CROSSING.STRUCTURAL STRENGTH TO BE CONFIRMED

TRIM & RELOCATE HEDGEROW

1.38 - OVER-RUN AREA
CH 6950 - 7130
AN OVER-RUN LOCATED IN AN AREA OF EXISTING VERGE TO THE NORTH, BETWEEN CH6950 AND CH7010 IS TO BE WIDENED TO 4M IN WIDTH WITH THE NEW PASSING PLACE CONSTRUCTED FROM ASPHALT AS A BETTERMENT TO THE ROAD. FROM CH7010 TO CG7130 THE MAXIMUM AREA OF 1M WIDTH IN GRASS REINFORCEMENT IS TO BE LAID IN THE VERGE TO ALLOW FOR OVER-RUN. NEW DRAINAGE IS TO BE PROVIDED TO THE REAR OF THE OVER-RUN AREA AT THE FOOT OF THE EARTHWORK PROFILE AND TIE INTO THE EXISTING DRAINAGE TOWARDS RIVER - TO BE DEFINED POST PLANNING.

THE HEDGEROW TO THE NORTH WILL BE IMPACTED AND WILL BE CUT BACK OR REPLANTED WITHIN THE EXISTING FIELD. THE MAXIMUM LENGTH OF HEDGEROW EXPECTED TO BE IMPACTED IS 15M IN LENGTH AND COMPRISES OF BLACKTHORN, HAZEL AND HAWTHORN. ANY VEGETATION LOSS IS TO BE REPLACED AND CURRENT HEDGE BANK SOIL IS TO BE USED IN THE CONSTRUCTION OF THE NEW HEDGE. A SINGLE BT POLE IS TO BE TO BE RELOCATED.

WORKS ARE TO BE CONSTRUCTED FROM THE EXISTING VERGE AREAS AND ON-LINE USING TRAFFIC MANAGEMENT.

1.39 - OVER-RUN AREA
CH 7100 - 7200
AN OVER-RUN AREA LOCATED IN THE NORTHERN VERGE ON THE APPROACH TO THE DOLWEN ISAF BRIDGE IS TO BE WIDENED BY 1METRE USING GRASS REINFORCEMENT UP TO THE FOOTING OF THE EXISTING EMBANKMENT. REINFORCEMENT IS TO BE LAID OVER THE EXISTING FILTER TRENCH, WHICH WILL NEED TO BE RETAINED. THE EMBANKMENT CAN BE PLANTED WITH A VARIETY OF SHRUBS SUCH AS HAWTHORN, BIRCH AND HAZEL TO ENHANCE THIS SECTION.

ALL WORKS ARE WITHIN THE HIGHWAY WITH MINIMAL VEGETATION IMPACT, THERE WILL HOWEVER BE A MINIMAL IMPACT ON THE EXISTING DRAINAGE IN THIS AREA. ALL WORKS ARE TO BE CONSTRUCTED ON-LINE USING TRAFFIC MANAGEMENT.

1.40 - OVER-RUN AREA
CH 7150 - 7290
AN OVER-RUN AREA OF 1.5M WIDTH IS REQUIRED IN THE NORTHERN VERGE WITH FILL EARTHWORKS DOWN TO THE EXISTING RIVER BANK. THE OVER-RUN IS TO BE CONSTRUCTED IN GRASS REINFORCEMENT WITH THE EXISTING VEGETATION (MOSTLY SMALL BUSHES AND TREES) TO BE CLEARED TO ALLOW FOR EARTHWORKS. FILL EARTHWORKS ARE TO BE CONSTRUCTED UP TO EXISTING FENCE LINE ALONG THE BANK OF THE RIVER AND THE EXISTING DRAINAGE IS TO BE ENGINEERED TO SUIT PROPOSED EARTHWORKS AND EMBANKMENT DRAINAGE - TO BE DETAILED POST PLANNING.

ALL WORKS IDENTIFIED AT THIS LOCATION ARE REQUIRED REGARDLESS OF WIDENING (OPTION 1) OR NON-WIDENING (OPTION 2) AT DOLWEN ISAF BRIDGE.

WORKS ARE TO BE CONSTRUCTED FROM THE EXISTING VERGE AREAS AND ON-LINE USING TRAFFIC MANAGEMENT.



BOTTOM VIEWPORT

TOP VIEWPORT

1.37 - OVER-RUN AREA
CH 6730 - 6950
WIDENING OF 1METRE, OVER APPROXIMATELY 220M OF LENGTH ALONG THE NORTHERN VERGE IS REQUIRED USING GRASS REINFORCEMENT. THERE WILL BE SOME IMPACT ON THE EXISTING HEDGEROW DUE TO THE PROPOSED FILL EARTHWORKS AND IN ALL CASES, NEW HEDGEROW WILL BE PLANTED TO THE BACK OF THE PROPOSED WORKS TO MATCH EXISTING HEDGEROW (COMPRISING OF HAZEL AND HAWTHORN). THE EXISTING HEDGEROW IS CURRENTLY SPARSE AND THE NEW HEDGEROW WILL BE AN IMPROVEMENT WHICH WOULD BE PLANTED PRIOR TO THE EARTHWORK PROFILE INTO THE FIELD TO THE SOUTH.

THE EXISTING FIELD ACCESS AT CH 6625 IS TO BE USED FOR ACCESS INTO THE FIELD TO THE SOUTH FOR CONSTRUCTION WORKS.

THERE ARE NO GULLIES LOCATED IN THE AFFECTED AREA TO THE NORTH AND IT IS ASSUMED THAT THE ROAD DRAINS INTO THE EXISTING VERGE AND THE PROPOSED POROUS GRASS REINFORCEMENT OVER-RUN AREA. NEW DRAINAGE IS TO BE PROVIDED TO THE BACK OF THE PROPOSED EARTHWORKS AS REQUIRED - TO BE DEFINED POST PLANNING.

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S.
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
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A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 11 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 6400 - 7400

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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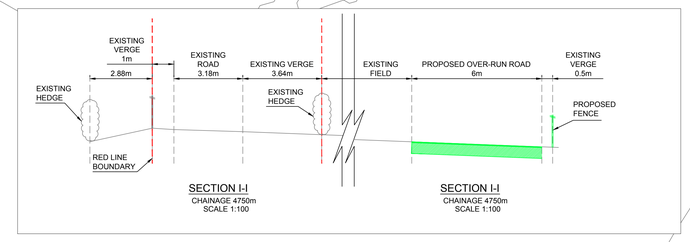
No. 60283248-D-011 Rev. G

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\LAYOUTS\60283248-D-001-014.dwg Layout Tab: 011 • User: RESEN Plot time: 19/07/2013 @ 11:19 AM



DOLWEN ISAF BRIDGE
CHAINAGE 7250 - 7300
CHAINAGE 7220 - 7330
THE OVER-RUN IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT WITH CUT EARTHWORKS TO TIE INTO THE EXISTING SLOPE PROFILE WITH EITHER REINFORCED EARTH OR OTHER APPROVED RETAINING SOLUTION AT A MAX 1:1 PROFILE. EXISTING TREES ARE TO BE CUT BACK TO SUIT THE REQUIRED EARTHWORKS WITH EARTHWORKS MITIGATED BY PLANTING AT THE TOP OF EARTHWORKS. PLANTING PROVIDED AT THE BRIDGE WILL CONSIST OF ASH, HAZEL, BIRCH AND HAWTHORN TO REPLICATE SPECIES ALREADY PRESENT. WORKS IN THIS SECTION ARE TO BE UNDERTAKEN ON-LINE WITH TRAFFIC MANAGEMENT.

THE EXISTING DRAINAGE CHANNEL ALONG THE FOOT OF THE EXISTING EARTHWORKS (LEADING FROM CH 7100 ON THE SOUTH SIDE) LEADS INTO THE RIVER TO THE SOUTH AND WILL BE MODIFIED TO ALLOW FOR OVER-RUN BY AIL VEHICLES WITH A DIVERSION AROUND THE BASE OF THE CUT EMBANKMENT.

THE WORKS AT THE BRIDGE WILL INVOLVE THE LOSS OF A MATURE ASH TREE AND A SMALL AMOUNT OF SCRUB. THE BANK WORKS INTO THE CONIFER PLANTATION WILL INVOLVE THE LOSS OF SOME HAZEL BUSHES, ALTHOUGH THESE HAVE RECENTLY BEEN TRIMMED BACK EXTENSIVELY BY HIGHWAY WORKS. THE BUSHES CURRENTLY SCREEN THE CONIFERS AND SHOULD BE REPLANTED AT THE TOP OF THE NEW EMBANKMENT.

THERE WAS A SMALL AMOUNT OF BADGER ACTIVITY NOTED IN THE CONIFER PLANTATION BUT THERE IS NO SETTS WERE IDENTIFIED IN THE WOOD. A RE-SURVEY FOR BADGERS WILL TAKE PLACE IMMEDIATELY BEFORE ANY WORK COMMENCES. PLANTING ON NEW EMBANKMENTS TO THE BRIDGE WILL BE OF ASH, HAZEL, BIRCH AND HAWTHORN TO REPLICATE THE SPECIES CURRENTLY PRESENT. AN OTTER SURVEY WAS UNDERTAKEN UNDER THE BRIDGE AND IMMEDIATELY UP AND DOWN STREAM; NO SIGNS OF ACTIVITY WERE REPORTED - THIS WILL BE REPEATED IMMEDIATELY PRIOR TO CONSTRUCTION.

BRIDGE WORKS
THE EXISTING FIXED PARAPETS ARE TO BE REPLACED WITH A SOLUTION TO CATER FOR THE AIL MOVEMENTS.

CHAINAGE 7330 - 7530
THE NEW OFF-ROAD TRACK IS TO BE CONSTRUCTED WITH A NEW WIDENED OVER-RUN AREA ON THE EXIT FROM THE BRIDGE. THE TRACK IS TO BE MINIMUM OF 5.5M WIDTH, WITH WIDENING ON THE LEFT TURN ONTO THE TRACK. THE BYPASS IS TO BE SCREENED FROM THE ROAD BY A NEW HEDGEROW REPLACING THE EXISTING FIELD BOUNDARY FENCE PROVIDING APPROXIMATELY 100M OF NEW HEDGEROW ALONG THE ROUTE AND ENHANCING THE CHARACTER OF THE ROAD. A NEW FENCE IS TO BE PROVIDED ACROSS THE NORTHERN EDGE OF THE BYPASS WITH A REMOVABLE FENCE ACROSS THE BYPASS TO SECURE ACCESS. A NEW FIELD ACCESS IS TO BE PROVIDED AS SHOWN ON DRAWING TO TIE INTO THE EXISTING ROAD ALIGNMENT AT THE EXISTING PROPERTY ACCESS. NEW FIELD DRAINAGE IS TO BE PROVIDED AND THIS WILL BE DEFINED POST PLANNING.

A NEW TEMPORARY COMPOUND WILL BE LOCATED TO THE NORTH OF THE WORKS TO PROVIDE WELFARE FACILITIES FOR WORKS ALONG THE COUNTY ROAD AND THIS WILL BE RESTORED TO AGRICULTURAL USE POST CONSTRUCTION.

AN ALTERNATIVE ARRANGEMENT FOR THESE WORKS IS SHOWN IN THE OPTION 1. OPTION 1 CAN ALSO BE USED FOR A SAN EXIT FROM DOLWEN ISAF BRIDGE.

EXISTING FIELD

EXISTING FIELD ACCESS TO REMAIN

EXISTING HEDGE TO BE RETAINED

RIVER

34.58m
10.64m
17.07m
10.98m
31.79m
28.00m
8.60m
8.60m

7550.000
7500.000
7450.000
7400.000
7350.000
7300.000

SECTION 1 CONTINUED ON 60283248-D-013

SECTION 1 CONTINUED ON 60283248-D-011

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
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---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: SECTION 1
SHEET 12 OF 14
LLANERFYL TO ACCESS 1
DOLWEN ISAF
CHAINAGE 7400 TO 7550

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:250@A0 - NTS@A3

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No. 60283248-D-012 Rev: G

A0

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ACCESS TO DOLWEN FARM

1.42 - OVER-RUN AREA
CH 7660 - 7720
AN OVER-RUN LOCATED TO THE NORTH EAST OF THE CARRIAGEWAY TO ALLOW AILS TO TURN LEFT AT THE DOLWEN FARM ENTRANCE. A NEW GRASS REINFORCEMENT CONSTRUCTION IS TO BE INSTALLED IN THE EXISTING VERGE UP TO THE EXISTING FENCE LINE (APPROXIMATELY 1.2M) - THE VERGE FALLS AWAY TOWARDS THE EXISTING WATERCOURSE TO THE NORTH AND THESE ARE TO BE RETAINED AS A PART OF THE OVER-RUN CONSTRUCTION.

IMPACT ON THE VEGETATION LOCATED BEHIND THE FENCE LINE IS EXPECTED TO BE MINIMAL.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND AS SUCH, CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AS WORKS ARE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.

EXISTING OVERHEAD CABLE LINE TO BE DIVERTED TO NORTH SIDE OF ROAD

7720.000
7700.000
7660.000
7600.000
7600.000
3.4m
3.8m
20.6m

RIGHT VIEWPORT

1.43 - OVER-RUN AREA
CH 7700 - 7780
OVER-RUN INSTALLED ON THE INSIDE OF THE BEND AND CONSTRUCTED WITHIN AN AREA OF CUT OPPOSITE THE DOLWEN FARM ACCESS. WORKS ARE TO BE CONSTRUCTED USING GRASS REINFORCEMENT. CONSTRUCTION OF THE OVER-RUN WILL IMPACT THE EXISTING HEDGEROW AND FENCING AND THE EXISTING GATED ACCESS IS TO BE RELOCATED TO CH7780. NEW DRAINAGE IS TO BE PROVIDED AT THE BACK OF OVER-RUN AREA TO TIE INTO EXISTING FIELD DRAINAGE. LEVELS FOR THE OVER-RUN AREA ARE TO FALL AWAY FROM THE EXISTING ROAD. THE CURRENT HEDGE IS OF HAZEL AND HAWTHORN ON A SMALL BANK AND CAN BE TRANS-LOCATED.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND AS SUCH, CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS WILL BE VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.

1.41 - OVER-RUN AREA
CH 7500 - 7670
AN OVER-RUN TO ENABLE AIL MOVEMENTS TOWARDS DOLWEN FARM, CONSTRUCTED FROM GRASS REINFORCEMENT LOCATED IN THE FIELD OPPOSITE THE EGRESS FROM THE DOLWEN UCHAF BRIDGE. EXISTING HEDGEROW AND FENCE LINES ARE IMPACTED AND ARE TO BE RELOCATED TO THE REAR OF THE WORKS. APPROXIMATELY 15M OF HEDGEROW AND 105M OF FENCING IS TO BE REMOVED AND REPLACED IN ITS EXISTING LOCATION WITH TIMBER FENCING AND GATES TO MAINTAIN THE EXISTING CHARACTER OF THE FIELD AT THIS LOCATION.

TWO EXISTING OVERHEAD LINE POLES ARE IMPACTED BY THE WORKS AND WILL NEED TO BE RELOCATED. WORKS ARE TO BE CONSTRUCTED FROM THE EXISTING FIELD WITH MINIMAL IMPACT ON THE ROAD.

SECTION 1 CONTINUED ON 60283348-D-014

7750.000
7800.000
7850.000
7900.000
7950.000
8000.000
8050.000
8100.000
8150.000

LEFT VIEWPORT

1.44 - OVER-RUN AREA
CH 7950 - 8040
A 1.5M WIDE OVER-RUN IS TO BE CONSTRUCTED USING GRASS REINFORCEMENT, THIS WORK WILL IMPACTS AN EXISTING PIPED CULVERT AND THE FENCE LINE AT THE REAR OF THE OVER-RUN AREA. MINIMAL EARTHWORKS ARE REQUIRED TO TIE INTO THE EXISTING LEVELS AT THE BACK OF THE VERGE AND ADJACENT TO THE EXISTING CULVERT. THE PROPOSED LEVELS ARE TO FALL AWAY FROM THE EXISTING ROAD WITH DRAINAGE TO BE PROVIDED AT THE REAR OF THE WORKS TO OUTFALL INTO THE EXISTING WATERCOURSE - TO BE DEFINED POST-PLANNING.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND AS SUCH, CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS WILL BE VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES

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2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
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7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

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- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
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- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- PUBLIC RIGHT OF WAY

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION.	SR	SC	KM
F	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	10/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
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--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBYRNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 13 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 7550 - 8100

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0- NTS@A3

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No. 60283248-D-013 Rev: G

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SITE ACCESS
CH 8250

NEW SITE ACCESS FOR TWO WAY HGV MOVEMENT TO BE CONSTRUCTED FROM ASPHALT FOR THE FIRST 10M. WITH THE AIL OVER-RUN CONSTRUCTED WITH GRASS REINFORCEMENT TO MINIMISE THE EXTENT OF ASPHALT. A WOODEN GATE AND FENCE LINE IS TO BE LOCATED AT A SET-BACK DISTANCE SUITABLE TO ALLOW AN HGV TO PULL INTO THE JUNCTION AND THEN SECURE/UNSECURE THE GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. THE AIL OVER-RUN FOR THE JUNCTION LOCATION IS TO SUIT LEFT TURN MOVEMENT INTO THE JUNCTION. THE JUNCTION IS DESIGNED BASED ON A 2.4M X 70M VISIBILITY SPLAY.

THE PROPOSED EARTHWORKS PROFILE IS TO MATCH THOSE CURRENTLY ON SITE. WORKS AT THE JUNCTION WILL IMPACT THE EXISTING FENCE LINE AND SITE ACCESS WHICH WILL BE INTEGRATED INTO THE NEW JUNCTION. THE EXISTING OVERHEAD POLE IS TO BE RELOCATED AND NEW DRAINAGE PROVIDED TO OUTFALL INTO ADJACENT SMALL WATERCOURSE.

ACCESS 1 ARRANGEMENT IS SHOWN ON DRAWING NO. 60283248-D-042.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND AS SUCH, CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS WILL BE VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.

1.45 - OVER-RUN AREA
CH 8150 - 8240

OVER-RUN TO BE CONSTRUCTED ON INSIDE OF BEND WITH NEW DRAINAGE TO BE PROVIDED TO THE NORTH ALONG THE BOTTOM OF EARTHWORK PROFILE TO TIE INTO THE PROPOSED DRAINAGE AT THE NEW ACCESS JUNCTION. THE PROPOSED WORKS WILL IMPACT AN EXISTING TREE AND AN AREA OF VEGETATION WHICH IS TO BE TRIMMED AND REPLACED WITH LOCAL PROVENANCE AT THE BACK OF THE WORKS.

A NEW FENCE LINE IS TO BE PROVIDED AT THE TOP OF THE EARTHWORKS AND WILL TIE INTO THE FENCE LINE ASSOCIATED WITH ACCESS 1.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND AS SUCH, CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR THE WORKS WILL BE VIA THE EXISTING FIELD ACCESS, WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.

8050.000
8100.000
8150.000
8200.000
8250.000
8300.000
8350.000

SECTION 1 CONTINUED ON 60283248-D-013

SITE ACCESS HERE

SITE ACCESS 1

EXISTING PIPE CULVERT CROSSINGS, STRUCTURAL STRENGTH TO BE CONFIRMED

SECTION 2 CONTINUED ON 60283248-D-015 to 022

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
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- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- PUBLIC RIGHT OF WAY

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--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 1 SHEET 14 OF 14 LLANERFYL TO ACCESS 1 CHAINAGE 8100 - 8250

Design:	SR	CAD:	RT
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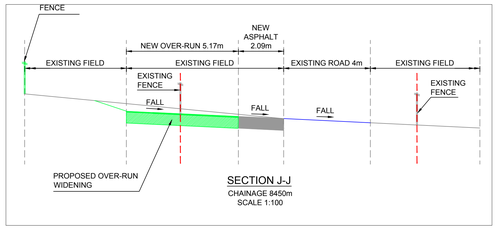


SECTION J-J
CHAINAGE 8450m
SCALE 1:100

SITE ACCESS 1
CH 8250
NEW SITE ACCESS FOR TWO WAY HGV MOVEMENT TO BE CONSTRUCTED FROM ASPHALT FOR THE FIRST 10M, WITH THE AIL OVER-RUN CONSTRUCTED WITH GRASS REINFORCEMENT TO MINIMISE THE EXTENT OF ASPHALT. A WOODEN GATE AND FENCE LINE IS TO BE LOCATED AT A SET-BACK DISTANCE SUITABLE TO ALLOW AN HGV TO PULL INTO THE JUNCTION AND THEN SECURE/UNSECURE THE GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. THE AIL OVER-RUN FOR THE JUNCTION LOCATION IS TO SUIT LEFT TURN MOVEMENT INTO THE JUNCTION. THE JUNCTION IS DESIGNED BASED ON A 2.4M X 70M VISIBILITY SPLAY.

THE PROPOSED EARTHWORKS PROFILE IS TO MATCH THOSE CURRENTLY ON SITE. WORKS AT THE JUNCTION WILL IMPACT THE EXISTING FENCE LINE AND SITE ACCESS WHICH WILL BE INTEGRATED INTO THE NEW JUNCTION. THE EXISTING OVERHEAD POLE IS TO BE RELOCATED AND NEW DRAINAGE PROVIDED TO OUTFALL INTO ADJACENT SMALL WATERCOURSE.

ACCESS 1 ARRANGEMENT IS SHOWN ON DRAWING NO. 60283248-D-042.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND AS SUCH, CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS WILL BE VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.

SITE ACCESS 1
DWG 60283248-D-042

2.2 - OVER-RUN AREA
CH 8330 - 8580
THIS SECTION OF OVER-RUN LOCATED TO THE SOUTH OF THE ROAD IN AN AREA OF CUT, WILL BE CONSTRUCTED FROM GRASS REINFORCEMENT AND WILL BE IS ALSO SUITABLE TO SERVE AS A PASSING PLACE FOR HGVS. PASSING WORKS CONSTRUCTED FROM GRASS REINFORCEMENT LOCATED TO THE SOUTH OF THE CARRIAGEWAY IN AN AREA OF CUT. EXISTING EMBANKMENTS HAVE AN OPEN CHANNEL OF APPROXIMATELY 0.1M WIDTH RUNNING DOWN FROM CHAINAGE 8450 TO A CULVERT LEADING DOWN TO THE RIVER TO THE SOUTH EAST. THE OVER-RUN AREA IS 6 METRES WIDE, WITH VERGE AND NEW HEDGEROW / FENCE LINE TO BE PROVIDED TO THE REAR PRIOR TO EARTHWORKS.

EXISTING ROAD DRAINAGE IS TO BE RETAINED WITH THE EXISTING GULLY AND CHANNEL TO BE INCORPORATED INTO THE DESIGN. THE CHANNEL IS TO BE DIVERTED TO THE FOOT OF THE PROPOSED EARTHWORKS WITH A NEW NEW CONNECTION INTO THE EXISTING GULLIES. NEW GULLIES ARE TO BE PROVIDED WITHIN THE AREA OF ASPHALT WIDENING FOR PASSING BAY ON CORNER.

IT IS EXPECTED THAT THREE T3 NO. EXISTING TREES (TWO SMALL ASH TREES AND A SMALL HAWTHORN) WILL BE ARE IMPACTED BY THE WORKS AND THEREFORE, NEW AND ADDITIONAL TREES WILL BE PLANTED OUTSIDE OF THE WORKS TO MITIGATE THIS LOSS. THESE TREES LOST ARE TWO SMALL ASH TREES AND A SMALL HAWTHORN. AN AN ADDITIONAL HAWTHORN IN THE CENTRE OF THIS SECTION WILL ALSO BE LOST, ALONG WITH A SMALL PATCH OF GORSE. THESE WILL BE REPLACED IN SIMILAR POSITIONS OUTSIDE OF THE PROPOSED NEW WORKS. A LARGER AREA OF GORSE WILL BE PLANTED ADJACENT TO THE CURRENT BUSHES ON THE INSIDE OF THE BEND WORKS ARE TO BE CONSTRUCTED FROM WITHIN THE FIELD TO THE SOUTH. THE PROPOSALS WILL ALSO IMPACT FOUR 4 NO OVERHEAD BT/ELECTRICITY POLES IMPACTED BY THE PROPOSAL AND THESE WILL NEED TO BE RELOCATED.

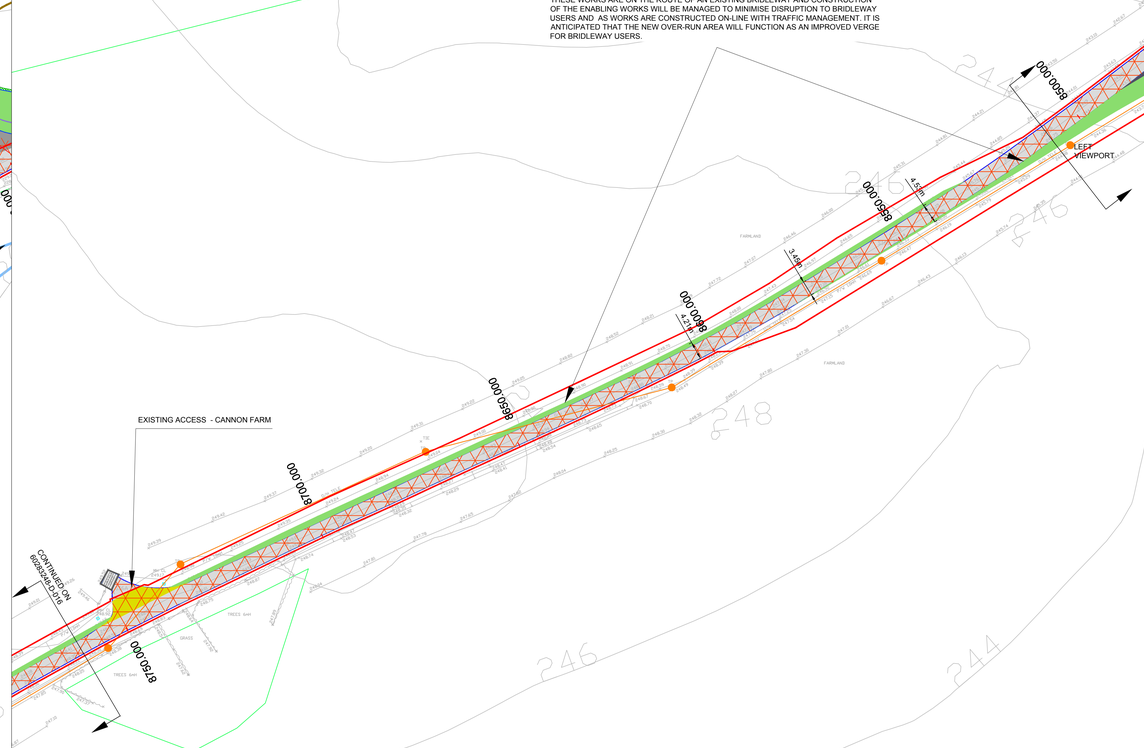
THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. THE WORKS ARE TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT WITH SOME WORKS CONSTRUCTED FROM THE ADJACENT FIELD. IT IS ANTICIPATED THAT THE NEW OVER-RUN AREA WILL FUNCTION AS AN IMPROVED VERGE FOR BRIDLEWAY USERS.

2.1 - OVER-RUN AREA
CH 8280 - 8320
AN OVER-RUN AREA OF APPROXIMATELY ONE 1METRE OVER-RUN IS TO BE CONSTRUCTED ON SOUTHERN SIDE OF THE ROAD ON THE OUTSIDE OF THE BEND. THIS OVER-RUN AREA WILL BE CONSTRUCTED FROM FROM GRASS REINFORCEMENT. TO THE SOUTH OF THE ROAD.

EXISTING CULVERTS WHICH PASS UNDER THE ROAD IN AT THIS LOCATION WILL AND ARE NOT BE IMPACTED BY THE OVER-RUN.
THESE WORKS ARE LOCATED ON THE ROUTE OF AN EXISTING BRIDLEWAY AND CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AS WORKS ARE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT. IT IS ANTICIPATED THAT THE NEW THIS OVER-RUN AREA WILL CAN FUNCTION AS AN IMPROVED VERGE FOR FUTURE USE BY BRIDLEWAY USERS.

LEFT VIEWPORT | RIGHT VIEWPORT

2.3A - OVER-RUN AREA
CH 8500 - 8850
A MINIMUM OVER-RUN OF MIN 1 METRE OVER-RUN IS TO BE CONSTRUCTED IN THE NORTHERN VERGE FROM GRASS REINFORCEMENT IN EXISTING NORTHERN VERGE WORKS TO THE NORTH ARE TO TIE IN WITH THE EXISTING CARRIAGEWAY AT THE CANNON FARM ACCESS WITH NO IMPACT ON EXISTING TREES, DRAINAGE OR VEGETATION ALONG THIS SECTION OF ROAD.
THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AND AS WORKS ARE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT. IT IS ANTICIPATED THAT THE NEW OVER-RUN AREA WILL FUNCTION AS AN IMPROVED VERGE FOR BRIDLEWAY USERS.



INTER VISIBILITY ASSESSMENT							
Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility / TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
8350	2.1	ACCESS 1	YES	Straight	NONE	110m	93m
8450	2.2	2.1	YES	Curve	NONE	293m	110m
8750	2.3	2.2	YES	Straight	NONE	200m	293m
9650	2.4	2.3	YES	Curve	NONE	83m	109m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	Appr'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	10/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	15/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	08/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 1 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 8250 TO 8750

Design:	JC	CAD:	JC
Chk'd:	SR	Appr'd:	SC
Date:	04/02/2013	Scale:	1:500@A0- NTS @A3

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No. 60283248-D-015 Rev. G

A0

NEINTHIRION BYPASS - DRAWING 60283248-D-045.
900M OF NEW ROAD
THIS NEW TRACK IS TO CARRY AIL AND HGV TRAFFIC FROM CHAINAGE 8950 ON THE COUNTY ROAD TO CHAINAGE 9600 TO THE SOUTH OF NEINTHIRON. THE BYPASS WILL BE 5.5 METRES WIDE WITH WIDENED SECTIONS TO SUIT THE AIL MOVEMENT AND THE HORIZONTAL ALIGNMENT OF THE TRACK. THIS NEW TRACK IS TO BE CONSTRUCTED FROM STONE WITH A GRASS REINFORCED SURFACING TO REDUCE THE VISUAL IMPACT OF THE TRACK.

THE PROPOSED BRIDGE WILL APPROXIMATELY 10 METRES IN WIDTH, LOCATED BETWEEN CH 120 AND 130 AND DURING THE CONSTRUCTION PERIOD WILL HAVE A TEMPORARY PARAPET WHICH WILL BE REMOVED AS PART OF THE PERMANENT WORKS TO REDUCE THE LONG TERM VISUAL IMPACT OF THE STRUCTURE. THE ALIGNMENT OF THE ROAD AND EARTHWORKS ARE TO BE SMOOTHED INTO THE EXISTING LANDFORM TO REDUCE THE VISUAL IMPACT, WITH ADDITIONAL GROUND REMODELLING. ALL EARTHWORKS WILL USE LOCALLY TOPSOIL AND WILL BE SEEDED WITH LOCAL SEED . TREES TO BE PLANTED ALONG EXISTING HEDGELINES TO PROVIDE ADDITIONAL SCREENING WHEN VIEWED FROM THE COUNTRY ROAD, GLYNDWR'S WAY FOOTPATH AND NEINTHIRON. THE BYPASS REQUIRES CULVERTS AND A BRIDGE STRUCTURE. ALL CHAINAGES ON THE SCHEDULE BELOW ARE BASED WITH CH0 AT CH8860 ON THE COUNTY ROAD. NEW CULVERT AT CH 550, 780, 790, 860. ALIGNMENT OF THE TRACK IS BASED ON SWEPT PATH ASSESSMENT, NOISE IMPACT OF THE TRAFFIC FROM NEINTHIRION AND IS DUE TO THE SWEPT PATH ALIGNMENT OF THE AILS.

ADDITIONAL CROSS EMBANKMENT DRAINS/CULVERTS ARE TO BE PROVIDED ON THE WESTERN APPROACH TO THE BRIDGE FOR APPROXIMATELY 100 METRES TO REDUCE IMPACT ON THE FLOOD PLAIN. THE NEW CULVERT ON THE EXISTING WATERCOURSE AT CH 460 IS TO BE DESIGNED TO SUIT THE LARGE CATCHMENT AREA OF APPROXIMATELY 0.7KM2.A NEW ACCESS DOWN TO THE EXISTING FARM TRACKS IS AT CH 490, WHICH IS AN EXISTING PUBLIC RIGHT OF WAY AND AS SUCH, A FORMALISED CROSSING AND ACCESS CONTROL WILL BE REQUIRED TO MAINTAIN THIS RIGHT OF WAY.

THE BYPASS SERVES AS A PASSING PLACE TO ALLOW TRAFFIC ON THE COUNTY ROAD TO BYPASS AILS DURING MOVEMENTS AND IS A PART OF THE PASSING AREA STRATEGY DETAILED IN THE LTMP DOCUMENTATION. THE BYPASS PROVIDES PASSING PLACES FOR HGVS AT CH 260, BETWEEN CH 400 TO CH 550, CH 700 TO CH 900 AND AT THE EGRESS JUNCTION AT CHAINAGE 1000 - THESE PASSING PLACES ARE ALL INTER-VISIBLE.

THE BY-PASS INVOLVES THE LOSS OF A SMALL AREA OF SCRUB WHERE IT LEAVES THE EXISTING ROAD AND CROSSES THE STREAM, THIS WILL BE REPLANTED ON THE EMBANKMENT OF THE NEW BY-PASS USING A MIX OF ASH AND HAWTHORN. THE BY-PASS THEN CROSSES A SERIES OF IMPROVED FIELDS WHERE THE TRACK IS RAISED ON AN EMBANKMENT. SCRUB WILL BE ALLOWED TO DEVELOP ALONG THE BANKS TO PROVIDE HABITAT AND SCREEN THE TRACK. HOWEVER, THE SCRUB WILL BE KEPT TRIMMED TO ENSURE THE OPEN NATURE OF THE AREA IS MAINTAINED AND TO ENSURE IT DOES NOT PROVIDE A POTENTIAL NESTING HABITAT FOR CROWS.
TOWARDS THE WESTERN END, A SECTION OF APPROXIMATELY 150 METRES PASSES OVER AN AREA OF MARSHY GRASSLAND OVER PEAT, WITH PEAT DEPTHS VARYING BETWEEN 0.2 METRES IN THE SOUTH, 0.85 METRES IN THE CENTRE AND 0.65 METRE AT THE NORTH. WHILST THIS AREA HAS BEEN EXTENSIVELY DRAINED, IT STILL RETAINS MARSHY HABITAT, MAINLY *MOLINIA*. THE AREA BETWEEN THE MARSHY GRASSLAND AND WHERE THE BY-PASS REJOINS THE ROAD IS DAMP BUT IS ON MINERAL SOIL. THERE WILL BE AN IMPACT ON PEAT FOR THE SECTION CROSSING THE MARSHY GRASSLAND. AN OTTER SURVEY WAS UNDERTAKEN AND NO SIGNS OF HABITAT WERE OBSERVED - THIS SURVEY WILL BE REPEATED IMMEDIATELY PRIOR TO CONSTRUCTION.

2.3B - NEINTHIRION BYPASS ACCESS AND OVER-RUN AREA
CH 8850 - 8950
THIS OVER-RUN AREA IS LOCATED TO THE NORTH OF THE ROAD PRIOR TO THE NEINTHIRION BRIDGE AND WILL BE CONSTRUCTED FROM GRASS REINFORCEMENT AND ASPHALT. THE JUNCTION IS LOCATED TO ALLOW A STRAIGHT ALIGNMENT OVER THE RIVER, PROVIDE VISIBILITY FOR ONCOMING TRAFFIC AND AT A LOCATION WHERE THE WIDTH OF THE RIVER IS REDUCED TO MINIMISE IMPACT ON THE EXISTING WATERCOURSE. THE BYPASS JUNCTION WILL HAVE A WOODEN SINGLE HINGED GATED ACCESS AND DESIGNED TO SUIT RIGHT TURNING IN AND LEFT TURNING OUT HGV TRAFFIC. VISIBILITY SPLAYS OF 2.4M X 70M ARE PROVIDED TO THE EAST, BUT VISIBILITY SPLAYS ARE CONSTRAINED TO THE WEST BY EXISTING EARTHWORKS WHICH ARE BEING RETAINED. APPROXIMATE SPLAYS ARE 2.4X 42M WEST.
NEW DRAINAGE IS TO BE PROVIDED ALONG THE VERGE AND AT THE TOE OF THE PROPOSED EARTHWORKS. WORKS ARE TO DRAIN AWAY FROM THE CARRIAGEWAY TO REDUCE THE IMPACT ON EXISTING DRAINAGE. A NEW FENCE IS TO BE ERECTED AROUND THE WORKS AND TIED INTO THE NEW GATED ACCESS. THE BRIDLEWAY IS TO BE RETAINED THROUGH NEINTHIRION AND WILL NOT USE THE BYPASS. ACCESS FOR THE CONSTRUCTION OF THE BYPASS AND THE ACCESS JUNCTION IS TO BE TAKEN FROM THE FIELDS ADJACENT AND TO THE NORTH OF THE ROAD.

NEW BRIDGE STRUCTURE
REQUIRED TO CROSS EXISTING WATERCOURSE.
DETAILS TO BE CONFIRMED POST PLANNING

EXISTING ACCESS - CANNON FARM

PROPOSED CULVERT

EXISTING STONE WALL TO BE TAKEN DOWN

EXISTING STONE WALL TO BE TAKEN DOWN AND NEW GATE PROVIDED

SECTION IN CUT LEADING TO BYPASS

NEINTHIRON BYPASS
REFER TO DWG. 60283245-D-045.

ACCESS DETAIL FOR BYPASS TO BE GATED AND AGREED. REFER TO DWG.60283248-D-045

PROPOSED CHANNEL DIVERSION

NEW ACCESS TO PROVIDE CROSSING OF EXISTING TRACK OVER BYPASS

EXISTING BRIDGE ALIGNMENT CONSIDERED UNFEASIBLE FOR AIL VEHICLES

NEINTHIRION

CONTINUED ON 60283248-D-015

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- PUBLIC RIGHT OF WAY

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 2 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 8750 TO 9250

Design:	JC	CAD:	JC
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0- NTS@A3

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No. 60283248-D-016 Rev: G

A0

NEINTHIRION

NEINTHIRON BYPASS REFER TO DWG.60283248-D-045

9100.000
9150.000
9200.000
9250.000
9300.000
9350.000
9400.000
9450.000
9500.000
9550.000
9600.000
9650.000
9700.000
9750.000
9800.000
9850.000
9900.000
9950.000
10000.000
10050.000

6.5m
5.5m
2.83m
7.41m
5.99m
3.37m
12.66m
3.27m
4.92m
2.8m

LEFT VIEWPORT
RIGHT VIEWPORT

EXISTING ACCESS ROAD

CONTAINER ON CONCRETE PAD

2.4 - NEINTHIRION BYPASS EGRESS AND OVER-RUN
CH 9550 - 9680
A NEW ACCESS JUNCTION AND OVER-RUN AREA FOR AILS IS PROPOSED TO THE WEST OF THE ROAD AND IS TO BE CONSTRUCTED FROM A COMBINATION OF GRASS REINFORCEMENT AND ASPHALT. THE PROPOSED LEVELS AT THE JUNCTION ARE TO TIE INTO THE EXISTING ROAD LEVELS WITH A SMALL BANK AROUND THE WORKS ABOVE THE PEATY GROUND.

A NEW WOODEN SINGLE HINGE GATE IS TO BE PROVIDED AT A 20 METRE SET-BACK FROM THE HIGHWAY TO ALLOW VEHICLES TO PULL INTO THE ACCESS AND OPEN THE GATE. EXISTING DRAINAGE AT THE FOOT OF ROAD PLATEAU IS TO BE RELOCATED TO THE TOE OF NEW EARTHWORKS FOR THE OVER-RUN AREA AND EGRESS. THE JUNCTION DESIGN ALLOWS FOR RIGHT TURNING IN AND LEFT TURNING OUT HGV TRAFFIC AND HAS A VISIBILITY SPLAY OF 2.4M X 70M FOR ONCOMING TRAFFIC.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AND WORKS WILL BE CONSTRUCTED FROM THE ADJACENT FIELD. IT IS ANTICIPATED THAT THE NEW OVER-RUN AREA WILL FUNCTION AS AN IMPROVED VERGE FOR BRIDLEWAY USERS.

2.6 - OVER-RUN AND HGV PASSING **AREA ADJACENT TO CATTLE GRID**
CH 9770 - 9980
OVER-RUN AREA BETWEEN CH 9870 AND CH 9980 AT THE EXISTING ACCESS IS SUITABLE FOR HGV PASSING.

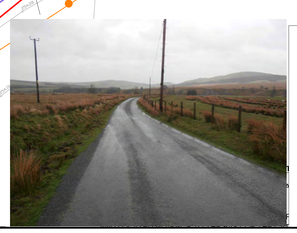
OVER-RUN AREA IS CONSTRUCTED FROM GRASS REINFORCEMENT AND LOCATED IN VERGE TO THE EAST OF THE CATTLE GRID. THE EXISTING GATE AND CATTLE GRID ARE TO REMAIN AND WILL BE USED BY HGVS ONLY WITH AIL VEHICLES USING THE NEW GATE AND OVER-RUN AREA. DURING NORMAL OPERATION, THE PROPOSED GATE WILL BE CLOSED PREVENTING ACCESS THROUGH THE CATTLE GRID ACROSS THE OVER-RUN AREA. A NEW WOODEN SINGLE HINGE GATE AND FENCE IS TO BE PROVIDED AT THE CATTLE GRID WITH ALSO A NEW FENCE AT THE BACK OF THE OVER-RUN AREA TO TIE INTO EXISTING FENCE LINES AT THE FIELD ACCESS. EXISTING FENCE POSTS ARE TO BE SOCKETED AT THE CATTLE GRID TO ALLOW FOR TEMPORARY REMOVAL IF REQUIRED.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AND WORKS WILL BE CONSTRUCTED FROM THE ADJACENT FIELD. IT IS ANTICIPATED THAT THE NEW OVER-RUN AREA WILL FUNCTION AS AN IMPROVED VERGE FOR BRIDLEWAY USERS.

2.5 - OVER-RUN AND PASSING PLACE
CH 9580 - 9840
THIS SECTION WILL SERVE AS A PASSING AREA FOR HGVS AND AIL MOVEMENTS BETWEEN CH 9760 AND CH 9840. THE OVER-RUN AREA IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT AND SEEDED WITH LOCAL SEED. A SECTION OF OFF-ROAD TRACK WILL BE PROVIDED BETWEEN CH 9680 AND CH 9840 TO AVOID IMPACTING ONE TREE AND TO STRAIGHTEN THE ALIGNMENT FOR THE AILS. THIS OFF-ROAD TRACK AND EXISTING ROAD WILL BE DELINEATED USING A WOODEN SINGLE HINGE GATE AND A WOODEN FENCE LINE. A PLANTING AREA OF GORSE BUSHES IS TO BE PROVIDED BETWEEN THE EXISTING ROAD AND THE NEW TRACK ALIGNMENT AND ALONG THE OUTSIDE OF THE ROAD. NEW DRAINAGE IS TO BE PROVIDED ON THE OUTSIDE OF THE OVER-RUN AREA TO THE WEST, WITH THE EXISTING DRAINAGE CHANNEL RELOCATED TO THE BACK OF THE OVER-RUN AREA. FOR AREAS IN CUT, NEW DRAINAGE IS TO BE PROVIDED AT THE FOOT OF THE EARTHWORKS.

A SECTION OF THE TRACK WILL IMPACT AN EXISTING DRAINAGE DITCH AND CHANNEL AND WILL REQUIRE THE CULVERT AT CH 9790 TO BE EXTENDED UP TO CH 9850 - EXISTING HIGHWAY DRAINAGE IS NOT IMPACTED.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AND WORKS WILL BE CONSTRUCTED FROM THE ADJACENT FIELD.



PROPOSED VERGE 4.3m | EXISTING ROAD 3m
EXISTING FIELD | NEW EMBANKMENT | PROPOSED OVER-RUN 5m | EXISTING VERGE | EXISTING FIELD
PROPOSED FENCE | GORSE PLANTING | EXISTING FENCE
FALL | FALL
PROPOSED OVER-RUN WIDENING

SECTION K-K
CHAINAGE 9725m
SCALE 1:100

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
9650	2.4	2.3	YES	Curve	NONE	83m	109m
9725	2.5	2.4	YES	Straight	NONE	274m	83m
10000	2.6	2.5	YES	Curve	NONE	120m	274m
10140	**ACCESS 2**	2.6	YES	Curve	NONE	98m	120m

NOTES
1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- PUBLIC RIGHT OF WAY

Rev	Date	Detail	Made	Chk'd	App'd
G	16/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 3 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 9250 TO 9900

Design:	JC	CAD:	JC
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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5th Floor, 2 City Walk
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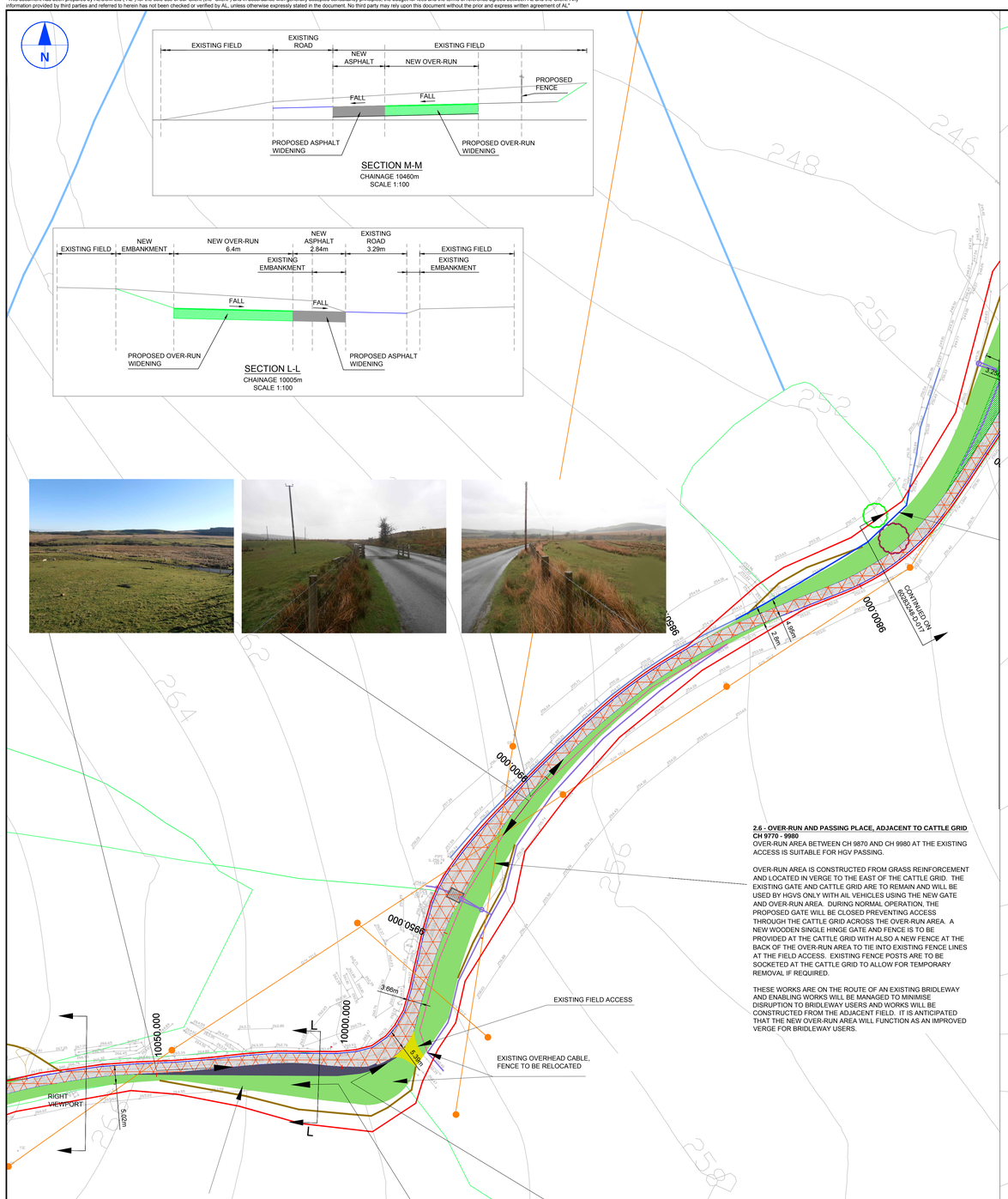
No. 60283248-D-017 Rev: G

A0

GRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUTS\60283248-D-015-022(A3 and A4)G.dwg - Layout Feb. 017 • User: REDSN Plot time - 16/07/2013 @ 10:59 AM

SECTION M-M
CHAINAGE 10460m
SCALE 1:100

SECTION L-L
CHAINAGE 10005m
SCALE 1:100



2.7A - OVER-RUN AND HGV PASSING **AREA TO SOUTH OF ACCESS 2**
CH 9980 - 10100

THIS SECTION OF GRASS REINFORCEMENT IS SUITABLE FOR HGVS TO PASS AND IS WITHIN AN AREA OF VERGE - THERE IS NO EXISTING VEGETATION OTHER THAN THE GRASSED AREAS TO THE SOUTH. THERE ARE NO EXISTING FENCE LINES, ALTHOUGH THERE ARE DRAINAGE CHANNELS LEADING INTO THE PEAT AND MARSH AREA TO THE SOUTH OF THESE WORKS. THIS SECTION HAS A WIDENED ASPHALT AREA FOR HGVS AFTER THE CATTLE GRID AND PRIOR TO ACCESS 2.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AND WORKS WILL BE CONSTRUCTED FROM THE ADJACENT FIELD. IT IS ANTICIPATED THAT THE NEW OVER-RUN AREA WILL FUNCTION AS AN IMPROVED VERGE FOR BRIDLEWAY USERS.

2.6 - OVER-RUN AND PASSING PLACE, ADJACENT TO CATTLE GRID
CH 9770 - 9980
OVER-RUN AREA BETWEEN CH 9870 AND CH 9980 AT THE EXISTING ACCESS IS SUITABLE FOR HGV PASSING.

OVER-RUN AREA IS CONSTRUCTED FROM GRASS REINFORCEMENT AND LOCATED IN VERGE TO THE EAST OF THE CATTLE GRID. THE EXISTING GATE AND CATTLE GRID ARE TO REMAIN AND WILL BE USED BY HGVS ONLY WITH AIL VEHICLES USING THE NEW GATE AND OVER-RUN AREA. DURING NORMAL OPERATION, THE PROPOSED GATE WILL BE CLOSED PREVENTING ACCESS THROUGH THE CATTLE GRID ACROSS THE OVER-RUN AREA. A NEW WOODEN SINGLE HINGE GATE AND FENCE IS TO BE PROVIDED AT THE CATTLE GRID WITH ALSO A NEW FENCE AT THE BACK OF THE OVER-RUN AREA TO TIE INTO EXISTING FENCE LINES AT THE FIELD ACCESS. EXISTING FENCE POSTS ARE TO BE SOCKETED AT THE CATTLE GRID TO ALLOW FOR TEMPORARY REMOVAL IF REQUIRED.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AND WORKS WILL BE CONSTRUCTED FROM THE ADJACENT FIELD. IT IS ANTICIPATED THAT THE NEW OVER-RUN AREA WILL FUNCTION AS AN IMPROVED VERGE FOR BRIDLEWAY USERS.

INTER VISIBILITY ASSESSMENT							
Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
10000	2.6	2.5	YES	Curve	NONE	120m	274m
10140	ACCESS 2	2.6	YES	Curve	NONE	98m	120m
10225	2.7	ACCESS 2	YES	Straight	NONE	103m	98m
10350	2.7	2.7	YES	Curve	NONE	90m	103m
10450	2.8	2.7	PARTIAL	Straight	NONE	75m	90m
10525	2.9	2.8	YES	Straight	NONE	67m	75m

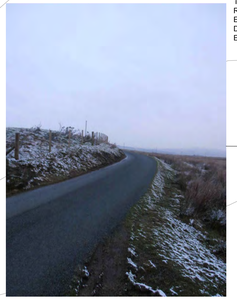
SITE ACCESS 2
CH 10140
A NEW SITE ACCESS, DESIGNED FOR TWO WAY HGV MOVEMENT, IS TO BE CONSTRUCTED FROM ASPHALT FOR FIRST 10 METRES, WITH GRASS REINFORCEMENT PROVIDING AN AIL OVER-RUN AREA ON THE NORTH EASTERN QUADRANT OF THE JUNCTION. A WOODEN GATE AND FENCE LINE IS TO BE LOCATED AT A SET-BACK DISTANCE SUITABLE TO ALLOW AN HGV TO PULL INTO THE JUNCTION AND THEN SECURE/UNSECURE THE GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. THE AIL OVER-RUN AREA FOR THE JUNCTION WILL BE TO SUIT LEFT TURN MOVEMENTS INTO THE JUNCTION. THE JUNCTION IS DESIGNED TO PROVIDE VISIBILITY SPLAYS OF 2.4M X 70 METRES.

THE PROPOSED LAND PROFILE TO THE NORTH EAST OF THE JUNCTION WILL BE SMOOTHED INTO THE EXISTING TOPOGRAPHY AND SEEDED WITH GORSE AND OTHER LOCAL SCRUB TO BLEND IT INTO THE SURROUNDING LANDSCAPE. THE EXISTING EARTHWORKS ADJACENT TO THE PROPOSED VERGE ON THE WEST OF THE JUNCTION AND ACCESS TRACK ARE TO BE RETAINED AS EXISTING AS SHOWN ON THE DRAWING.

A WIDENED VERGE IS TO BE PROVIDED TO THE WEST OF THE ACCESS TRACK FOR THE PUBLIC BRIDLEWAY, THIS IS AN IMPROVED PROVISION FOR BRIDLEWAY USERS SEGREGATED FROM SITE TRAFFIC DURING THE WORKS. TRAFFIC MANAGEMENT WILL BE USED TO PROVIDE SAFE CROSSING.

REFER TO DWG 60283248-D-043

2.7B - OVER-RUN AND HGV PASSING **AREA TO EAST FROM ACCESS 2 TO RIVER**
CH 10100 - 10440
OVER-RUN AREA IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO THE SOUTH AND EAST OF THE EXISTING ROAD. THIS SECTION OF OVER-RUN IS TO BE CONSTRUCTED WITH THE VERGE. THE AREA HAS CULVERTS FROM ADJACENT LAND TO THE NORTH AND WEST WHICH CONNECT TO THE HIGHWAY DRAINAGE. THESE CULVERTS AND THE EXISTING LAND DRAINS RUNNING ALONG THE ROAD EMBANKMENT WILL BE EXTENDED AND DIVERTED AS REQUIRED WITH A NEW DRAIN ALONG THE FOOT OF THE PROPOSED EMBANKMENTS AT THE EAST OF THE OVER-RUN AREAS.



2.8 - OVER-RUN AND PASSING PLACE
CH 10410 - 10500
THIS SECTION IS SUITABLE FOR HGVS TO PASS. ROAD WIDENING IS TO BE CONSTRUCTED USING ASPHALT AND THE OVER-RUN AREA IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT ON THE INSIDE OF THIS BEND TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD. THE WIDENED WORKS IN THIS AREA AVOIDS IMPACTING THE EXISTING FLOOD PLANE TO THE SOUTH AND WILL REQUIRE THE CONSTRUCTION OF A REINFORCED EARTH EMBANKMENT WHICH WILL BE MADE TO LOOK AS NATURAL AS POSSIBLE AND TIED INTO THE EXISTING GROUND PROFILE.

THE EXISTING FENCE LINE IS TO BE RELOCATED TO THE BACK OF THE NEW CUT EARTHWORKS AROUND THE CORNER AND THERE IS NO IMPACT ON VEGETATION. WORKS ARE TO BE CONSTRUCTED ON-LINE FROM THE FIELD, USING TRAFFIC MANAGEMENT.

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES
1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED. EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY
- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- PUBLIC RIGHT OF WAY

Rev	Date	Detail	Made	Chk'd	Appr'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	10/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	26/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 4 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 9900 TO 10500

Design:	JC	CAD:	JC
Chk'd:	SR	Appr'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-018 Rev: G

A0

2.9 - OVER-RUN AND PASSING PLACE ADJACENT TO RIVER BED
CH 10480 - 10530
OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO THE SOUTH WITHIN THE RIVER BANK AREA BETWEEN THE BEND AND THE EXISTING PASSING PLACE. EARTHWORKS WILL BE REQUIRED OUTSIDE OF THE EXISTING ROAD EMBANKMENT ON THE CORNER WHICH IS NOT EXPECTED TO HAVE A SIGNIFICANT IMPACT ON THE FLOOD PLAIN. EXISTING PASSING PLACE TO BE IMPROVED WITH ASPHALT WIDENING WITHIN THE AREA OF OVER-RUN. WORKS TO BE CONSTRUCTED ON-LINE AND WITHIN THE EXISTING VERGE AREA WITH TRAFFIC MANAGEMENT.

CONTINUED ON: 60283248-D-020

WATERCOURSE & DRAIN AT FRONT OF OVER-RUN RELOCATED NORTH WEST INTO FIELD

2.10 - OVER-RUN AREA TO NORTH
CH 10530 - 10610
AN OVER-RUN AREA TO THE NORTH OF THE ROAD WITHIN THE VERGE IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT WITH WIDENING OF THE EMBANKMENT INTO THE FIELD. THE OPEN V-SHAPED LAND DRAIN IS TO BE RECONSTRUCTED IN THE FIELD AT THE REAR OF THE OVER-RUN AREA, WITH A NEW FENCE LINE SET BACK FURTHER FROM THE EDGE OF THE ROAD EMBANKMENT. THE EXISTING CULVERT WILL NEED TO BE EXTENDED TO THE NORTH AND TIED INTO THE NEW LAND DRAIN. WORKS ARE TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT IN PLACE.

EXISTING ACCESS

WATERCOURSE & DRAIN TO NORTH DIVERTED TO ALLOW FOR OVER-RUN AND EARTHWORKS

EXISTING ACCESS JUNCTION

EXISTING ACCESS JUNCTION AND EXISTING PASSING PLACE

2.12 - CULVERT WIDENING AND HGV PASSING AREA
CH 10750 - 10800
THE EXISTING CULVERT STRUCTURE IS TO BE WIDENED TO ALLOW FOR AIL VEHICLES AND HGV PASSING. THE EXISTING CULVERT CONSISTS OF THREE 0.9M DIAMETER CONCRETE PIPES, WHICH WILL BE LENGTHENED ON THE NORTHERN SIDE WITH NEW BEAMS CAST IN-SITU FOR THE BRIDGE PARAPET AND EDGE RESTRAINT. THE EXISTING PARAPET IS TO BE REPLACED WITH NEW TO ALLOW FOR AIL OVER-RUN AND THE CULVERT WIDENING AND OTHER BRIDGING OPTIONS ARE TO BE DETAILED POST PLANNING.
TO WEST OF THE CULVERT THE ROAD IS TO BE WIDENED TO SUIT THE NEW CULVERT WIDTH. WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

2.11 - OVER-RUN AREA TO NORTH WEST OF CATTLE GRID
CH 10620 - 10730
THE CATTLE GRID IS TO HAVE ITS NORTHERN FENCE SOCKETED FOR AIL MOVEMENTS AND THE ROAD WIDENED BY A MINIMUM OF 2 METRE TO THE NORTH. THIS WORK WILL IMPACT AN EXISTING LAND DRAIN WHICH WILL NEED TO BE RELOCATED FURTHER INTO THE FIELD AND A NEW FENCE LINE PROVIDED. WORKS ARE TO BE CONSTRUCTED OFF-LINE USING THE AREA TO THE SOUTH OF THE ROAD, WITH TRAFFIC MANAGEMENT IN PLACE.

EXISTING POLE TO BE RELOCATED

RIGHT VIEWPORT

2.13 - OVER-RUN AND HGV PASSING AREA
CH 10675 - 10950
A NEW 2M WIDE OVER-RUN AREA IN THE SOUTH-EASTERN VERGE IS TO BE CONSTRUCTED USING GRASS REINFORCEMENT. A PASSING PLACE HAS BEEN PROVIDED AT CH 10875 AT THE BEND OPPOSITE AN EXISTING FIELD ACCESS WHICH WILL BE OF ASPHALT CONSTRUCTION.

WORKS WILL REQUIRE THE EXISTING PARAPET ON THE CULVERT AT CH 10760 TO BE REPLACED FOR THE AIL OVER-RUN AND THEN GEMINATELY REPLACED WITH A NEW TIMBER PARAPET SIMILAR TO EXISTING FOLLOWING COMPLETION OF THE WORKS.

WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
10525	**2.9**	**2.8**	YES	Straight	NONE	67m	75m
10600	**2.10**	**2.9**	YES	Straight	NONE	163m	67m
10750	**2.12**	**2.1**	YES	Curve	NONE	146m	163m
10900	**2.13**	**2.12**	YES	Straight	NONE	327m	146m
11200	**2.15**	**2.13**	YES	Curve	NONE	164m	327m
11375	**2.16**	**2.15**	YES	Curve	NONE	76m	164m

LEFT VIEWPORT | RIGHT VIEWPORT

EXISTING ACCESS

LEFT VIEWPORT

2.13 - OVER-RUN AND PASSING PLACE
CH 10675 - 10950
A NEW 2M WIDE OVER-RUN AREA IN THE SOUTH-EASTERN VERGE IS TO BE CONSTRUCTED USING GRASS REINFORCEMENT. A PASSING PLACE HAS BEEN PROVIDED AT CH 10875 AT THE BEND OPPOSITE AN EXISTING FIELD ACCESS WHICH WILL BE OF ASPHALT CONSTRUCTION.

WORKS WILL REQUIRE THE EXISTING PARAPET ON THE CULVERT AT CH 10760 TO BE REPLACED FOR THE AIL OVER-RUN AND THEN GEMINATELY REPLACED WITH A NEW TIMBER PARAPET SIMILAR TO EXISTING FOLLOWING COMPLETION OF THE WORKS.

WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

2.14 - OVER-RUN AREA
CH 10920 - 11120
A NEW 2M WIDE OVER-RUN AREA TO THE WEST OF THE ROAD IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT WITH THE EXISTING FENCE LINE TO BE SET BACK UP TO 2.5M FURTHER BACK INTO THE FIELD.
WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

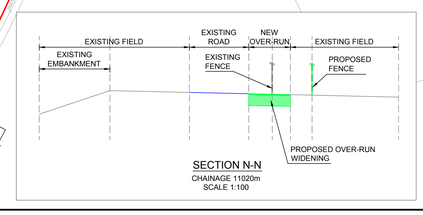
2.15 - OVER-RUN AND HGV PASSING AREA
CH 11100 - 11390
THIS SECTION OF OVER-RUN AREA IS SUITABLE FOR HGV TO PASS FROM CH 11100 UP TO CH 11390.

A NEW 2M WIDE OVER-RUN AREA IS TO BE CONSTRUCTED USING GRASS REINFORCEMENT ALONG THE SOUTHERN AND EASTERN VERGE OF THE ROAD TO REDUCE IMPACT ON VEGETATION AND FENCE LINES WHICH ARE PRESENT ALONG THE NORTHERN SIDE OF THE ROAD.

FROM CH 11350 TO CH 11390 THE OVER-RUN AREA WILL INCLUDE AN AREA OF ASPHALT WIDENING AND THE PROVISION OF A NEW SOCKETED WOODEN SINGLE HINGE GATE AND FENCE ADJACENT TO THE CATTLE GRID. THE EXISTING FENCE AT THE CATTLE GRID WILL BE SOCKETED TO ALLOW REMOVAL PRIOR TO AIL DELIVERY.

AN EXISTING CULVERT RUNS UNDER THE CATTLE GRID, THIS WILL REQUIRE A NEW CULVERT HEADWALL WITH PIPE TO BE INSTALLED TO EXTEND THE EXISTING CULVERT TO THE WEST, WITH ADDITIONAL DRAINAGE TO BE PROVIDED AT THE FOOT OF THE EARTHWORKS AND DETAILED POST PLANNING. NO IMPACT ON VEGETATION IS ENVISAGED AT THIS LOCATION. WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

CONTINUED ON: 60283248-D-020



SECTION N-N
CHAINAGE 11020m
SCALE 1:100

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	Appr'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	10/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	26/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 5 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 10500 TO 11200

Design:	JC	CAD:	JC
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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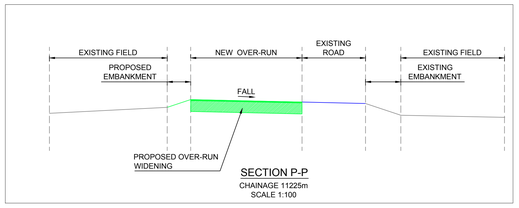
No. 60283248-D-019 Rev: G

A0

DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-015-020.Arch1945.dwg Layout Tab: 019 ▪ User: RESSN Plot time: 19/07/2013 @ 11:00 AM



SECTION P-P
CHAINAGE 11225m
SCALE 1:100

2.15 - OVER-RUN AND PASSING PLACE
CH 11100 - 11390
THIS SECTION OF OVER-RUN AREA IS SUITABLE FOR HGV TO PASS FROM CH 11100 UP TO CH 11390.

A NEW 2M WIDE OVER-RUN AREA IS TO BE CONSTRUCTED USING GRASS REINFORCEMENT ALONG THE SOUTHERN AND EASTERN VERGE OF THE ROAD TO REDUCE IMPACT ON VEGETATION AND FENCE LINES WHICH ARE PRESENT ALONG THE NORTHERN SIDE OF THE ROAD.

FROM CH 11350 TO CH 11390 THE OVER-RUN AREA WILL INCLUDE AN AREA OF ASPHALT WIDENING AND THE PROVISION OF A NEW SOCKETED WOODEN SINGLE HINGE GATE AND FENCE ADJACENT TO THE CATTLE GRID. THE EXISTING FENCE AT THE CATTLE GRID WILL BE SOCKETED TO ALLOW REMOVAL PRIOR TO AIL DELIVERY.

AN EXISTING CULVERT RUNS UNDER THE CATTLE GRID, THIS WILL REQUIRE A NEW CULVERT HEADWALL WITH PIPE TO BE INSTALLED TO EXTEND THE EXISTING CULVERT TO THE WEST, WITH ADDITIONAL DRAINAGE TO BE PROVIDED AT THE FOOT OF THE EARTHWORKS AND DETAILED POST PLANNING. NO IMPACT ON VEGETATION IS ENVISAGED AT THIS LOCATION. WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

11150.000
11200.000
11250.000
11300.000
11350.000
11400.000
11450.000
2.8m
4.5m
2.5m
2.65m
2.68m
2.65m
2.68m
CONTINUED ON 60283248-D-019
P
P
EXISTING ACCESS
RIGHT VIEWPORT

2.16A - OVER-RUN AND HGV PASSING AREA
CH 11390 - 11430
A NEW 2M WIDE OVER-RUN AREA IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO ENABLE HGVS TO PASS.

THIS SECTION HAS AN AREA OF ASPHALT WIDENING AFTER THE CATTLE GRID. ADDITIONAL DRAINAGE IS TO BE PROVIDED AT THE FOOT OF THE EARTHWORKS AND THESE WILL BE DETAILED POST PLANNING, NO IMPACT ON VEGETATION OR EXISTING DRAINAGE IS ENVISAGED.

WORKS ARE TO CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

2.16B - OVER-RUN AND HGV PASSING AREA
CH 11430 - 11640
A NEW 2M WIDE OVER-RUN IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO ENABLE HGVS TO PASS.

THE EXISTING CULVERTS AT CH 11450 AND CH 11640 ARE IMPACTED AND WILL NEED TO BE EXTENDED. ADDITIONAL DRAINAGE IS TO BE PROVIDED AT THE FOOT OF THE EARTHWORKS AND THESE WILL BE DETAILED POST PLANNING, NO IMPACT ON VEGETATION OR EXISTING DRAINAGE IS ENVISAGED.

WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
11200	**2.15**	**2.13**	YES	Curve	NONE	164m	327m
11375	**2.16**	**2.15**	YES	Curve	NONE	76m	164m
11450	**2.16**	**2.16**	YES	Straight	NONE	184m	76m
11650	**2.16**	**2.16**	YES	Curve	NONE	96m	184m
11750	**2.16**	**2.16**	YES	Straight	NONE	168m	96m
11900	**2.16**	**2.16**	YES	Straight	NONE	215m	168m
12100	**2.17**	**2.16**	YES	Straight	NONE	244m	215m

11400.000
11450.000
11500.000
11550.000
11600.000
11650.000
11700.000
11750.000
2.92m
2.68m
2.5m
2.68m
4.6m
2.48m
CONTINUED ON 60283248-D-021
LEFT VIEWPORT

2.16C - OVER-RUN AND HGV PASSING AREA
CH 11640 - 11700
A NEW 2M WIDE OVER-RUN IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO ENABLE HGVS TO PASS.

THIS SECTION INCLUDES A NEW ASPHALT PASSING PLACE AT CH 11650. THE EXISTING SMALL PASSING PLACE AT CH 11670 WILL BE RESURFACED AND EXTENDED USING OVER-RUN AREA CONSTRUCTION. THE EXISTING CULVERT AT CH 11640 IS TO BE LENGTHENED. ADDITIONAL DRAINAGE IS TO BE PROVIDED AT THE FOOT OF THE EARTHWORKS AND THESE WILL BE DETAILED POST PLANNING, NO IMPACT ON VEGETATION OR EXISTING DRAINAGE IS ENVISAGED.

WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	Appr'd
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	04/02/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 6 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 11200 TO 11750

Design:	JC	CAD:	JC
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-020 Rev: G

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-015-0220 Acd 0450.dwg Layout Tab: 020 + User: RESDN Plot time: 19/07/2013 @ 11:01 AM

2.16D - OVER-RUN AND EXISTING PASSING AREA IMPROVED
CH 11700 - 12000
A NEW OVER-RUN AREA OF UP TO 4M IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT. THIS OVER-RUN IS SUITABLE FOR HGV PASSING AND THE EXISTING PASSING PLACE AT CH 11900 IS TO BE EXTENDED WITH ASPHALT TO PROVIDE A LARGER AREA FOR HGVS AND OTHER ROAD USERS. THE EXISTING CULVERT BENEATH THE ROAD LOCATED AFTER THE EXISTING PASSING PLACE AT CH 11935 AND CH 11990 WILL NOT BE IMPACTED.

WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

CONTINUED ON 60283248-D-023

11750.000

11800.000

11850.000

11900.000

11930.000

4.46m

2.46m

2.68m

3.0m

12000.000

12050.000

RIGHT VIEWPORT

2.17 - OVER-RUN AND HGV PASSING AREA
CH 12000 - 12390
THIS SECTION OF OVER-RUN SPANS BETWEEN THE CATTLE GRID AT CH 12000 AND SITE ACCESS 4 AT CH 12390.

A NEW 2M OF OVER-RUN IS PROPOSED BETWEEN CH 12000 AND 12330 IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT. ALL WORKS ARE LOCATED IN THE SOUTHERN VERGE AND NO EXISTING VEGETATION IS IMPACTED OTHER THAN THE CUTTING BACK OF EXISTING SHRUBS. EXISTING CULVERTS AT CH 12100 AND CH 12200 ARE NOT IMPACTED BY THE PROPOSALS AS WORKS ARE WITHIN THE HIGHWAY. NO IMPACT TO VEGETATION OR EXISTING DRAINAGE IS ENVISAGED. WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

EXISTING PIPE CULVERT CROSSINGS TO BE EXTENDED AND STRENGTH CHECKED POST PLANNING.

EXISTING PIPE CULVERT CROSSINGS TO BE EXTENDED AND STRENGTH CHECKED POST PLANNING.

CONTINUED ON 60283248-D-022

12100.000

12150.000

12200.000

12250.000

12260.000

2.38m

3.1m

2.65m

3.0m

LEFT VIEWPORT

Q

Q

12300.000

12350.000

2.17 - OVER-RUN AND HGV PASSING AREA
CH 12000 - 12390
THIS SECTION OF OVER-RUN SPANS BETWEEN THE CATTLE GRID AT CH 12000 AND SITE ACCESS 4 AT CH 12390.

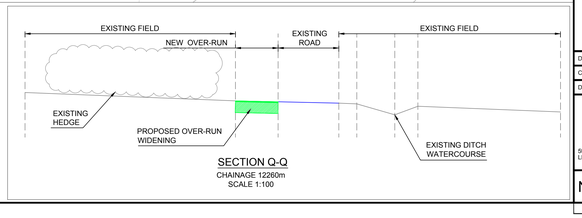
A NEW 2M OF OVER-RUN IS PROPOSED BETWEEN CH 12000 AND 12330 IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT. ALL WORKS ARE LOCATED IN THE SOUTHERN VERGE AND NO EXISTING VEGETATION IS IMPACTED OTHER THAN THE CUTTING BACK OF EXISTING SHRUBS. EXISTING CULVERTS AT CH 12100 AND CH 12200 ARE NOT IMPACTED BY THE PROPOSALS AS WORKS ARE WITHIN THE HIGHWAY. NO IMPACT TO VEGETATION OR EXISTING DRAINAGE IS ENVISAGED. WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

EXISTING CATTLE GRID RETAINED

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
11900	**2.16**	**2.16**	YES	Straight	NONE	215m	168m
12100	**2.17**	**2.16**	YES	Straight	NONE	244m	215m
12375	**ACCESS 4**	**2.17**	YES	Curve	NONE	316m	244m

LEFT VIEWPORT | RIGHT VIEWPORT



SECTION Q-Q
CHAINAGE 12260m
SCALE 1:100

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	App'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	10/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 7 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 11750 TO 12350

Design:	JC	CAD:	JC
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-021 | Rev: G

A0

N

SITE ACCESS 4
REFER TO DWG 60283248-D-044

SITE ACCESS 4
CH 12390
A NEW ASPHALT SITE ACCESS DESIGNED FOR TWO-WAY HGV MOVEMENTS WITH OVER-RUN AREA. THE AREA OF ASPHALT HAS BEEN MINIMISED BY USING GRASS REINFORCEMENT FOR THE OVER-RUN AREA WITH ONLY A SUFFICIENT AREA OF ASPHALT PROVIDED TO ALLOW AN HGV TO PULL INTO THE JUNCTION AND SECURE/UNSECURE THE PROPOSED SINGLE HINGE WOODEN GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. THE JUNCTION IS DESIGNED WITH 2.4M X 70M VISIBILITY SPLAYS IN BOTH DIRECTIONS AND THE EXISTING CATTLE GRID TO THE SOUTH RETAINED. THE PROPOSED WORKS WILL TIE INTO THE EXISTING ROAD CONSTRUCTION IN THIS AREA.

EARTHWORKS ARE TO BLEND WITH THE EXISTING PROFILES ON SITE AND RE-MODELLED AREAS ARE TO BE SEEDED WITH LOCAL GRASS SEED TO MATCH EXISTING. WORKS WILL TIE INTO THE EXISTING HIGHWAY AND THE CATTLE GRID TO THE SOUTH OF THE ACCESS AND THE EXISTING WATER COURSE WILL BE CULVERTED BENEATH THE EXISTING WITH A NEW OPEN DITCH PROVIDED AT THE BACK OF THE WORKS.

ALL WORKS ARE TO BE CONSTRUCTED FROM THE ADJACENT FIELD TO MINIMISE IMPACT ON THE HIGHWAY. WORKS WITHIN THE HIGHWAY WILL BE UNDERTAKEN USING TRAFFIC MANAGEMENT.

2.17 - OVER-RUN AND HGV PASSING AREA
CH 12000 - 12390
THIS SECTION OF OVER-RUN SPANS BETWEEN THE CATTLE GRID AT CH 12000 AND SITE ACCESS 4 AT CH 12390.

A NEW 2M OF OVER-RUN IS PROPOSED BETWEEN CH 12000 AND 12330 IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT. ALL WORKS ARE LOCATED IN THE SOUTHERN VERGE AND NO EXISTING VEGETATION IS IMPACTED OTHER THAN THE CUTTING BACK OF EXISTING SHRUBS. EXISTING CULVERTS AT CH 12100 AND CH 12200 ARE NOT IMPACTED BY THE PROPOSALS AS WORKS ARE WITHIN THE HIGHWAY. NO IMPACT TO VEGETATION OR EXISTING DRAINAGE IS ENVISAGED. WORKS ARE TO BE CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE.

SECTION 3 CONTINUED ON 60283248-D-023-R3(6)

EXISTING CATTLE GRID RETAINED

BRIDGE

12100.000
12150.000
12200.000
12250.000
12300.000
12350.000
12400.000
12450.000
12500.000
12550.000
12600.000

2.38m
2.5m
2.65m
2.5m
2.4m

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
12100	2.17	2.16	YES	Straight	NONE	244m	215m
12375	ACCESS 4	2.17	YES	Curve	NONE	316m	244m

NOTES
1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	Appr'd
G	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	06/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	10/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	26/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 2 SHEET 8 OF 8 ACCESS 1 TO ACCESS 4 CHAINAGE 12350 TO 12600

Design:	JC	CAD:	JC
Chk'd:	SR	Appr'd:	SC
Date:	04/02/2013	Scale:	1:200@A0 - NTS@A3

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No. 60283248-D-022 Rev: G

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DRG Path: I:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-015-020(Ann)1453.dwg Layout Tab: 022 ● User: RESSN Plot time: 19/07/2013 @ 11:02 AM

NEINTHIRION BYPASS - DRAWING 60283248-D-045.

900m OF NEW ROAD

THIS NEW TRACK IS TO CARRY AIL AND HGV TRAFFIC FROM CHAINAGE 8950 ON THE COUNTY ROAD TO CHAINAGE 9600 TO THE SOUTH OF NEINTHIRION. THE BYPASS WILL BE 5.5 METRES WIDE WITH WIDENED SECTIONS TO SUIT THE AIL MOVEMENT AND THE HORIZONTAL ALIGNMENT OF THE TRACK. THIS NEW TRACK IS TO BE CONSTRUCTED FROM STONE WITH A GRASS REINFORCED SURFACING TO REDUCE THE VISUAL IMPACT OF THE TRACK.

THE PROPOSED BRIDGE WILL APPROXIMATELY 10 METRES IN WIDTH, LOCATED BETWEEN CH 120 AND 130 AND DURING THE CONSTRUCTION PERIOD WILL HAVE A TEMPORARY PARAPET WHICH WILL BE REMOVED AS PART OF THE PERMANENT WORKS TO REDUCE THE LONG TERM VISUAL IMPACT OF THE STRUCTURE. THE ALIGNMENT OF THE ROAD AND EARTHWORKS ARE TO BE SMOOTHED INTO THE EXISTING LANDFORM TO REDUCE THE VISUAL IMPACT, WITH ADDITIONAL GROUND REMODELLING. ALL EARTHWORKS WILL USE LOCALLY TOPSOIL AND WILL BE SEEDED WITH LOCAL SEED . TREES TO BE PLANTED ALONG EXISTING HEDGELINES TO PROVIDE ADDITIONAL SCREENING WHEN VIEWED FROM THE COUNTRY ROAD, GLYNDWR'S WAY FOOTPATH AND NEINTHIRON. THE BYPASS REQUIRES CULVERTS AND A BRIDGE STRUCTURE. ALL CHAINAGES ON THE SCHEDULE BELOW ARE BASED WITH CH0 AT CH8860 ON THE COUNTY ROAD. NEW CULVERT AT CH 550, 780, 790, 860. ALIGNMENT OF THE TRACK IS BASED ON SWEPT PATH ASSESSMENT, NOISE IMPACT OF THE TRAFFIC FROM NEINTHIRION AND IS DUE TO THE SWEPT PATH ALIGNMENT OF THE AILS.

ADDITIONAL CROSS EMBANKMENT DRAINS/CULVERTS ARE TO BE PROVIDED ON THE WESTERN APPROACH TO THE BRIDGE FOR APPROXIMATELY 100 METRES TO REDUCE IMPACT ON THE FLOOD PLAIN. THE NEW CULVERT ON THE EXISTING WATERCOURSE AT CH 460 IS TO BE DESIGNED TO SUIT THE LARGE CATCHMENT AREA OF APPROXIMATELY 0.7KM2 A NEW ACCESS DOWN TO THE EXISTING FARM TRACKS IS AT CH 490, WHICH IS AN EXISTING PUBLIC RIGHT OF WAY AND AS SUCH, A FORMALISED CROSSING AND ACCESS CONTROL WILL BE REQUIRED TO MAINTAIN THIS RIGHT OF WAY.

THE BYPASS SERVES AS A PASSING PLACE TO ALLOW TRAFFIC ON THE COUNTY ROAD TO BYPASS AILS DURING MOVEMENTS AND IS A PART OF THE PASSING AREA STRATEGY DETAILED IN THE LTMP DOCUMENTATION. THE BYPASS PROVIDES PASSING PLACES FOR HGVS AT CH 260, BETWEEN CH 400 TO CH 550, CH 700 TO CH 900 AND AT THE EGRESS JUNCTION AT CHAINAGE 1000 - THESE PASSING PLACES ARE ALL INTER-VISIBLE.

THE BY-PASS INVOLVES THE LOSS OF A SMALL AREA OF SCRUB WHERE IT LEAVES THE EXISTING ROAD AND CROSSES THE STREAM, THIS WILL BE REPLANTED ON THE EMBANKMENT OF THE NEW BY-PASS USING A MIX OF ASH AND HAWTHORN. THE BY-PASS THEN CROSSES A SERIES OF IMPROVED FIELDS WHERE THE TRACK IS RAISED ON AN EMBANKMENT. SCRUB WILL BE ALLOWED TO DEVELOP ALONG THE BANKS TO PROVIDE HABITAT AND SCREEN THE TRACK, HOWEVER, THE SCRUB WILL BE KEPT TRIMMED TO ENSURE THE OPEN NATURE OF THE AREA IS MAINTAINED AND TO ENSURE IT DOES NOT PROVIDE A POTENTIAL NESTING HABITAT FOR CROWS.

TOWARDS THE WESTERN END, A SECTION OF APPROXIMATELY 150 METRES PASSES OVER AN AREA OF MARSHY GRASSLAND OVER PEAT, WITH PEAT DEPTHS VARYING BETWEEN 0.2 METRES IN THE SOUTH, 0.85 METRES IN THE CENTRE AND 0.65 METRE AT THE NORTH. WHILST THIS AREA HAS BEEN EXTENSIVELY DRAINED, IT STILL RETAINS MARSHY HABITAT, MAINLY *MOLINIA*. THE AREA BETWEEN THE MARSHY GRASSLAND AND WHERE THE BY-PASS REJOINS THE ROAD IS DAMP BUT IS ON MINERAL SOIL. THERE WILL BE AN IMPACT ON PEAT FOR THE SECTION CROSSING THE MARSHY GRASSLAND. AN OTTER SURVEY WAS UNDERTAKEN AND NO SIGNS OF HABITAT WERE OBSERVED - THIS SURVEY WILL BE REPEATED IMMEDIATELY PRIOR TO CONSTRUCTION.

NEW BRIDGE STRUCTURE
REQUIRED TO CROSS EXISTING WATERCOURSE.
DETAILS TO BE CONFIRMED POST PLANNING

EXISTING STONE WALL
TO BE TAKEN DOWN AND NEW
GATE PROVIDED

PROPOSED
CULVERT

EXISTING STONE WALL
TO BE TAKEN DOWN AND STONE
USED TO IMPROVE OTHER WALLS

SECTION IN CUT LEADING TO BYPASS

PROPOSED CHANNEL DIVERSION

NEW ACCESS TO PROVIDE
CROSSING OF EXISTING TRACK
OVER BYPASS

EXISTING BRIDGE ALIGNMENT CONSIDERED
UNFEASIBLE FOR AIL VEHICLES

PROPOSED
CULVERT

PROPOSED
CULVERT

PROPOSED
CULVERT

PROPOSED
CULVERT

2.3B - NEINTHIRION BYPASS ACCESS AND OVER-RUN AREA
CH 8850 - 8950
THIS OVER-RUN AREA IS LOCATED TO THE NORTH OF THE ROAD PRIOR TO THE NEINTHIRION BRIDGE AND WILL BE CONSTRUCTED FROM GRASS REINFORCEMENT AND ASPHALT. THE JUNCTION IS LOCATED TO ALLOW A STRAIGHT ALIGNMENT OVER THE RIVER, PROVIDE VISIBILITY FOR ONCOMING TRAFFIC AND AT A LOCATION WHERE THE WIDTH OF THE RIVER IS REDUCED TO MINIMISE IMPACT ON THE EXISTING WATERCOURSE. THE BYPASS JUNCTION WILL HAVE A WOODEN SINGLE HINGED GATED ACCESS AND DESIGNED TO SUIT RIGHT TURNING IN AND LEFT TURNING OUT HGV TRAFFIC. VISIBILITY SPLAYS OF 2.4M X 70M WILL BE PROVIDED FOR ONCOMING TRAFFIC.
NEW DRAINAGE IS TO BE PROVIDED ALONG THE VERGE AND AT THE TOE OF THE PROPOSED EARTHWORKS. WORKS ARE TO DRAIN AWAY FROM THE CARRIAGEWAY TO REDUCE THE IMPACT ON EXISTING DRAINAGE. A NEW FENCE IS TO BE ERECTED AROUND THE WORKS AND TIED INTO THE NEW GATED ACCESS. THE BRIDLEWAY IS TO BE RETAINED THROUGH NEINTHIRION AND WILL NOT USE THE BYPASS. ACCESS FOR THE CONSTRUCTION OF THE BYPASS AND THE ACCESS JUNCTION IS TO BE TAKEN FROM THE FIELDS ADJACENT AND TO THE NORTH OF THE ROAD.

2.4 - NEINTHIRION BYPASS EGRESS AND OVER-RUN
CH 9550 - 9580
A NEW ACCESS JUNCTION AND OVER-RUN AREA FOR AILS IS PROPOSED TO THE WEST OF THE ROAD AND IS TO BE CONSTRUCTED FROM A COMBINATION OF GRASS REINFORCEMENT AND ASPHALT. THE PROPOSED LEVELS AT THE JUNCTION ARE TO TIE INTO THE EXISTING ROAD LEVELS WITH A SMALL BANK AROUND THE WORKS ABOVE THE PEATY GROUND.

A NEW WOODEN SINGLE HINGE GATE IS TO BE PROVIDED AT A 20 METRE SET-BACK FROM THE HIGHWAY TO ALLOW VEHICLES TO PULL INTO THE ACCESS AND OPEN THE GATE. EXISTING DRAINAGE AT THE FOOT OF ROAD PLATEAU IS TO BE RELOCATED TO THE TOE OF NEW EARTHWORKS FOR THE OVER-RUN AREA AND EGRESS. THE JUNCTION DESIGN ALLOWS FOR RIGHT TURNING IN AND LEFT TURNING OUT HGV TRAFFIC AND HAS A VISIBILITY SPLAY OF 2.4M X 70M FOR ONCOMING TRAFFIC.

THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY AND ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AND WORKS WILL BE CONSTRUCTED FROM THE ADJACENT FIELD. IT IS ANTICIPATED THAT THE NEW OVER-RUN AREA WILL FUNCTION AS AN IMPROVED VERGE FOR BRIDLEWAY USERS.

NOTES
1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY
- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	App'd
G	14/01/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
F	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
E	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
C	26/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC 17.04.13 AND COMMENTS RAISED	SR	SC	KM
B	05/04/2013	AMENDED DUE TO COMMENTS FROM DESIGN TEAM. ISSUED TO PCC/CCW	SR	SC	KM
A	28/03/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBYRNMAIR WIND FARM
POWYS

Title: SECTION 2
NEINTHIRON BYPASS

Design: JC | CAD: RT
Chk'd: SR | App'd: SC
Date: 04/02/2013 | Scale: 1:1000@A0 - NTS@A3

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No. 60283248-D-045 | Rev: G | A0

DRG Path: F:\PROJECTS\Development - Llanbyrnmair Wind Farm\DWGS\AECOM\PLAYOUTS\60283248-D-015-022D And 045D.dwg Layout Tab: 045 • User: RESSN Plot time: 18/07/2013 @ 11:02 AM

N

SITE ACCESS 4
REFER TO DWG 60283248-D-044

SITE ACCESS 4
CH 12390
NEW ASPHALT SITE ACCESS DESIGNED FOR TWO WAY HGV MOVEMENTWITH OVER-RUN. AREA OF ASPHALT HAS BEEN MINIMISED BY USING REINFORCED GRASS FOR OVER-RUN AREA AND ONLY INCLUDING ENOUGH ASPHALT TO ALLOW A HGV TO PULL INTO THE JUNCTION AND SECURE/UNSECURE THE PROPOSED SINGL HINGE WOODEN GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. JUNCTION DESIGNED WITH 2.4m X 70m VISIBILITY SPLAYS, ACHIEVED IN BOTH DIRECTIONS. EXISTING CATTLE GRID TO THE SOUTH RETAINED. PROPOSED WORKS TO TIE INTO EXISTING ROAD CONSTRUCTION AT THIS AREA.

EARTHWORKS TO BE SCULPTED TO BLEND WITH THE EXISTING PROFILES ON SITE. REMODLLED AREAS TO BE SEEDED WITH LOCAL GRASS SEED TO MATCH EXISTING.. WORKS TO TIE INTO THE EXISTING HIGHWAY AND THE CATTLE GRID TO THE SOUTH OF THE ACCESS. EXISTING WATER COURSE WILL BE CULVERTED UNDER THE EXISTING WITH A NEW OPEN DITCH PROVIDED AT THE BACK OF THE WORKS. ACCESS. DRAINAGE FOR THE ACCESS WILL BE DETAILED POST PLANNING.

ALL WORKS CONSTRUCTED FROM ADJACENT FIELD TO MINIMISE IMPACT ON THE HIGHWAY. WORKS WITHIN THE HIGHWAY UNDERTAKEN USING TRAFFIC MANAGEMENT.

CONTINUED ON 60283248-D-022

EXISTING CATTLE GRID

EXISTING BRIDGE

3.1A - EXISTING PASSING AREA
CH 12700
EXISTING PAVED ACCESS JUNCTIONS INTO FARM YARD TO BE RETAINED FOR USE AS A PASSING PLACE FOR VEHICLES PRIOR TO THE CATTLE GRID. AREA IS USED AS AN EXISTING PASSING PLACE FOR HGVS. NO IMPROVEMENTS PROPOSED.

EXISTING BUILDING

3m

3m

RIGHT VIEWPORT

EXISTING CATTLE GRID

LEFT VIEWPORT | RIGHT VIEWPORT

EXISTING BUILDING

3m

3m

LEFT VIEWPORT

EXISTING CATTLE GRID

INDICATIVE CULVERT LOCATION

3.1B - EXISTING PASSING AREA UPGRADED
CH 12950
EXISTING PAVED PASSING PLACE TO BE LENGTHENED AND WIDENED WITH ASPHALT CONSTRUCTION. OVER-RUN AREA FOR HGVS TO BE CONSTRUCTED USING GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT.
PROPOSED WIDENING WORK WILL IMPACT AN EXISTING LAND DRAIN LOCATED TO THE NORTH. THE EXISTING CULVERT IS TO BE BY-PASSED USING A NEW OPEN V-CHANNEL TO THE REAR OF THE PROPOSED EARTHWORKS AND FENCE LINE. EXISTING EARTHWORKS ARE TO BE EXTENDED INTO THE ADJACENT FIELD BEYOND THE FENCE LINE AND FEATHERED INTO THE EXISTING LANDFORM TO MATCH EXISTING. A NEW FENCE LINE IS TO BE PROVIDED TO MATCH EXISTING. WITH ALL WORKS UNDERTAKEN OFF-LINE FROM THE ADJACENT FIELD.

CONTINUED ON 60283248-D-024

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
12375	ACCESS 4	2.17	YES	Curve	NONE	316m	244m
Section 3							
12700	3.1A	ACCESS 4	PARTIAL	Curve	TREE OBSTRUCTION	229m	316m
12950	3.1B	3.1A	YES	Straight	NONE	225m	229m
13150	3.1C	3.1B	YES	Straight	NONE	179m	225m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- VISIBILITY SPLAY

Rev	Date	Detail	Made	Chk'd	App'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	16/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	25/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	05/04/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE.	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 1 OF 8 CHAINAGE 12350 TO 13100

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-023 Rev: F

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUTS\60283248-D-023.DGN ; Layout Tab: 023 • User: RESDN Plot time: 19/07/2013 @ 11:59 AM

CONTINUED ON 60283248-D-024

3.1C - EXISTING PASSING PLACE, IMPROVED
CH 13160
EXISTING PAVED PASSING PLACE TO BE LENGTHENED AND WIDENED WITH ASPHALT CONSTRUCTION. OVER-RUN AREA FOR HGVS TO BE CONSTRUCTED USING GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT. PROPOSED WIDENING WORK WILL IMPACT AN EXISTING LAND DRAIN LOCATED TO THE SOUTH WEST. THE EXISTING CULVERT BELOW THE PASSING PLACE IS TO BE EXTENDED TO SUIT. THIS WILL ALSO ALL FOR THE MAINTENANCE OF THE EXISTING FIELD ACCESS. EXISTING EARTHWORKS ARE TO BE EXTENDED INTO THE ADJACENT FIELD BEYOND THE FENCE LINE AND FEATHERED INTO EXISTING LANDFORM TO MATCH EXISTING. A NEW FENCE LINE IS TO BE PROVIDED TO MATCH EXISTING, WITH ALL WORKS UNDERTAKEN OFF-LINE FROM THE ADJACENT FIELD.

3.1D - EXISTING PASSING PLACE
CH 13330
EXISTING PAVED PASSING PLACE IS TO BE RETAINED. THE AREA IS NOT OF SUFFICIENT SIZE TO ACCOMMODATE HGVS.

3.2B - EXISTING PASSING PLACE
CH 13550
EXISTING PAVED PASSING PLACE TO BE RETAINED. THE AREA IS NOT OF SUFFICIENT SIZE TO ACCOMMODATE HGVS.

INDICATIVE CULVERT LOCATION

3.2A - EXISTING PASSING AREA
CH 13460
EXISTING PAVED PASSING PLACE TO BE RESURFACED WITH SPRAYED BITUMEN AND CHIPPINGS. THE PASSING PLACE IS TO ALSO BE EXTENDED TO ENABLE PASSING OF HGVS. THE EXTENDED PASSING PLACE AREA IS TO BE CONSTRUCTED WITH GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT. EARTHWORKS ARE TO TIE INTO THE EXISTING FIELD ACCESS ON THE WESTERN SIDE. WITH ALL WORKS UNDERTAKEN WITHIN THE EXISTING FENCE LINE UTILISING THE AREA AND FIELD ACCESS LOCATED TO REAR OF PASSING PLACE.

3.3 - EXISTING PASSING AREA, IMPROVED
CH 13700
THE EXISTING PAVED PASSING PLACE LOCATED TO THE NORTH OF THE CATTLE GRID AND THE EXISTING ACCESS INTO FORESTRY LAND TO THE NORTH WEST IS TO BE WIDENED AND LENGTHENED TO PROVIDE A MINIMUM ROAD WIDTH OF 6 METRES. WIDENING WORKS ARE TO BE CONSTRUCTED USING GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT. EARTHWORKS TO THE REAR OF THE PASSING PLACE ARE TO BE PROFILED TO SUIT EXISTING LEVELS AND FEATHERED INTO EXISTING LANDFORM TO MATCH EXISTING. A NEW POST AND WIRE FENCE (TO MATCH EXISTING) IS TO BE LOCATED AT THE REAR OF THE EARTHWORKS, WITH ALL WORKS CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD.

FOOTPATH ACCESS

EXISTING CATTLE GRID

CONTINUED ON 60283248-D-026

LEFT VIEWPORT

RIGHT VIEWPORT

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
13150	3.1C	3.1B	YES	Straight	NONE	179m	225m
13325	3.1D	3.1C	YES	Curve	NONE	109m	179m
13450	3.2A	3.1D	YES	Curve	NONE	122m	109m
13550	3.2B	3.2A	YES	Straight	NONE	157m	122m
13700	3.3	3.2B	YES	Straight	NONE	155m	157m
13850	3.4	3.3	PARTIAL	Curve	TREE OBSTRUCTION	220m	155m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
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- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
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- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- VISIBILITY SPLAY

Rev	Date	Detail	Made	Chk'd	Appr'd
F	14/01/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	07/06/2012	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	30/05/2012	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	16/05/2012	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	20/04/2012	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	05/04/2012	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	14/02/2012	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 2 OF 8 CHAINAGE 13050 TO 13800

Design: SR	CAD: RT
Chk'd: SR	App'd: SC
Date: 04/02/2013	Scale: 1:500@A0 - NTS@A3

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No. 60283248-D-024 Rev: F

A0

CONTINUED ON 60283248-D-024

3.4 - NEW PASSING PLACE AT ACCESS
CH 13840
THE BELL MOUTH OF THE EXISTING ACCESS JUNCTION IS TO BE WIDENED ON THE SOUTH-EASTERN SIDE USING GRASS REINFORCEMENT TO CREATE A PASSING PLACE FOR HGVS. ALL WORKS ARE TO BE CONSTRUCTED OFF-LINE FROM ADJACENT VERGE AREA WITH NO IMPACT ON EXISTING VEGETATION, DRAINAGE AND FENCE LINES.

EXISTING FORESTRY SITE ENTRANCE

EXISTING DISUSED QUARRY

3.4A - NEW PASSING PLACE
CH 13950
A NEW PASSING PLACE TO BE PROVIDED ON THE OUTSIDE OF THE BEND TO PROVIDE A MINIMUM ROAD WIDTH OF 6 METRES FOR HGVS. EARTHWORKS PROFILE IS TO BLEND INTO EXISTING LEVELS WITH THE VERGE SEEDED WITH A LOCAL SEED MIX. THE PASSING PLACE IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT, WITH ALL WORKS CONSTRUCTED OFF-LINE USING THE EXISTING VERGE.

EXISTING FORESTRY SITE

3.5 - EXISTING PASSING PLACE, IMPROVED
CH 14075
EXISTING PAVED PASSING PLACES ON BOTH SIDES OF THE ROAD ARE TO BE EXTENDED NORTHWARDS USING GRASS REINFORCEMENT TO ALLOW HGVS TO PASS. THE PROPOSED WORKS WILL HAVE NO IMPACT ON THE EXISTING DRAINAGE OR VEGETATION AND ALL WORKS ARE TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT VERGE AREAS.

EXISTING FORESTRY SITE

RIGHT VIEWPORT

LEFT VIEWPORT | RIGHT VIEWPORT

EXISTING FORESTRY SITE

3.6 - EXISTING PASSING AREA
CH 14250
EXISTING PAVED PASSING PLACE TO BE RETAINED. THE AREA IS NOT OF SUFFICIENT SIZE TO ACCOMMODATE HGVS.

3.7 - EXISTING PASSING AREA AT CATTLE GRID
CH 14300
EXISTING UNBOUND PASSING PLACES ARE LOCATED ON EITHER SIDE OF THE EXISTING CATTLE GRID, ALTHOUGH THESE AREAS ARE OF INSUFFICIENT SIZE TO ACCOMMODATE A WAITING HGV. EXISTING INFRASTRUCTURE TO BE RETAINED FOR USE BY GENERAL CONSTRUCTION VEHICLES.

EXISTING CATTLE GRID

CONTINUED ON 60283248-D-026

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
13850	3.4	3.3	PARTIAL	Curve	TREE OBSTRUCTION	97m	155m
13950	3.4A	3.4	YES	Straight	NONE	138m	97m
14075	3.5	3.4A	YES	Straight	NONE	191m	138m
14250	3.6	3.5	YES	Straight	NONE	59m	191m
14325	3.7	3.6	YES	Curve	NONE	215m	59m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- VISIBILITY SPLAY

Rev	Date	Detail	Made	Ch'd	Appr'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	16/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	25/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	05/04/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 3 OF 8 CHAINAGE 13800 TO 14500

Design:	JC	CAD:	JC
Ch'k'd:	SR	Appr'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-025 Rev: F

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-023-030F_.dwg Layout Tab: 025 • User: RESDN Plot time: 19/07/2013 12:49:00

3.8A - EXISTING PASSING PLACE, IMPROVED
CH 14520
EXISTING ASPHALT PASSING PLACE TO BE EXTENDED TO THE NORTH OF NANT-YR-ESGAIR-WEN FARM. THE EXISTING PASSING PLACE IS TO BE LENGTHENED USING ASPHALT WITH A GRASS REINFORCEMENT AREA SURFACE TO ACCOMMODATE HGVS. AN EXISTING GRIT BIN IS TO BE RELOCATED TO THE NORTHERN SIDE OF THE PASSING PLACE TO THE BACK OF THE GRASS REINFORCED AREA. THERE WILL BE NO IMPACT TO THE EXISTING DRAINAGE OR VEGETATION, WITH ALL WORKS CONSTRUCTED OFF-LINE FROM THE ADJACENT VERGE AREAS.

CONTINUED ON 60283248-D-025

3.8B - NEW PASSING PLACE
CH 14620
A NEW PASSING PLACE IS TO BE PROVIDED ON THE CORNER, APPROXIMATELY MID-WAY ALONG THE UPHILL GRADIENT FROM NANT-YR-ESGAIR-WEN FARM. THE NEW PASSING PLACE ON BOTH SIDES OF THE ROAD IS TO BE CONSTRUCTED FROM ASPHALT WITH LEVELS TO SUIT EXISTING ROAD LEVELS. THERE WILL BE NO IMPACT ON THE EXISTING DRAINAGE OR VEGETATION AND WORKS ARE TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT VERGE.

EXISTING DISUSED QUARRY

3.9 - EXISTING PASSING PLACE AT ACCESS
CH 14695
THE EXISTING PAVED ACCESS AND PASSING PLACE OUTSIDE NANT-YR-ESGAIR-WEN FARM IS TO BE RESURFACED WITH SPRAYED BITUMEN AND CHIPPINGS TO ALLOW USE BY HGVS. THERE WILL BE NO IMPACT ON THE EXISTING VEGETATION, OVERHEAD LINES OR PROPERTIES AND WORKS ARE TO BE UNDERTAKEN FROM WITHIN THE EXISTING PASSING PLACE, EXISTING ACCESS JUNCTION AND VERGE AREAS.

EXISTING TREES AND SHRUBBERY

3.10 - EXISTING PASSING PLACE AT ACCESS
CH 14850
AN EXISTING PASSING PLACE IS LOCATED AT THE TURNING AREA FOR THE FORESTRY SITE, TO THE SOUTH OF THE CATTLE GRID. THE TURNING AREA IS TO BE RESURFACED CRUSHED STONE. NO OTHER ADDITIONAL WORKS ARE PROPOSED.

EXISTING CATTLE GRID

RIGHT VIEWPORT

EXISTING FORESTRY SITE ACCESS

3.11 - EXISTING PASSING AREA
CH 15000
EXISTING ASPHALT PASSING PLACE TO BE RETAINED. THE AREA IS NOT OF SUFFICIENT SIZE TO ACCOMMODATE HGVS.

LEFT VIEWPORT

EXISTING FIELD ACCESS

EXISTING FIELD ENTRANCE

3.12 - EXISTING PASSING AREA
CH 15150
EXISTING ASPHALT PASSING PLACE TO BE RETAINED. THE AREA IS OF SUFFICIENT SIZE TO ACCOMMODATE HGVS WITHOUT IMPROVEMENT MEASURES.

CONTINUED ON 60283248-D-027

Capel yr Aber

Nant-y

LEFT VIEWPORT | RIGHT VIEWPORT

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14-cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- VISIBILITY SPLAY

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
14525	3.8A	3.7	YES	Curve	NONE	78m	215m
14625	3.8B	3.8A	YES	Curve	NONE	66m	78m
14675	3.9	3.8B	YES	Curve	NONE	179m	66m
14850	3.10	3.9	PARTIAL	Curve	TREE OBSTRUCTION	162m	179m
15000	3.11	3.10	YES	Curve	NONE	377m	162m
15375	3.13	3.11	YES	Straight	NONE	143m	377m

Rev	Date	Detail	Made	Chk'd	App'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	16/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	25/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	05/04/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 4 OF 8 CHAINAGE 14500 TO 15300

Design: SR	CAD: RT
Chk'd: SR	App'd: SC
Date: 04/02/2013	Scale: 1:500@A0 - NTS@A3

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No. 60283248-D-026 Rev: F

A0

DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-025-026F...dwg Layout Tab: 026 • User: RESIDN Plot time: 19/07/2013 @ 12:05 PM

3.13 - EXISTING PASSING AREA AT ACCESS
CH 15350
EXISTING PASSING PLACE AREA BETWEEN THE TWO JUNCTIONS IS OF SUFFICIENT SIZE TO ACCOMMODATE HGVS.

3.14 - NEW PASSING AREA AT ACCESS
CH 15570
NEW PASSING PLACE TO BE PROVIDED ON CORNER. PASSING PLACE TO BE CONSTRUCTED FROM ASPHALT TO ACCOMMODATE SMALLER VEHICLES WITH AN ADDITIONAL AREA CONSTRUCTED FROM GRASS REINFORCEMENT TO ACCOMMODATE HGVS TO MINIMISE VISUAL IMPACT. THE NEW PASSING PLACE IS LOCATED WITHIN THE EXISTING VERGE, WITH A MINOR LOCALISED IMPACT ON DRAINAGE. WORKS ARE TO BE CONSTRUCTED OFF-LINE FROM VERGE AREA.

3.15 - EXISTING PASSING AREA, IMPROVED
CH 15780
EXISTING ASPHALT PASSING PLACE ON BEND TO BE EXTENDED TO ACCOMMODATE HGVS WITH GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT.
THE PROPOSED WORKS WILL IMPACT AN AREA OF WILLOW SCRUB WHICH WILL BE REPLACED WITH NEWLY PLANTED WILLOW TO THE BACK OF THE WORKS. WORKS WILL ALSO AFFECT FENCE LINE AND FIELD ACCESS TO THE NORTH OF THE ROAD AS WELL AS THE GATED ACCESS BETWEEN THE TWO NORTHERN FIELDS. IN ADDITION, THE EXISTING CULVERT BENEATH THE ROAD WILL REQUIRE EXTENDING UNDER THE GRASS REINFORCEMENT AREA. WORKS WILL BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELDS.

OPEN WATERCOURSE CULVERTED TO RETAIN CURRENT WATERFLOW
INDICATIVE CULVERT LOCATION
INDICATIVE LOCATION OF TREE
FIELD ACCESS
CONTINUED ON 60283248-D-026
CONTINUED ON 60283248-D-028
LEFT VIEWPORT
RIGHT VIEWPORT
Track
Ponds
Issued
267.9m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- VISIBILITY SPLAY

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
15375	3.13	3.11	YES	Straight	NONE	143m	377m
15500	3.14	3.13	YES	Straight	NONE	226m	143m
15725	3.15	3.14	PARTIAL	Straight	VEGETATION OBSTRUCTIONS	239m	226m
15975	3.16	3.15	PARTIAL	Curve	PARTIALLY BLOCKED BY HILL	280m	239m

Rev	Date	Detail	Made	Chk'd	App'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	16/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	25/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	05/04/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
←	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 5 OF 8 CHAINAGE 15300 TO 15900

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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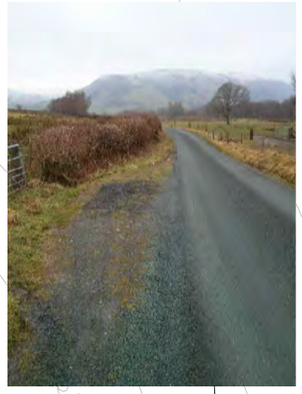
No. 60283248-D-027 Rev: F

A0

DRG Path: P:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-025-026F_.dwg Layout Tab: 027 ▸ User: RESDN Plot time: 19/07/2013 @ 12:05 PM



3.16 - EXISTING PASSING AREA, IMPROVED
CH 15950
THE EXISTING ASPHALT PASSING PLACE LOCATED ON THE SOUTHERN SIDE OF THE ROAD AT THE FIELD ACCESS IS TO BE EXTENDED TO THE EAST INTO AN AREA OF VERGE. THE EXISTING PASSING PLACE TO BE RESURFACED WITH ASPHALT, WITH THE EXTENSION CONSTRUCTED WITH GRASS REINFORCEMENT.
THE EXTENSION OF THE PASSING PLACE WILL IMPACT THE EXISTING FIELD BOUNDARY AND HEDGEROW. A NEW MIXED HEDGEROW WILL BE PLANTED ALONG BACK OF THE WORKS AND THE EXISTING FIELD ACCESS IS TO BE RELOCATED ALONG THE NEW HEDGE LINE - THIS WILL BE AN IMPROVEMENT OVER THE EXISTING HAZEL HEDGE. THE EXISTING CULVERT BENEATH THE PASSING PLACE AND FIELD WILL REQUIRE REPLACING TO ALLOW HGV IMPOSED LOADING. WORKS WILL BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD TO THE SOUTH.

EXISTING OPEN WATERCOURSE TO BE CULVERTED TO RETAIN WATER FLOW

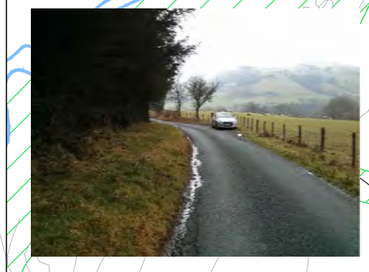
CONTINUED ON 60283248-D-027

15900.000
16000.000
16050.000
16100.000
16150.000
16200.000

256.2m
252.6m

RIGHT VIEWPORT

Issues



3.17A - NEW PASSING PLACE
CH 16275
A NEW PASSING PLACE IS TO BE CONSTRUCTED TO THE SOUTH OF ROAD TO AVOID IMPACTING VEGETATION. NEW PASSING PLACE IS TO BE CONSTRUCTED FROM ASPHALT TO ACCOMMODATE SMALLER VEHICLES WITH AN ADDITIONAL AREA CONSTRUCTED FROM GRASS REINFORCEMENT TO ACCOMMODATE HGVS TO MINIMISE VISUAL IMPACT.
THE PROPOSED PASSING PLACE WILL BE LOCATED IN A LOWERED VERGE WHICH WILL REQUIRE THE EXISTING LAND DRAIN LOCATED AT THE REAR OF VERGE TO BE DIVERTED AND RECONSTRUCTED AT THE REAR OF THE PASSING PLACE.
WORKS WILL BE CONSTRUCTED OFF-LINE FROM THE VERGE AREA AND THE ADJACENT FIELD, WITH NO IMPACT ON VEGETATION.

3.17B - EXISTING PASSING PLACE
CH 16360
EXISTING PASSING PLACE TO BE EXTENDED INTO THE VERGE AND ADJACENT FIELD TO PROVIDE A MINIMUM ROAD WIDTH OF 6 METRES TO ALLOW HGVS TO PASS. GRASS REINFORCEMENT IS TO BE USED TO MINIMISE VISUAL IMPACT AND THE EXISTING FENCE LINE IS TO BE RELOCATED TO THE BACK OF WORKS. WORKS WILL BE CONSTRUCTED OFF-LINE FROM THE VERGE AREA AND ADJACENT FIELD, WITH MINIMAL IMPACT ON VEGETATION.

3.18 - EXISTING PASSING PLACE AT PANTGLAS FARM
CH 16480
THE EXISTING PASSING PLACE AT PANTGLAS FARM TO THE NORTH WEST OF THE EXISTING BUILDINGS IS TO BE RETAINED. THE AREA IS OF SUFFICIENT SIZE TO ACCOMMODATE HGVS AND IS CURRENTLY USED FOR STORAGE BY THE FARM.

16150.000
16200.000
16250.000
16300.000
16350.000
16400.000
16450.000
16500.000

CONTINUED ON 60283248-D-029

Pantglas

LEFT VIEWPORT

RIGHT VIEWPORT

INTERVISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
15975	3.18	3.16	PARTIAL	Curve	PARTIALLY BLOCKED BY HILL	280m	239m
16275	3.17	3.16	YES	Straight	NONE	103m	230m
16375	3.17A	3.17	YES	Straight	NONE	100m	105m
15475	3.16	3.17A	YES	Straight	NONE	52m	100m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- VISIBILITY SPLAY

Ref	Date	Detail	Made	Chk'd	Appr'd
F	30/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	16/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	23/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	08/04/2013	ISSUED FOR COMMENT BY RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	04/03/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 6 OF 8 CHAINAGE 15900 TO 16500

Design:	SR	CAD:	RT
Chk'd:	SR	Appr'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-028 Rev: F

A0

3.19 - NEW PASSING AREA
CH 16550
NEW PASSING PLACE TO BE CONSTRUCTED IN VERGE ON BOTH SIDES OF ROAD IN ORDER TO REDUCE IMPACT ON A TREE AND OTHER VEGETATION LOCATED AT THE REAR OF BOTH VERGES. THE PASSING PLACE IS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT. THE VERGE IS RAISED SLIGHTLY ABOVE THE EXISTING CARRIAGEWAY LEVELS; HOWEVER, ONLY MINIMAL EARTHWORKS ARE REQUIRED ON BOTH SIDES OF THE ROAD. WORKS ARE TO BE CONSTRUCTED ON-LINE USING TRAFFIC MANAGEMENT.

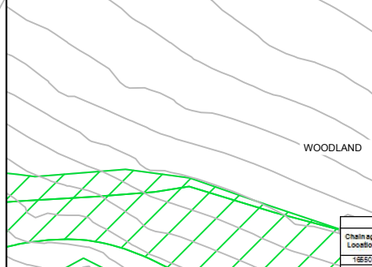
CONTINUED ON 60283248-D-028

3.20 - EXISTING PASSING PLACE, IMPROVED
CH 16715
THE EXISTING ASPHALT PASSING PLACE LOCATED ON THE NOTHERN SIDE OF THE ROAD ADJACENT TO A WOODED AREA WITH A FIELD ACCESS WILL BE EXTENDED INTO THE AREA BEHIND THE FENCE AND HEDGE LINE TO ACCOMMODATE HGVS. GRASS REINFORCEMENT IS TO BE USED TO MINIMISE VISUAL IMPACT. WORKS TO THE WEST WILL NOT IMPACT THE EXISTING HEDGE OR FENCE BEHIND THE PROPOSED PASSING PLACE AND WORKS ARE TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD.

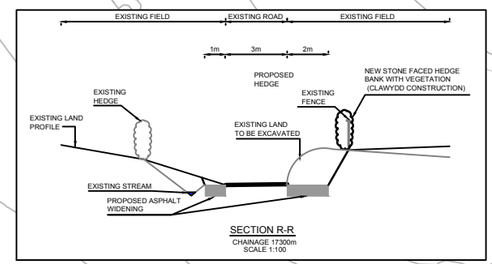
3.21 - EXISTING PASSING PLACE, IMPROVED
CH 16855
EXISTING ASPHALT PASSING PLACE LOCATED ON THE WESTERN SIDE OF THE ROAD ADJACENT TO A FIELD WITH TREES LINING THE FENCE LINE WILL BE EXTENDED TO ACCOMMODATE HGVS. GRASS REINFORCEMENT IS TO BE USED TO MINIMISE VISUAL IMPACT. THE WORKS MAY IMPACT EXISTING TREES LOCATED ALONG THE FENCE LINE, IS THIS IS UNAVOIDABLE NEW OAK TREES WILL BE PLANTED ALONG THE RELOCATED FENCE LINE. WORKS ARE TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD.

3.22A - EXISTING PASSING PLACE, IMPROVED AT EXISTING CATTLE GRID.
CH 17080
EXISTING ASPHALT PASSING PLACE TO THE NORTH OF THE CATTLE GRID IS TO BE LENGTHENED TO ALLOW HGVS TO WAIT, THIS WILL BE CONSTRUCTED USING GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT. THE EXISTING GATE AND FENCE AT THE CATTLE GRID IS TO BE REPLACED BY A NEW GATE POST ON THE SOUTHERN SIDE WHICH WILL ALLOW FOR TWO WAY OPERATION THROUGH THE CATTLE GRID WHEN THE GATE IS OPENED.
THE EXTENDED PASSING PLACE WILL REQUIRE THE EXISTING HEDGE AND FENCE ALONG SOUTHERN SIDE OF THE ROAD TO BE REMOVED AND A NEW MIXED HEDGE WILL BE REPLANTED TO THE BACK OF THE PROPOSED WORKS. ALONG WITH A NEW FENCE. THE HEDGES ON EITHER SIDE OF THE GATEWAY ARE DOUBLE-FENCED AND ARE LIKELY TO HAVE BEEN MANAGED WITHIN THE AGRI-ENVIRONMENT SCHEME. WILLOW AND HAWTHORN ARE LOCATED TO THE LEFT AND RIGHT OF THE GATE RESPECTIVELY AND NEW HEDGES ARE TO BE OF THE SAME SPECIES AS THOSE REMOVED. A DRAINAGE CHANNEL IS LOCATED TO NORTH OF THE WORKS AND THE ROAD DRAINS INTO THIS CHANNEL. WORKS AT THIS LOCATION ARE TO BE CONSTRUCTED FROM THE ADJACENT FIELD TO THE SOUTH.

3.22B - EXISTING PASSING PLACE, IMPROVED
CH 17200
THE EXISTING SMALL PASSING PLACE IS TO BE WIDENED TO ACCOMMODATE HGV MOVEMENTS. THE PROPOSED WORKS ARE WITHIN AN EXISTING AREA OF FLATTENED VERGE TO THE NORTH EAST OF THE ROAD. ADJACENT TO A FARM ACCESS ROAD. MINIMAL EARTHWORKS ARE EXPECTED. WITH NO IMPACT ON EXISTING FENCE LINES ENVISAGED. THERE IS THE POTENTIAL FOR A MEDIUM PRESSURE GAS MAIN TO BE LOCATED BENEATH THE VERGE AND THIS IS TO BE CONFIRMED POST PLANNING. WORKS ARE TO BE CONSTRUCTED FROM THE AREA OF VERGE TO THE NORTH.



3.22C - NEW PASSING PLACE
CH 17290
EXISTING ASPHALT PASSING AREA TO THE NORTH OF THE CATTLE GRID IS TO BE LENGTHENED TO ALLOW HGVS TO WAIT, THIS WILL BE CONSTRUCTED USING GRASS REINFORCEMENT TO MINIMISE VISUAL IMPACT. THE EXISTING GATE AND FENCE AT THE CATTLE GRID IS TO BE REPLACED BY A NEW GATE POST ON THE SOUTHERN SIDE WHICH WILL ALLOW FOR TWO WAY OPERATION THROUGH THE CATTLE GRID WHEN THE GATE IS OPENED.
THE EXTENDED PASSING AREA WILL REQUIRE THE EXISTING HEDGE AND FENCE ALONG SOUTHERN SIDE OF THE ROAD TO BE REMOVED AND A NEW MIXED HEDGE WILL BE REPLANTED TO THE BACK OF THE PROPOSED WORKS. ALONG WITH A NEW FENCE. THE HEDGES ON EITHER SIDE OF THE GATEWAY ARE DOUBLE-FENCED AND ARE LIKELY TO HAVE BEEN MANAGED WITHIN THE AGRI- ENVIRONMENT SCHEME. WILLOW AND HAWTHORN ARE LOCATED TO THE LEFT AND RIGHT OF THE GATE RESPECTIVELY AND NEW HEDGES ARE TO BE OF THE SAME SPECIES AS THOSE REMOVED. A DRAINAGE CHANNEL IS LOCATED TO NORTH OF THE WORKS AND THE ROAD DRAINS INTO THIS CHANNEL. WORKS AT THIS LOCATION ARE TO BE CONSTRUCTED FROM THE ADJACENT FIELD TO THE SOUTH.



SECTION R-R
CHAINAGE 17300m
SCALE 1:100

INTER VISIBILITY ASSESSMENT							
Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
16550	3.19	3.19	YES	Curve	NONE	147m	62m
16700	3.20	3.19	PARTIAL	Curve	TREE OBSTRUCTION	145m	147m
16825	3.21	3.2	PARTIAL	Curve	TREE OBSTRUCTION	254m	146m
17075	3.22A	3.21	PARTIAL	Curve	PARTIALLY BLOCKED BY HILL	129m	254m
17200	3.22B	3.22A	YES	Straight	TREE OBSTRUCTION	89m	125m
17300	3.22C	3.22B	YES	Curve	NONE	145m	89m
17450	3.23	3.22C	PARTIAL	Curve	TREE OBSTRUCTION	91m	145m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS HAVE BEEN DESIGNED BASED ON BEST AVAILABLE TOPOGRAPHICAL DATA.
5. TO MINIMISE IMPACT ON EXISTING TRAFFIC REFER TO LTMP DOCUMENT FOR DETAILS ON BUILDABILITY PHILOSOPHY AND INFORMATION REGARDING TRAFFIC MANAGEMENT.
6. TRIMMING WILL BE REQUIRED ALONG THE ROUTE TO SUIT MANUFACTURERS REQUIREMENTS.
7. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14-cm GIRTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
- PROPOSED OR EXISTING PIPE / CULVERT AFFECTED BY WORKS
- EXISTING CARRIAGEWAY
- PROPOSED PASSING BAY - ASPHALT.
- EXISTING ACCESS OR AREA OF ROAD / FOOTWAY USED FOR PASSING BAY / OVER-RUN
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- BRIDGES / RETAINING WALLS / CATTLE GRID/ OTHER STRUCTURES - IMPACTED WITH MITIGATION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- STONE ACCESS TRACK CONSTRUCTION
- PROPOSED RETAINING STRUCTURE OR OTHER WORKS
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW OR HEDGEBANK
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING
- VISIBILITY SPLAY

Rev	Date	Detail	Made	Chkd	Appd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	27/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	20/06/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	18/06/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	23/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	08/04/2013	ISSUED FOR COMMENT BY RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
--	15/03/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 7 OF 8 CHAINAGE 16500 CH17350

Design:	SR	CAD:	RT
Ch'kd:	SR	Appr'd:	SC
Date:	04/02/2013	Scale:	1:500@A0 - NTS@A3

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No. 60283248-D-029 Rev: F

A0

LEFT VIEWPORT

RIGHT VIEWPORT

N

WOODLAND

17350.000

17400.000

17450.000

17500.000

250.000

200.000

150.000

EXISTING FIELD ACCESS

EXISTING BRIDGE

EXISTING CATTLE GRID

20m

18m

16m

15m

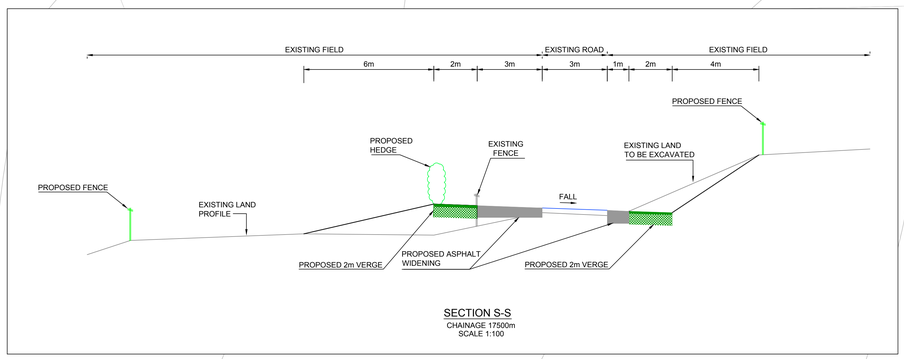
10m

3.23 - NEW PASSING PLACE
CH 17450
NEW PASSING PLACE TO BE CONSTRUCTED IN VERGE TO THE NORTHERN SIDE OF THE ROAD USING ASPHALT FOR AN AREA SUITABLE FOR SMALLER VEHICLES PROVIDED, WITH AN ADDITIONAL AREA CONSTRUCTED WITH GRASS REINFORCEMENT TO ACCOMMODATE HGV MOVEMENTS. THE PROPOSED WORKS WILL IMPACT AN EXISTING DRAINAGE CHANNEL WHICH IS TO BE DIVERTED AND CULVERTED. THE PROPOSED WORKS WILL ALSO IMPACT A TREE TO THE NORTH OF THE WORKS; THIS WILL BE REPLACED WITH A NEW TREE OF THE SAME SPECIES. WORKS ARE TO BE CONSTRUCTED OFFLINE FROM ADJACENT FIELD TO THE WEST.

TALLERDDIG JUNCTION WORKS
THE MINOR ARM OF THE JUNCTION WITH THE A470 WILL BE WIDENED ALONG ITS LENGTH UP TO THE CATTLE GRID TO ALLOW TWO-WAY HGV TRAFFIC. JUNCTION WIDENING WORKS ARE TO BE CONSTRUCTED FROM ASPHALT WITH APPROPRIATE VISIBILITY SPLAYS ONTO THE A470 AND IN ACCORDANCE WITH THE DETAILS SHOWN ON DRAWING NO. 60283248-D-040-1. THE EXISTING EMBANKMENT IS TO BE WIDENED AND THE PROPOSED SLOPES ARE TO BE PROFILED OUT TO MATCH EXISTING SO FAR AS PRACTICALLY POSSIBLE. SCRUB WILL BE ALLOWED TO GROW ON THE BANKS TO BLEND INTO SURROUNDINGS. THIS WILL LIKELY COMPRISE OF MIXED HEDGEROW INCLUDING HAZEL, HAWTHORN AND ASH TO MATCH OTHER HEDGES NEARBY AND BE PLANTED ALONG THE TOP OF THE BANK (ALONGSIDE THE ROAD) TO TIE IN WITH EXISTING HEDGEROWS.

A470 ACCESS JUNCTION - TALLERDDIG

REFER TO DRAWING 60283248-D-040 1 FOR TALERDDIG JUNCTION IMPROVEMENT DETAILS



SECTION S-S
CHAINAGE 17500m
SCALE 1:100

INTER VISIBILITY ASSESSMENT

Chainage Location	VISIBILITY FROM	VISIBILITY TO	Inter-Visibility - TO SITE	Road Summary	Visibility Comments	To Site Spacing	From Site Spacing
17450	3.23	3.22C	PARTIAL	Curve	TREE OBSTRUCTION	91m	145m
17500	A470	3.23	YES	Straight	NONE	0m	91m

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS SHOWN ARE INDICATIVE AND WILL BE DEFINED POST PLANNING.
5. ALL OVERHEAD LINES TO BE ASSESSED FOR ALL VEHICLE HEIGHT CLEARANCE POST-PLANNING
6. ALL DIVERSIONS FOR OVERHEAD AND BURIED STATUTORY UNDERTAKER'S PLANT TO BE ADDRESSED POST-PLANNING
7. ALL TREES AND HEDGEROWS TO BE CUT BACK TO SUIT TURBINE MANUFACTURER'S CLEARANCE REQUIREMENT.
8. ALL TOPSOIL EXCAVATED DURING WORKS TO BE STOCKPILED LOCALLY AND REUSED WITHIN WORKS TO ENSURE LOCAL SEED MIX. REPLACEMENT TREES TO BE ROOTBALLED, EXTRA HEAVY STANDARD, 14+cm GERTH, MIN 4m TALL.

KEY

- EXISTING OVERHEAD CABLES
- EXISTING POLE FOR OVERHEAD CABLES
- EXISTING OPEN DRAINAGE DITCH/DIRECTION OF FLOW ARROW
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- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
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- PROPOSED HEDGEROW
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- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- RED LINE BOUNDARY WORKS
- WOODED AREA
- IMPACTED VEGETATION
- NEW/RELOCATED VEGETATION
- AREA OF PROPOSED PLANTING

Rev	Date	Detail	Made	Chk'd	App'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY PRIOR TO PLANNING SUBMISSION	SR	SC	KM
E	07/06/2013	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO PCC & NRW	SR	SC	KM
D	30/05/2013	REVISED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	16/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
B	25/04/2013	REVISED FOLLOWING SITE MEETINGS WITH PCC AND COMMENTS RAISED	SR	SC	KM
A	05/04/2013	ISSUED FOR COMMENT BY: RES / ECOLOGY / ARCHAEOLOGY / HYDROLOGY / LANDSCAPE AND VISUAL	SR	SC	KM
---	04/02/2013	FIRST ISSUE	JC	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SECTION 3 SHEET 8 OF 8 CHAINAGE 17350 TO 17500

Design:	SR	CAD:	RT
Chk'd:	SR	App'd:	SC
Date:	04/02/2013	Scale:	1:200@A0 - NTS@A3

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No. 60283248-D-030 Rev: F

A0

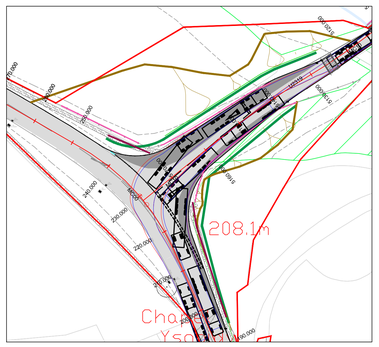
DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-030.dgn Layout Tab: 030 User: RESDN Plot time: 19/07/2013 @ 12:01 PM

IMAGE A - VIEW NORTH
WEST ON A470

IMAGE C - VIEW NORTH
EAST ON A470

IMAGE B - VIEW NORTH
WEST ON A470

IMAGE D - VISIBILITY SPLAY
FROM SOUTH TO JUNCTION



SWEPT PATH ANALYSIS OF JUNCTION
16.5m ARTICULATED HGV.

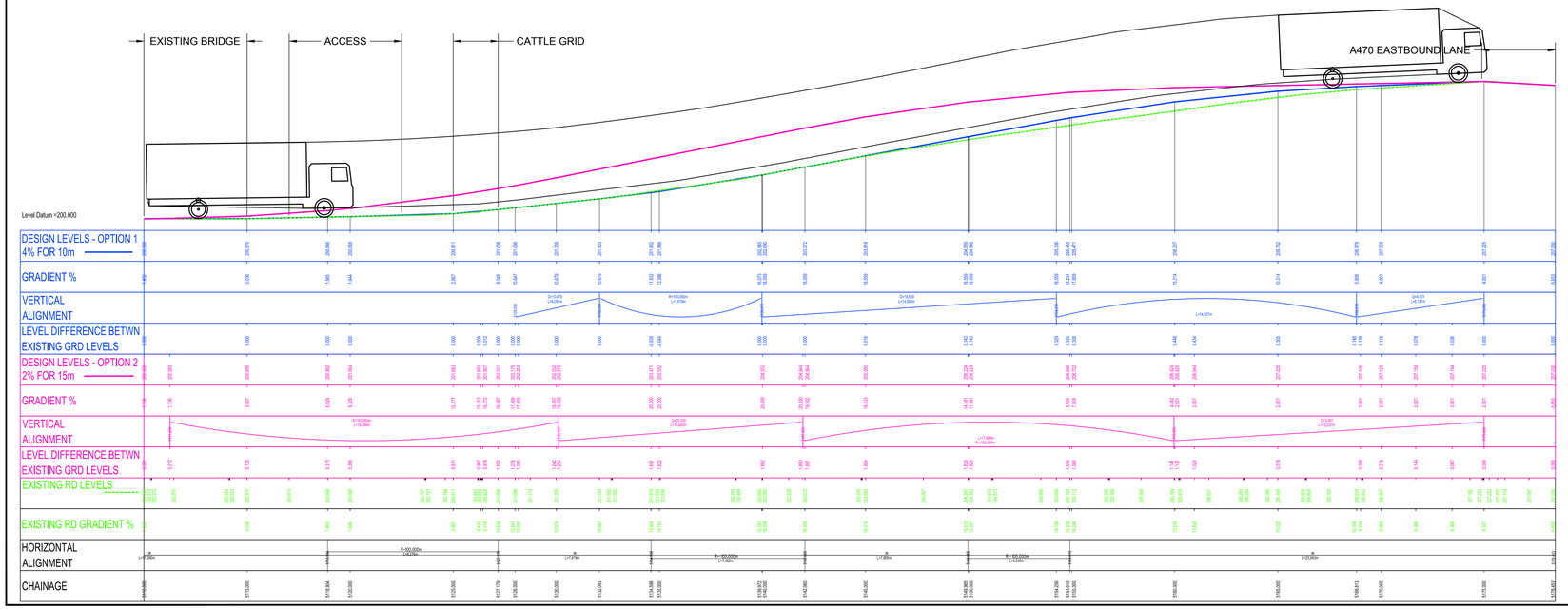
OPTION 1 - APPROVED IN PRINCIPLE BY WELSH GOVERNMENT 15/5/13
THIS VERTICAL ALIGNMENT IS DELIVERABLE WITH A RELAXATION FROM DESIGN STANDARDS FOR JUNCTION APPROACH PLATEAU.

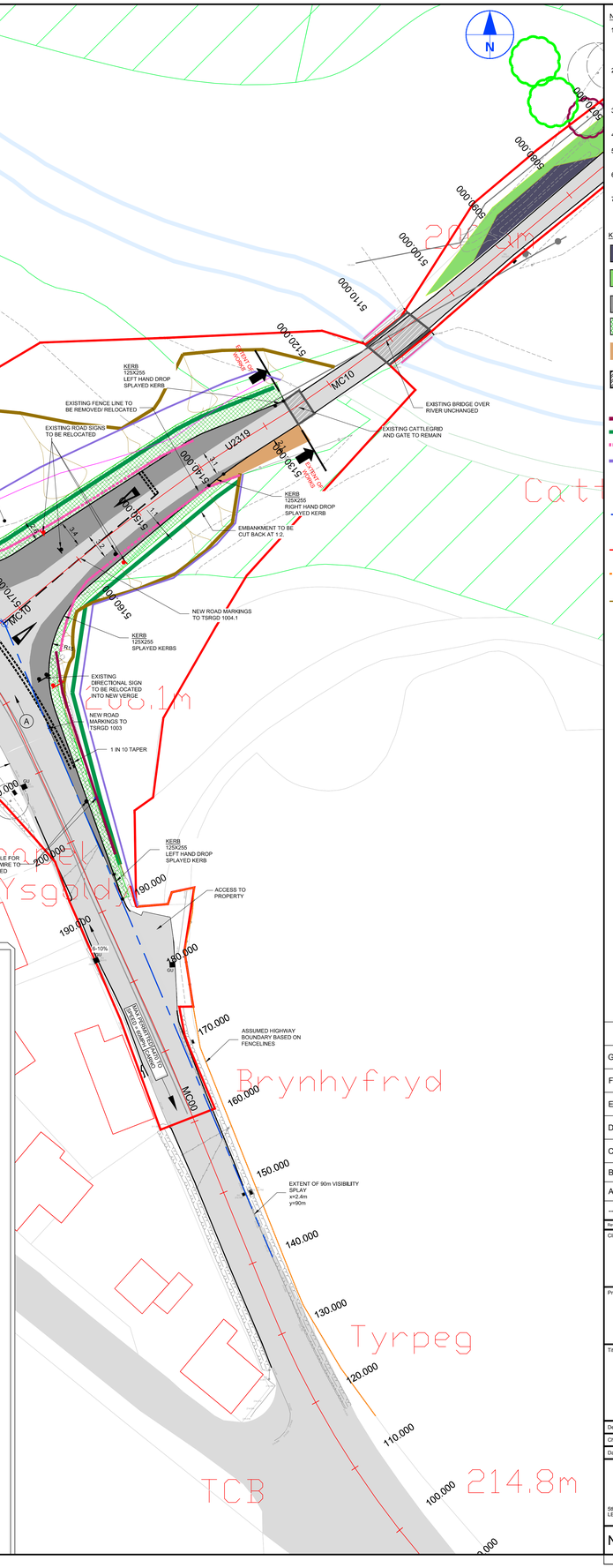
THIS LAYOUT CAN BE TIED INTO THE EXISTING ROAD LEVELS PRIOR TO CATTLE GRID WITH A 1 IN 6 GRADIENT, AND WITH NO IMPACT ON THE EXISTING BRIDGE OR ACCESS. THESE WORKS CAN BE DELIVERED WITH LESS IMPACT THAN OPTION 2.

OPTION 2 - DMRB TD 41 95 STANDARD 2% FOR 15m FROM GIVE WAY LINE
THIS VERTICAL ALIGNMENT RESULTS IN CONSTRUCTION BUILD UP IN EXCESS OF 1.2m ABOVE EXISTING LEVELS, REQUIRING A ROAD CLOSURE AS WELL AS RECONSTRUCTION OF THE CATTLE GRID AND THE EXISTING BRIDGE.

THIS ALIGNMENT IS DEPENDENT ON A 1 IN 5 GRADIENT BETWEEN THE HOG AND SAG CURVES. ADDITIONAL EARTHWORKS IMPACT WILL BE PRESENT BEYOND THOSE SHOWN ON THIS LAYOUT TO ACCOUNT FOR THE ADDITIONAL CONSTRUCTION ABOVE THOSE LEVELS DESIGNED.

LONGSECTION OF CENTRELINE THROUGH U2319, MC10.
OPTIONS 1, 2 AND EXISTING ALIGNMENT





NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS SHOWN ARE INDICATIVE AND WILL BE DEFINED POST PLANNING.
5. ALL OVERHEAD LINES TO BE ASSESSED FOR ALL VEHICLE HEIGHT CLEARANCE POST-PLANNING
6. ALL DIVERSIONS FOR OVERHEAD AND BURIED STATUTORY UNDERTAKER'S PLANT TO BE ADDRESSED POST-PLANNING
7. ALL TREES AND HEDGEROWS TO BE CUT BACK TO SUIT TURBINE MANUFACTURER'S CLEARANCE REQUIREMENT. DEFINED IN POST PLANNING

KEY:

- PROPOSED PASSING BAY - ASPHALT.
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- STONE ACCESS TRACK CONSTRUCTION
- BRIDGES / RETAINING WALLS / CATTLE GRID / OTHER STRUCTURES - NOT IMPACTED & EXISTING
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- PROPOSED REMOVABLE BOLLARDS
- VISIBILITY SPLAY
- GU EXISTING DRAINAGE GULLY
- PROPOSED RED LINE BOUNDARY
- ASSUMED EXTENT OF HIGHWAY BOUNDARY OUTSIDE OF WORKS BASED ON FENCELINES
- PROPOSED RED LINE BOUNDARY

Rev	Date	Detail	Made	Chk'd	App'd
G	18.07.13	REVISED WITH UPDATED RED LINE BOUNDARY FOR PLANNING SUBMISSION	SR	SC	KM
F	15.05.13	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW.	SR	SC	KM
E	29.04.2013	REVISED ALIGNMENT OF ROAD TOWARDS CATTLE GRID	SR	SR	SC
D	14.03.2013	FORWARD VISIBILITY TURNING RIGHT AMENDED TO 90 METRES	WJ	SR	SC
C	06.03.2013	REVISED ALIGNMENT TO GIVE 15m RADIUS FOR LEFT TURN IN. FURTHER LAND OWNERSHIP AND VISI SPLAY CLARIFICATIONS.	SR	SC	KM
B	15/02/2013	UPDATED TO SUIT TOPO SURVEY, ADDITIONAL 3D DESIGN AND OPTIONEERING. ADDED VISI SPLAYS.	SR	SC	KM
A	26/02/2013	REVISED TO SUIT TOPOGRAPHICAL SURVEY AND COMMENTS FROM WG.	SR	SC	KM
--	19/02/2013	FIRST ISSUE	WJ	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: A470 TALERDDIG JUNCTION

Design:	SDR	CAD:	JC
Chk'd:	SC	App'd:	KM
Date:	08/02/2013	Scale:	1:250@A0 NTS @A3

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No. 60283248-D-040 Rev: G

A0

GRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUTS\60283248-D-040G.dwg Layout Tab: 60283248-P-040 User: RESDN Plot time: 19/07/2013 @ 11:43 AM

EXISTING TREE WITH AGREED TREE ROOT ZONE 15.6m RADIUS PROPOSED WORKS BY ROOT PROTECTION ZONE AROUND EXISTING TREE. NO WORKS LOCATED WITHIN THIS ZONE, EXCEPT VERGE PLANTING

EXISTING FOOTPATH

EXISTING HEDGE LINE

EXISTING CROSSING TO REMAIN OPEN

34.1m - EXISTING KERBS REPLACED WITH SPLAY KERBS EXCEPT AT DROPPED CROSSING, WHICH IS RETAINED

EXISTING ACCESS JUNCTION TO BE RETAINED

A458

C2031

ch0.000 (MC00)

ch0.000 (MC00)

R50

R15.6

R100

R157

R45

R12

EXISTING FIELD ACCESS TO BE REMOVED

EXISTING ELECTRICITY POLE AND TELEGRAPH POLE TO BE RELOCATED

LINE OF PROPOSED WOOD FENCELINEINSTALLED POST CONSTRUCTION

PROPOSED ACCESS TRACK

PROPOSED FENCELINE / GATE TO PREVENT ACCESS ONTO OVER-RUN AREA. DETAIL TO BE AGREED

PROPOSED FENCELINE / GATE TO PREVENT ACCESS ONTO OVER-RUN AREA.

30.8m - EXISTING KERBS REPLACED WITH SPLAY KERBS

FIELD ACCESS GATE LOCATION TO BE CONFIRMED WITH LANDOWNER

NEW ACCESS FOR AIL TRAFFIC TO BE PROVIDED FROM A458 TO THE C2031, DETAILS OF WHICH ARE SHOWN ON DRAWING NO. 60283248-D-041. THE PROPOSED WORKS ARE FOR AIL ONLY AND NOT FOR ANY OTHER TRAFFIC USE.

DURING CONSTRUCTION: PROPOSED ACCESS TRACK TO BE CONSTRUCTED OF GRASS REINFORCEMENT TO BLEND WITH THE SURROUNDING FIELDS. SLOPES TO BE BLENDED AND FEATHERED INTO EXISTING LANDFORM AND SEEDED TO MATCH THE ADJACENT FIELD. TEMPORARY BOLLARDS WILL BE INSTALLED AND THEN REMOVED FOR THE PERMANENT WORKS.

AFTER CONSTRUCTION: A REINFORCED GRASS SOLUTION WILL SEEK ENSURE THE AREA MATCHES THE SURROUNDING FIELD SO FAR AS PRACTICALLY POSSIBLE. THE TEMPORARY FENCING ALONGSIDE THE ACCESS TRACK AND THE GATES AT EITHER END OF TRACK WILL BE REMOVED. A WOODEN POST AND RAIL FENCE WILL BE CONSTRUCTED (WHICH CAN BE REMOVED IF A REPLACEMENT BLADE IS REQUIRED), WITH REPLACEMENT GATES MADE FROM WOOD.

THE CURRENT ROADSIDE HEDGE IS RELATIVELY NEWLY PLANTED HAWTHORN. ANY REPLANTED HEDGE CAN BE IMPROVED BY THE ADDITION OF OTHER SPECIES SUCH AS BLACKTHORN AND HAZEL TO MATCH OTHER HEDGES IN THE VICINITY. THE PROPOSED TRACK CONSTRUCTION IS TO BE PERMEABLE AND DRAIN AWAY FROM THE EXISTING ROAD, THEREFORE THE DRAINAGE IMPACT IS NEGLIGIBLE.

TO BE REVIEWED IN CONJUNCTION WITH 60283248-D-001

NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF AECOM.

2. DO NOT SCALE FROM THIS DRAWING

. ALL DIMENSIONS IN METRES UNLESS SPECIFIED OTHERWISE.

4. JUNCTION DESIGN IN ACCORDANCE WITH DMRB TD 42/95 MAJOR/ MINOR PRIORITY

5. JUNCTION IS PRELIMINARY DESIGN BASED ON A TOPOGRAPHICAL SURVEY CARRIED OUT FEBRUARY 2013. VISIBILITY SPLAYS MEASURED ON-SITE ON 11TH FEBRUARY 2013.

6. EARTHWORKS SHOWN ARE FOR THE OPTION 1 ALIGNMENT DETAILED IN THE LONGSECTION

KEY:

- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED VERGE
- EXISTING DRAINAGE GULLY
- EXISTING FOOTWAY TO BE STRENGTHED FOR VEHICLE LOADS
- STONE ACCESS TRACK CONSTRUCTION
- TREE ROOT ZONE
- INDICATIVE EARTHWORKS
- PROPOSED HEDGEROW
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- PROPOSED REMOVABLE BOLLARDS

Rev	Date	Detail	Made	Chk'd	App'd
G	19.07.13	REVISED WITH UPDATED RED LINE BOUNDARY FOR PLANNING SUBMISSION	SR	SC	KM
F	07.06.13	DRAWINGS REVISED FOLLOWING NRW AND DESIGN TEAM COMMENTS. ISSUED TO NRW AND PCC	SR	SC	KM
E	30.05.13	AMENDED TO SUIT CLIENTS COMMENTS	SR	SC	KM
D	15.05.13	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE,ECOLOGY, DRAINAGE, PCC AND NRW	SR	SC	KM
C	29.04.13	MINOR AMENDMENTS FOLLOWING PCC MEETING 17.04.13	SR	SR	SC
B	15.03.2013	MINOR AND ADDITIONAL NOTES AND INFORMATION ADDED	WJ	SR	SC
A	14/03/2013	HEDGEROW INFORMATION AMENDED	WJ	SR	SC
--	14/02/2013	FIRST ISSUE	WJ	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM POWYS

Title: A458 ACCESS JUNCTION AIL ONLY ARRANGEMENT

Design: WJ	CAD: WJ
Chk'd: SR	App'd: SDC
Date: 08/02/2012	Scale: 1:250@A1 NTS @A3

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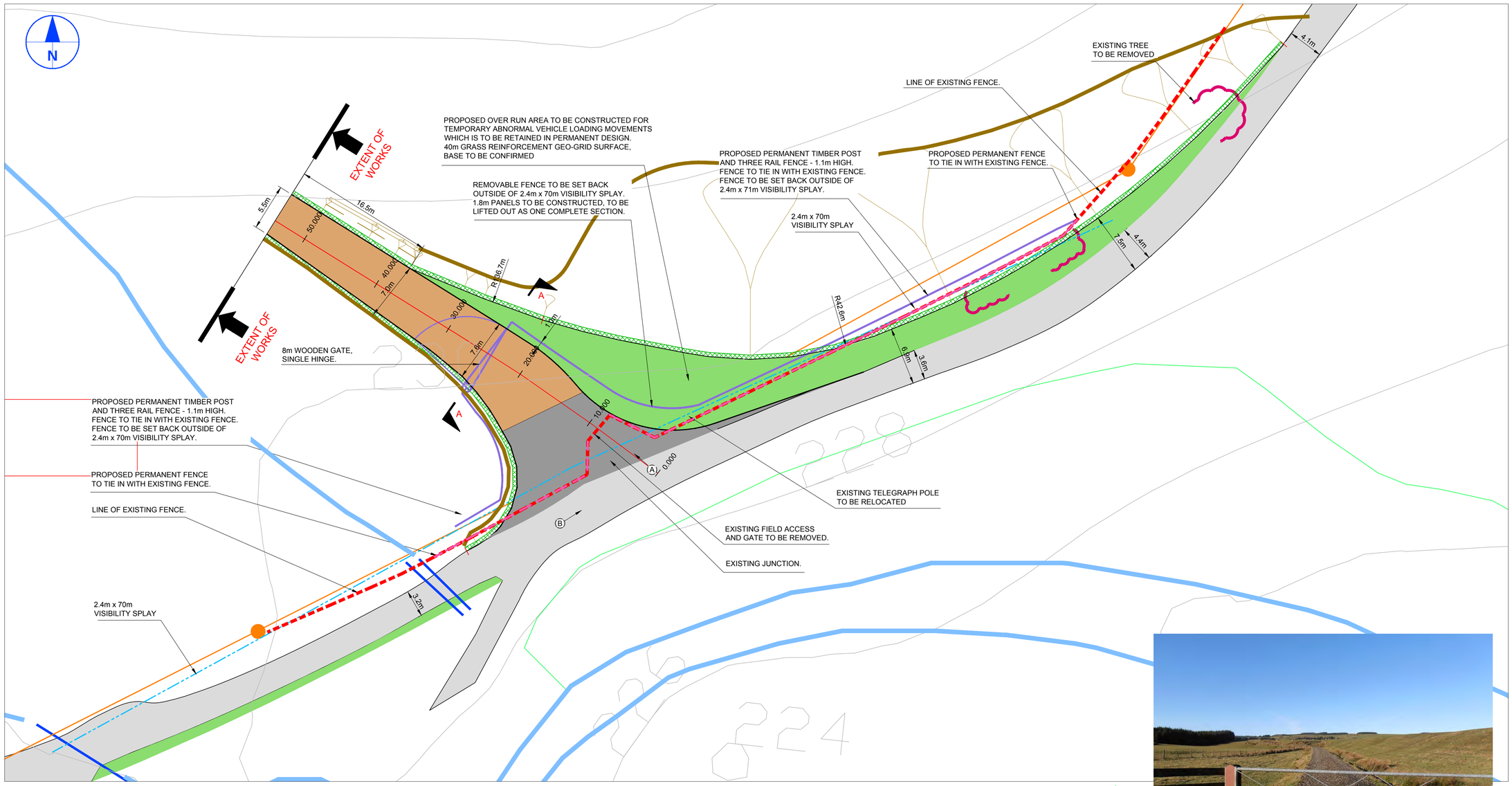
No. 60283248-P-041 Rev: G

A1

DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-041-1 G.dwg Layout Tab: P-041 • User: REDSN Plot time: 19/07/2013 @ 11:45 AM

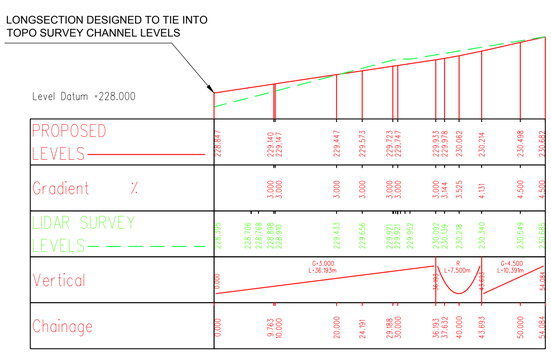


NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS SHOWN ARE INDICATIVE AND WILL BE DEFINED POST PLANNING.
5. ALL OVERHEAD LINES TO BE ASSESSED FOR AIL VEHICLE HEIGHT CLEARANCE POST-PLANNING
6. ALL DIVERSIONS FOR OVERHEAD AND BURIED STATUTORY UNDERTAKER'S PLANT TO BE ADDRESSED POST-PLANNING
7. ALL TREES AND HEDGEROWS TO BE CUT BACK TO SUIT TURBINE MANUFACTURER'S CLEARANCE REQUIREMENT. DEFINED IN POST PLANNING

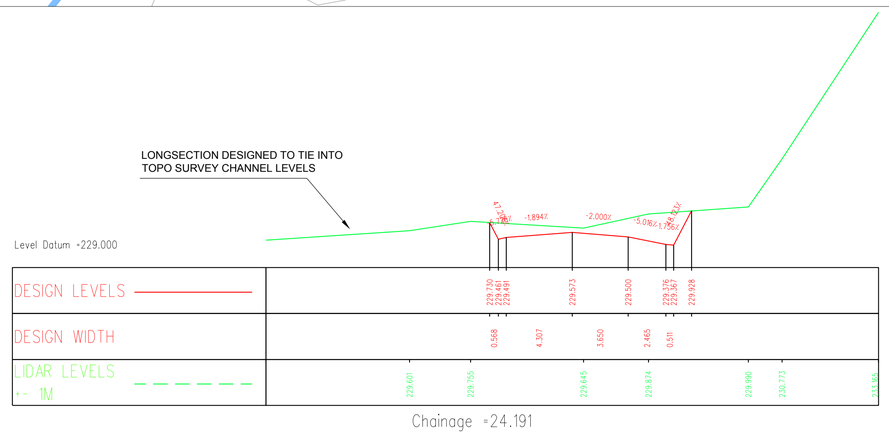
KEY

- PROPOSED PASSING BAY - ASPHALT.
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- STONE ACCESS TRACK CONSTRUCTION
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- IMPACTED VEGETATION
- (A) PHOTO LOCATION
- ASSUMED EXTENT OF HIGHWAY BOUNDARY OUTSIDE OF WORKS BASED ON FENCELINES



ACCESS 1 - CENTRELINE LONGSECTION

Slope Units =%
Horizontal Scale = 1:500,Vertical Scale = 1:100



ACCESS 1 - CENTRELINE CROSS SECTION A-A @ CH 24.191

Slope Units =%
Horizontal Scale = 1:200,Vertical Scale = 1:50

PHOTO A

PHOTO B

Rev	Date	Detail	Made	Chk'd	App'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY FOR PLANNING SUBMISSION	SR	SC	KM
E	07/06/2013	REVISED TO SUIT LVIA COMMENTS, FOR PCC APPROVAL	SR	SC	KM
D	30/05/2013	AMENDED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW	SR	SC	KM
B	29/04/2013	REVISED JUNCTION DESIGN TO SUIT PCC COMMENTS 17.04.13. INCLUDED REDUCING HGV JUNCTION AREA	SR	SC	KM
A	10/04/2013	DETAILS AMENDED AND REFINED	SR	SC	KM
--	20/03/2013	DRAFT ISSUE	SR	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SITE ACCESS JUNCTION 1 CHAINAGE 8250

Design: SR	CAD: WJ
Chk'd: SR	App'd: SDC
Date: 08/02/2012	Scale: 1:250 @ A1, NTS @ A3

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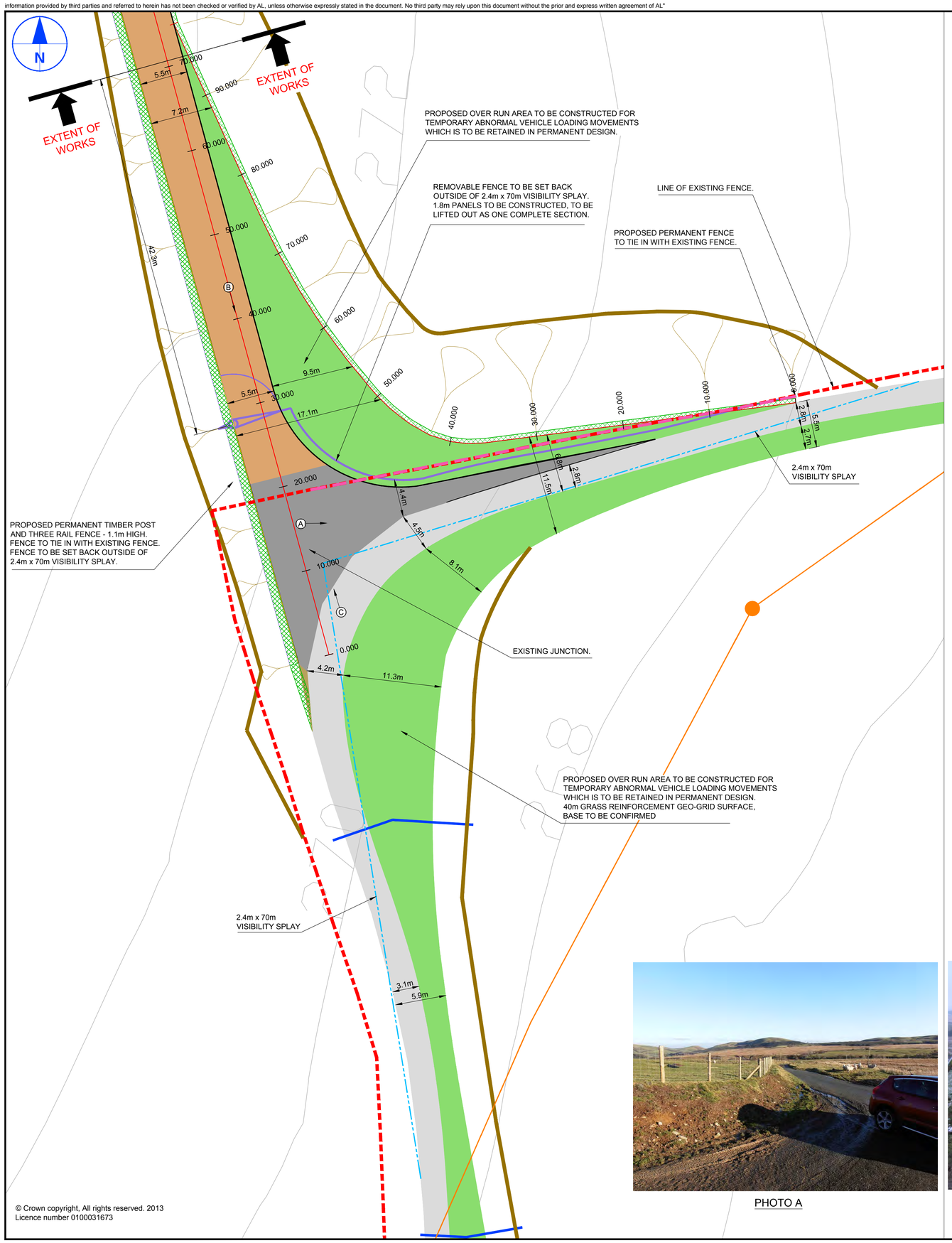
Fax: +44 (0) 113 391 6899
www.aecom.com

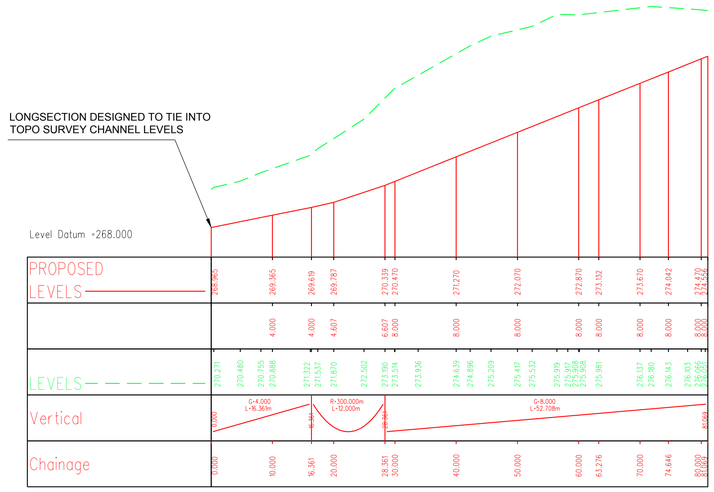
No. 60283248-D-042

Rev: F

A1

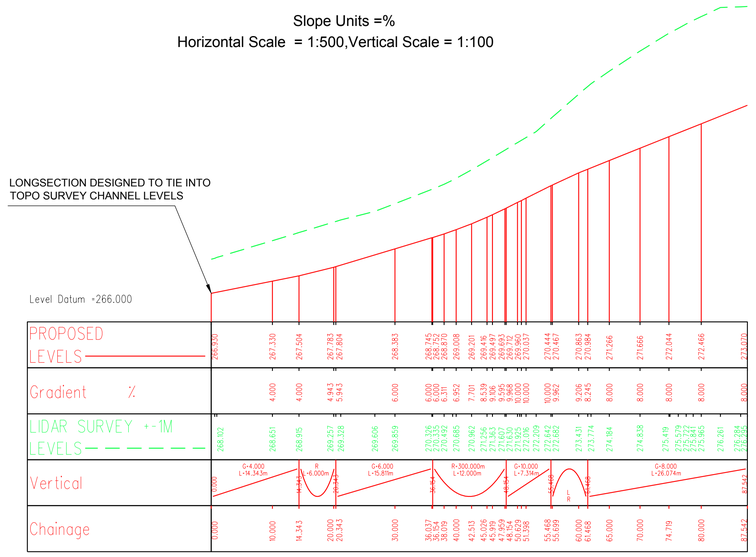
DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-042D.dwg Layout Tab: 042 • User: REIDSN Plot time: 19/07/2013 @ 12:06 PM





ACCESS 2 - CENTRELINE LONGSECTION

Slope Units =%
Horizontal Scale = 1:500,Vertical Scale = 1:100



ACCESS 2 - LONGSECTION AT BACK OF OVER-RUN AREA

Slope Units =%
Horizontal Scale = 1:500,Vertical Scale = 1:100

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGVS
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS SHOWN ARE INDICATIVE AND WILL BE DEFINED POST PLANNING.
5. ALL OVERHEAD LINES TO BE ASSESSED FOR ALL VEHICLE HEIGHT CLEARANCE POST-PLANNING
6. ALL DIVERSIONS FOR OVERHEAD AND BURIED STATUTORY UNDERTAKER'S PLANT TO BE ADDRESSED POST-PLANNING
7. ALL TREES AND HEDGEROWS TO BE CUT BACK TO SUIT TURBINE MANUFACTURER'S CLEARANCE REQUIREMENT. DEFINED IN POST PLANNING

KEY

- PROPOSED PASSING BAY - ASPHALT.
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- STONE ACCESS TRACK CONSTRUCTION
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- IMPACTED VEGETATION
- PHOTO LOCATION
- ASSUMED EXTENT OF HIGHWAY BOUNDARY OUTSIDE OF WORKS BASED ON FENCELINES

PHOTO A

PHOTO B

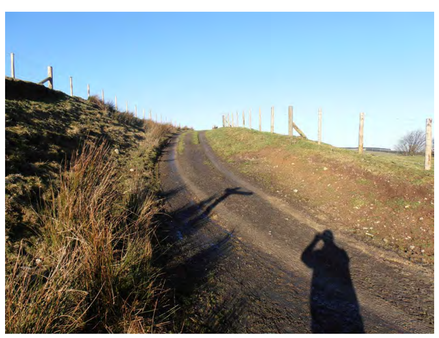


PHOTO C

Rev	Date	Detail	Made	Chk'd	App'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY FOR PLANNING SUBMISSION	SR	SC	KM
E	07/06/2013	REVISED TO SUIT LVIA COMMENTS, FOR PCC APPROVAL	SR	SC	KM
D	30/05/2013	AMENDED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW	SR	SC	KM
B	29/04/2013	REVISED JUNCTION DESIGN TO SUIT PCC COMMENTS 17.04.13. INCLUDED REDUCING HGV JUNCTION AREA	SR	SC	KM
A	10/04/2013	DETAILS AMENDED AND REFINED	SR	SC	KM
--	20/03/2013	DRAFT ISSUE	SR	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SITE ACCESS JUNCTION 2 CHAINAGE 10100 - 10150

Design:	SR	CAD:	WJ
Chk'd:	SR	App'd:	SDC
Date:	08/02/2012	Scale:	1:250

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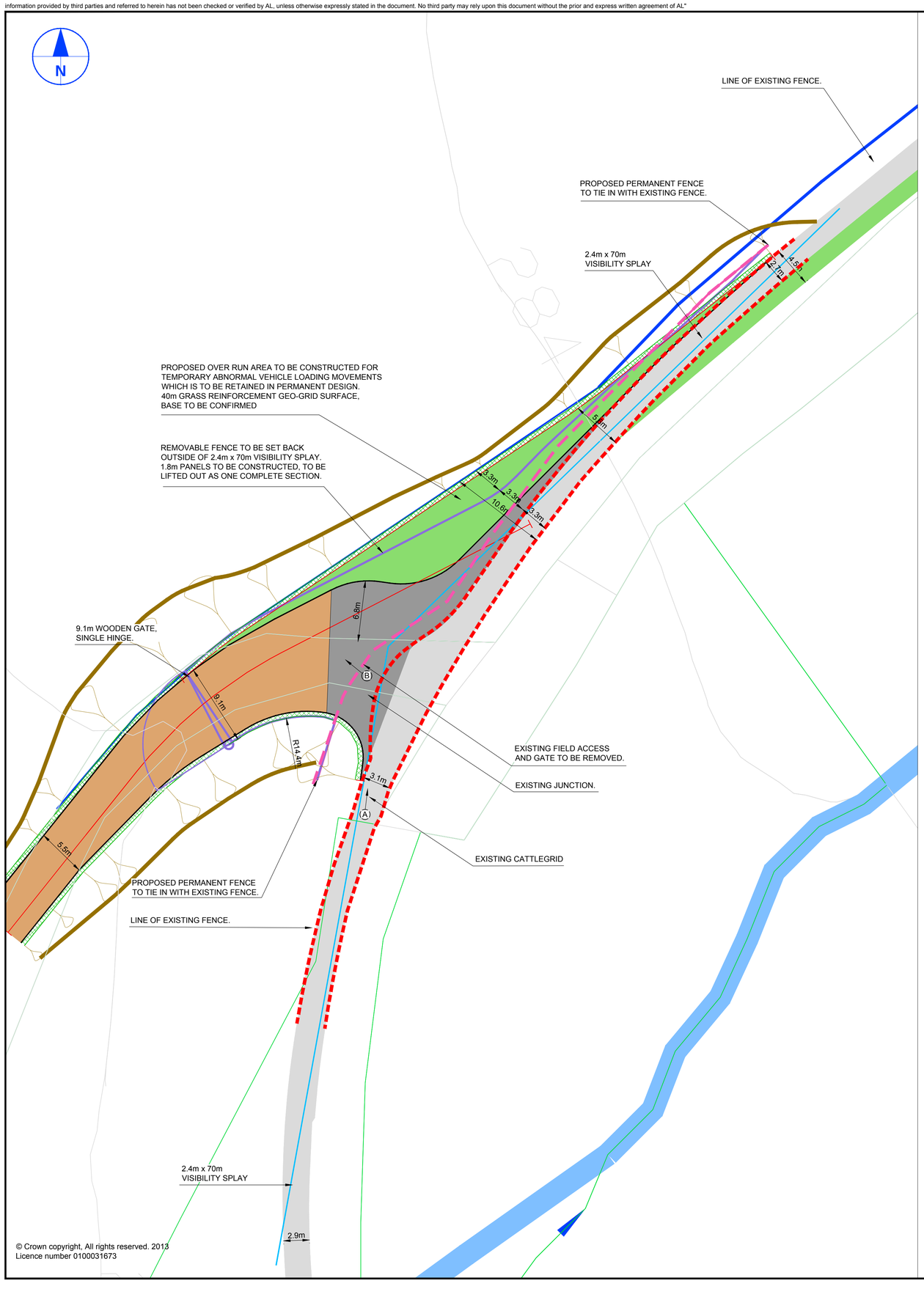
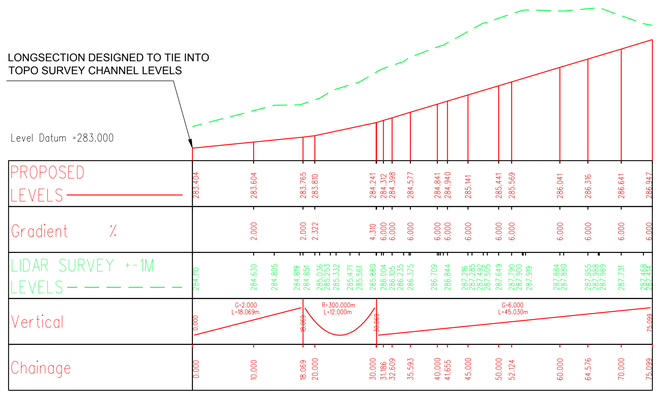
No. 60283248-P-043 Rev: F

A1

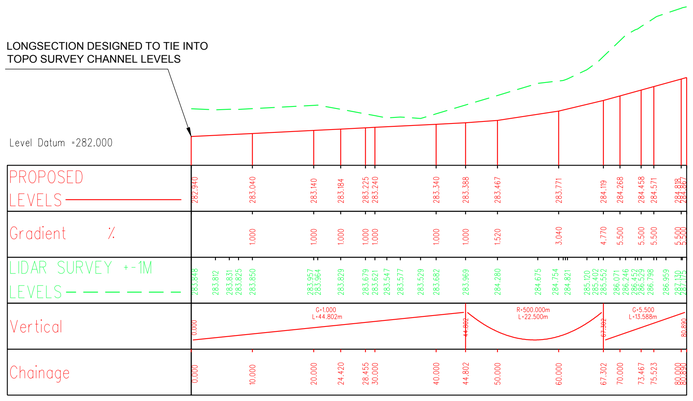
DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-043D.dwg Layout Tab: 043 • User: REIDSN Plot time: 19/07/2013 @ 12:05 PM





ACCESS 4 - CENTRELINE LONGSECTION

Slope Units =%
Horizontal Scale = 1:500,Vertical Scale = 1:100



ACCESS 4 - OVER-RUN LONGSECTION

Slope Units =%
Horizontal Scale = 1:500,Vertical Scale = 1:100

PHOTO A

PHOTO B

NOTES

1. ALL WORKS ON SECTION 1(LLANERFYL TO ACCESS 1) DESIGNED TO SUIT PROPOSED MOVEMENTS OF AIL VEHICLES. SECTION 2 (ACCESS 1 TO ACCESS 4) DESIGNED TO SUIT AIL VEHICLES AND SITE HGV'S
2. HEDGE/FENCE ASSUMED TO BE HIGHWAY BOUNDARY. WHERE THERE IS NO HEDGE/FENCE THEN THE BACK OF FOOTWAY/ EDGE OF CARRIAGEWAY IS ASSUMED AS THE BOUNDARY.
3. ALL PROPOSALS ARE BASED ON TOPOGRAPHICAL SURVEY UNLESS OTHERWISE STATED.
4. EARTHWORKS SHOWN ARE INDICATIVE AND WILL BE DEFINED POST PLANNING.
5. ALL OVERHEAD LINES TO BE ASSESSED FOR ALL VEHICLE HEIGHT CLEARANCE POST-PLANNING
6. ALL DIVERSIONS FOR OVERHEAD AND BURIED STATUTORY UNDERTAKER'S PLANT TO BE ADDRESSED POST-PLANNING
7. ALL TREES AND HEDGEROWS TO BE CUT BACK TO SUIT TURBINE MANUFACTURER'S CLEARANCE REQUIREMENT. DEFINED IN POST PLANNING

KEY

- PROPOSED PASSING BAY - ASPHALT.
- PROPOSED AIL OVER-RUN. GRASS REINFORCEMENT.
- PROPOSED ASPHALT CONSTRUCTION
- PROPOSED VERGE
- STONE ACCESS TRACK CONSTRUCTION
- EXISTING HEDGEROW IMPACTED BY WORKS
- PROPOSED HEDGEROW
- EXISTING FENCE LINE - IMPACTED BY WORKS
- PROPOSED FENCE LINE OR GATE
- EXISTING GATE, IMPACTED BY WORKS
- INDICATIVE EARTHWORKS
- IMPACTED VEGETATION
- A → PHOTO LOCATION
- ASSUMED EXTENT OF HIGHWAY BOUNDARY OUTSIDE OF WORKS BASED ON FENCELINES

Rev	Date	Detail	Made	Chk'd	App'd
F	19/07/2013	REVISED WITH UPDATED RED LINE BOUNDARY FOR PLANNING SUBMISSION	SR	SC	KM
E	07/06/2013	REVISED TO SUIT LVIA COMMENTS, FOR PCC APPROVAL	SR	SC	KM
D	30/05/2013	AMENDED TO SUIT CLIENTS COMMENTS	SR	SC	KM
C	15/05/2013	DESIGN FREEZE FOLLOWING CONSULTATION WITH LANDSCAPE, ECOLOGY, DRAINAGE, PCC AND NRW	SR	SC	KM
B	29/04/2013	REVISED JUNCTION DESIGN TO SUIT PCC COMMENTS 17.04.13. INCLUDED REDUCING HGV JUNCTION AREA	SR	SC	KM
A	10/04/2013	DETAILS AMENDED AND REFINED	SR	SC	KM
--	20/03/2013	DRAFT ISSUE	SR	SR	SC

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: PROPOSED HIGHWAY WORKS SITE ACCESS JUNCTION 4 CHAINAGE 12350

Design: SR	CAD: WJ
Chk'd: SR	App'd: SDC
Date: 08/02/2012	Scale: 1:250

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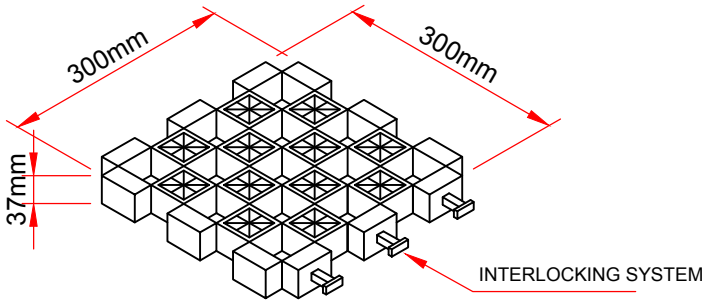
No. 60283248-P-044 Rev: F

A1

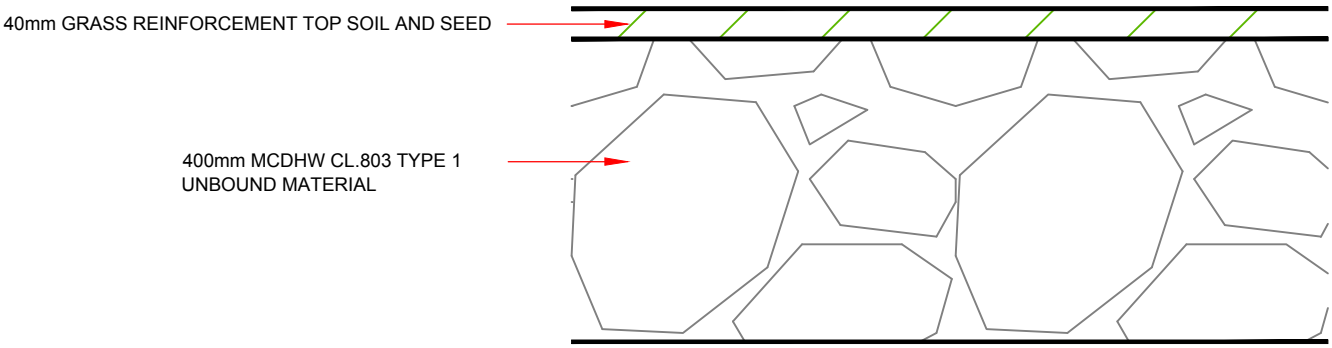
DRG Path: F:\PROJECTS\Development - Llanbrynmair Wind Farm\DWGS\AECOM\PLAYOUT\60283248-D-044D.dwg Layout Tab: P-044 • User: REIDSN Plot time: 19/07/2013 @ 12:07 PM



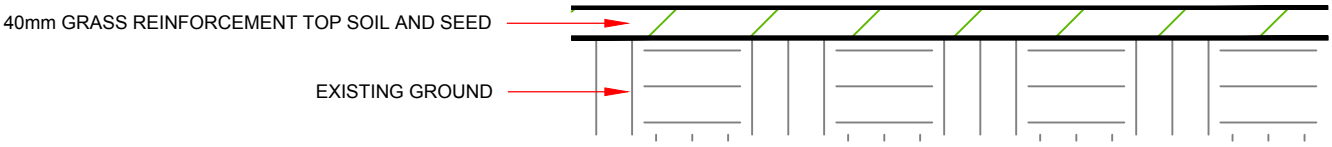
MANUFACTURER - **PERFO**
PRODUCT **TERRA-GRID**, INTERLOCKING GROUND REINFORCEMENT SYSTEM.

DETAIL VIEW OF GRASS REINFORCEMENT SYSTEM
SCALE 1:10

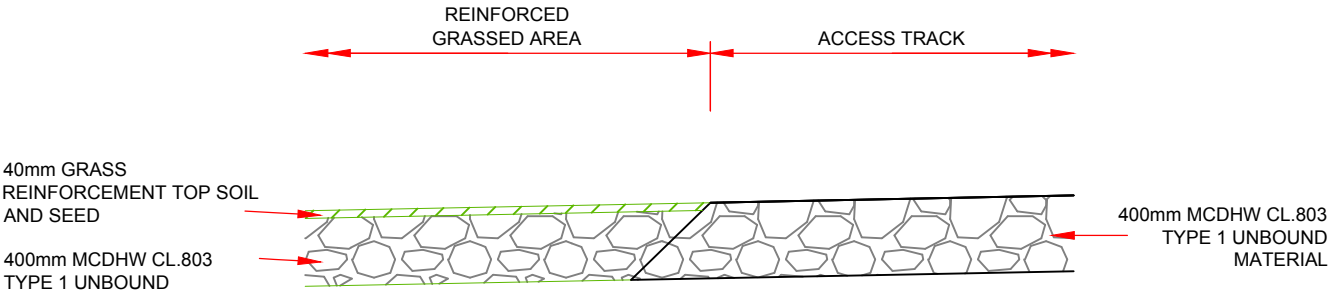
PHOTOGRAPH OF PERFO TERRA-GRID GRASS REINFORCEMENT AS PREVIOUSLY INSTALLED ON MARR WIND FARM, DONCASTER, PHOTO TAKEN 30.05.13



GRASS REINFORCEMENT SYSTEM LAID ON TOP OF ACCESS TRACK BUILD UP (TO BE USED ON SOFT GROUND)
SCALE 1:10



GRASS REINFORCEMENT SYSTEM LAID ONTO EXISTING GROUND (TO BE USED ON HARD GROUND)
SCALE 1:10



TYPICAL SECTION OF REINFORCED GRASS OVERRUN AREA
SCALE 1:40

Client: res	Title: TYPICAL DETAILS GRASS REINFORCEMENT	AECOM 5th Floor, 2 City Walk LEEDS, LS11 9AR Tel: +44 (0) 113 391 6800 Fax: +44 (0) 113 391 6899 www.aecom.com	cm
Project: LLANBRYNMAIR WIND FARM	Design: JC / CAD: JC Chk'd: SDC / App'd: SDC Date: 31/05/2013 / Scale: AS SHOWN	No. 60283248-SD-001	Rev: --
			A4

PHOTOGRAPH OF GRASS REINFORCEMENT SYSTEM AS PREVIOUSLY INSTALLED ON UNIVERSITY OF YORK, HESLINGTON CHURCH
PHOTOS TAKEN 05.06.13, AGE = 2 YEARS

Client: res

Project: LLANBRYNMAIR WIND FARM

Title: TYPICAL DETAILS GRASS REINFORCEMENT

Design: JC	CAD: JC
Chk'd: SDC	App'd: SDC
Date: 31/05/2013	Scale: AS SHOWN

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Fax: +44 (0) 113 391 6899
www.aecom.com

No. 60283248-SD-002

Rev: A

cm

A4

APPENDIX 10.1 - B: TRANSPORT CONSULTATION

Llywodraeth Cymru
Welsh Government

Kevin Martin
AECOM
225 Bath Street
Glasgow
G2 4GZ

Transport - Trafnidiaeth

Eich cyf . Your ref
Ein cyf . Our ref

15 March 2013

Dear Kevin,

Proposed Llanbrynmair Wind Farm
Potential for Construction Traffic to access the site via the A470 at Talerddig

I refer to your email of 11 February 2013 and our subsequent discussions regarding the above application.

I advise that the Welsh Government as highway authority for the Welsh trunk road network has no objection in principle to the use of the A470 and the junction with the Llanerfyl road at Talerddig for construction traffic associated with the Llanbrynmair wind farm, subject to the implementation of appropriate improvement measures.

1. Visibility at the Talerddig Junction
The visibility splays demonstrated on drawing reference 60283248-D-40-01 revision A are considered appropriate for the measured traffic speeds.

2. Talerddig Junction Layout
As the level of traffic through the Talerddig junction is unlikely to exceed 500 AADT with the addition of construction traffic associated with the Llanbrynmair wind farm, TD 41/95 of the Design Manual for Roads and Bridges is considered to be an applicable design standard. The proposed improvements to the horizontal layout of the junction shown on drawing reference 60283248-D-40 revision D are therefore considered to be appropriate.

The approach gradient of the minor road will be significantly improved by the formation of a 10m long dwell area with a 4% gradient, as proposed in Option 1 on drawing reference 60283248-D-40 revision D. This is considered acceptable as a relaxation from standard in this case.

BUDDSODDWR MEWN POBL
INVESTOR IN PEOPLE

Sarn Mynach
Cyffordd Llandudno
LL31 9RZ

Sarn Mynach
Llandudno Junction
LL31 9RZ

Ffôn • Tel: 0300 062 5435
Ffacs • Fax: 0300 062 5061
Ebost • Email: Andrew.Cochran@wales.gsi.gov.uk

3. Llanerfyl Junction Layout
There is no objection in principle to the use of a short length of private haul road between the A458 and the minor road at Llanerfyl for the use of abnormal indivisible loads travelling towards the site under police escort only. The proposed details shown on drawing reference 60283248-P-041 revision B are broadly acceptable in principle, subject to the outcome of a Stage 1 / 2 Road Safety Audit in accordance with the Design Manual for Roads and Bridges HD 19/03.

Finally, we would strongly recommend consulting with Highways Officers at Powys County Council regarding your proposals as there will be impacts on the county road network on which the Welsh Government is not in a position to comment.

Yours sincerely

Andrew Cochran

cc Mike Whitbread – RES UK & Ireland

Notes of Discussion

AECOM

Project:	**Llanbrynmair**	Job No/Ref:	
Purpose:		Date held:	**18th April 2013**
Held at:	Powys City Council	Made by:	

Present:	Distribution:
Mike Whitbread	Mike Whitbread
Steven Carmody	Steven Carmody
Kevin Martin	Kevin Martin
David Williams	David Williams
Dale Boyington	Dale Boyington
Apologies:	

No.	Item	Action By
1	**Review Notes**	
1.1	Review and cross section review for solutions.	SC / DW.
1.2	Dale confirmed we are on the right track but fine tuning is required	
1.3	New pack submission at A3	
1.4	Discuss with Carol to confirm reissue of information	
1.5	Larger scale with landscape architect for Dolwen area and the public rights of way	
1.6	PCC have a landscape objection potentially get them to the next meeting	
1.7	David confirmed there is a landscape witness from PCC	
1.8	Where is Marc Van Grieken with PCC Landscape	
1.9	David believes landscape perspective maybe required for the highway works additional plans and information • Setting • Character	
1.10	David has a note to brief PCC landscape Dale view – scale reasonable subject to info Proposal in the right direction Arrangement proposed sounds sensible David's view confirmed a supportive statement subject to, Buildability, impact etc "Encouragement only" David has questions on traffic that we will need to provide.	
1.11	Dale believes that Environmental elements need to be clear.	
1.12	David to send e-mail to us for supportive note.	
1.13	David is now the primary contact for this scheme	
1.14	AECOM to ask about input into STMP6 from CCW natural resources Wales	
2	**Conditions**	
2.1	Kevin raised a set of conditions in the cabinet report.	
2.2	Discussion was agreed that a set of conditions should commence to shape the next stages of work	
2.3	David's view is that he would like agreements for the overall sites and not	

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	something that defines individual site elements.	
2.4	This would link from S278, S38 etc for bonds remedial works.	
2.5	PCC legal services to provide a draft of this.	
2.6	Responsibility if the road under Res.	
3	**PROW**	
3.1	Colour code plans to show locations of PROW impacts, final solutions.	
3.2	Dale expressed concern about PROW impacts up to Llanerfyl.	
3.3	Aecom to look at crossing points and other areas, not just Dolwen to access 2.	
3.4	Nina Davis contact at PCC. Currently on maternity	
3.5	MW to discuss with Gwilym (PCC) her husband	
4	**Cumulative Impact**	
4.1	Aecom to be proactive on the other sites.	
4.2	Aecom will review all elements for Traffic and Transport are they light or not, we will fill gaps	
4.3	Aecom will contact planners to discuss this Gwilym (planner PCC)	
4.4	Aecom will agree and discuss methodology for filling potential holes with PCC	
	Transport tool – confirmed there will be a note for this.	

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Steven Cornock Comments 7/5/13

Action named are required as per list

Notes from Site Visit 2/5/13

The following comments were made by NRW (Carol Fielding) /John Campion on a site visit to view the proposed offsite access works on 2 May 2013.

Overall comments:

- Red lines needed on plans including construction areas so they can be assessed in the ES ✓
- Avoid any post planning 'to be agreed' notes – others to provide notes
- Would be interested to see photos of materials being proposed ✓
- Need confidence that the scheme will be built as detailed (wary of design and build contracts) ✓
- Open ditches are preferred over culverts ✓
- Hedges should be replaced like to like – keen to see mixed hedges including hazel and consideration of laying hedges where appropriate (Mick to advise on appropriate mixes for the area?) ✓
- If there is any signage it should only be temporary (during construction) ✓
- NRW would like to see an overall strategy/rational for landscape works (in LVIA?) Landscape ✓ not
- Woodlands are shown incorrectly on plan agree, others to define
- Need to make a distinction between 'hedge' and 'scrub' or 'woodland' in drawing notes and on plans agree, others to define
- Would like to see some sketches/sections showing treatment of typical details such as creation of hedge banks, hedgerows, - ensure hedge banks are big enough! ✓
- Possibly include some planting mixes for the mixed hedges? ✓
- Ground flora is often as important as the hedge itself – where these areas are affected all soil should be reused to ensure the ground flora reinstates in its new position. ✓
- Any trees lost should be replaced with decent size standards ?
- Use wooden gates where possible. ✓
- Avoid urbanising features such as black and white posts along ditches ✓
- Grass reinforcement to be created using a compacted unbound sub-base with an interlocking geogrid surfacing infilled with topsoil (salvaged from excavation if possible) and local grass seed. ✓
- Site accesses – key here is to blend them into the surrounding landscape through careful design of earthworks and ensuring grass seed matches that on site. ✓
- Would like to see method for translocating hedges (including allowance for replanting if the hedgerow does not take). ✓
- Replacement trees to be in character with the environment – any replacement trees along Section 1 and more enclosed lower lying western section of section 3 to be oak; trees in higher areas (eastern part of section 3 and section 2) to be rowan or hawthorn. ✓
- All replacement oaks to be root balled extra heavy standards 14-16cm girth and around 4m tall. ✓
- Would be to include photos showing the type of features we are aiming to recreate e.g. welsh hedge banks; coppiced and laid hedgerows; oak trees at the size we are planning to plant. ✓
- Can tree species be shown on the drawings? (is there an arboricultural survey?) TBC

Tasks

Mick to survey hedges to be lost to identify those which should be translocated. Also note NRW's preference to lose flailed hedges over those that have grown out.

Provide method statement for translocating hedges including monitoring.

Provide species mix for hedgerow replacement.

Provide species mix for coppice replacement e.g. at Ch 3000 and 3400 (1.14 and 1.15)

Provide species mix for the steep bank on the left on the approach to DOLWEN ISAF bridge (new detail) – Mick to propose?

Suggest species of trees to strengthen line of trees visible in photo towards the Neintherion by-pass from the Glyndwr's Way – Mick to suggest? Has this area been surveyed for tree species?

Engineered cross sections required at:

Ch17300
Ch3400

} Akeo – to sort..

Changes to drawings:

Llanerfyl Access Junction – change stone surface to grass reinforcement along full length so the new road will appear to be part of wider grassed field. Remove new hedge. Relax and feather slopes as much as possible. Will access track need to be fenced? If so can this be temporary? And can gates on wither end of the access track be removed post construction (the new wood post and rail fence with prevent access onto the area?. Footway appears to end abruptly – what is happening here? Bollards to be temporary - include wooden post and rail fence along gaps in hedgerow in the long term (can be removed if replacement blades need to be delivered). May need to show drawing during construction and post construction? Can new gates be wood?

Might be better to have a bigger difference between verge and hedgerow colours so easier to read drawings.

Ch950 – need to make it clear that the pink hatched area for parking will be reinforced grass.

1.6 – words say a tree will be lost but this is not shown on the map (the tree is black on my drawing)

1.12 – TREES ARE SHOWN RED ON MY DRAWING BUT I UNDERSTAND THESE ARE BEIG RETAINED.... NEEDS CHANGE IN COLOUR TO BLACK?

1.16/1.17 – DISCUSSIONS TO AVOID MATURE TREES – STEVE HAS DETAILS. THE AIM IS TO AVOID LOSS OF MATURE TREES. THE PROPOSAL IS TO CUT THE OUTGROWN HEDGE TO THE NORTH RIGHT DOWN TO ALLOW AIL TO OVERSAIL AND THEN LEAVE THIS TO NATURALLY REGENERATE AND GROW BACK. IF THIS OUTGROWN HEDGE HAS TO BE LOST THE PROPOSAL WILL BE TO REPLACE WITH A NEW SPECIES RICH MIXED HEDGE AND RE-USE EXISTING SOIL TO ENSURE THE GROUND COVER GROWS BACK.

1.20 AND 1.21 – MAKE HEDGEROWS CURVED TO FOLLOW THE LINE OF THE ROAD (avoiding straight lines and angles) - AS CLOSE TO THE ROAD AS POSSIBLE. DO WE NEED TWO DRAWINGS SHOW AT CONSTRUCTION AND DURING OPERATION? (BECAUSE THERE IS A TEMPORARY COMPOUND HERE....

Gosen bridge – need to show what is happening in pink hatched areas – maybe need a during construction and post construction drawing? Also changes discussed on site – Steve has details. Minimise loss of trees to north. Would it be simpler to have another drawing showing this to be removed so the lines being removed are not shown on the 'proposed' drawing? DURING CONSTRUCTION THE KEY POINT WILL BE TO MINIMISE LOSS OF MATURE TREES. DURING OPERATION THE KEY ISSUE WILL BE TO USE STONE FOR RETAINING STRUCTURES/ THE BRIDGE (AN EXISTING STONE RETAINING WALL ON THE ROAD NORTH - SEE BELOW – PROVIDES AN IDEA OF THE CHARACTER THAT COULD BE REPLICATED). ALSO TO REPLACE ALDER COPPICE ALONG RIVER BANK AFTER WORKS.

1.24 NEED TO SHOW HEDGEROW AND PLANTING. Also TO INCLUDE SOME SCREEN PLANTING RUNNING EAST/WEST TO SOUTH-WEST OF CHAPEL TO SCREEN VIEWS of CRAWLER LANE FROM THE ROAD (see photo below).

GOSEN TO SYCHTYN OFF-ROAD TRACK CH 4620 TO 4970 – EARTHWORKS NEED TO BE AS GENTLE AS POSSIBLE TO BLEND INTO THE SOUURONDING FIELD. THE LANE SHOULD REMAIN UNFENCED FROM THE REST OF THE FIELD (currently there is a fenceline shown in the drawing). THIS NEEDS A SEPARATE SOLUTION OF DURONG CONSTRUCTION AND AFTER CONSTRUCTION... ON SITE NRW PROPOSED THAT THE CRAWLER LANE SHOULD BE GRASS REINFORCEMENT IN THE LONG TERM (STONE SURFACE DURING CONSTRUCTION OK). If this is the case the offsite planting referred to above - RUNNING EAST/WEST TO SOUTH-WEST OF CHAPEL – may not be needed. As for the Llanerfyl track can the gates just be there for construction – with wooden post and rail fencing added in long term (which could be removed if replacement blades need to be transported)?

DOLWEN ISAF CH 7270 – 7530 – AMDNEMENT (STEVE HAS DETAILS)

1.41 - the idea here is to make the area of grass reinforcement appear part of the wider field – so remove hedge and fence.

Site access 1 – similar to principals for site access 4 (below) – need to ease earthworks gradients much as possible and feather to blend with existing. Also minimise area of tarmac (no white lines). May be

need for different short term and long term gate proposals. Ensure no hedgerows are shown here... [NB some of the colours used in the key are still mv similar e.g. verge and hedgerow look the same on this drawing]. Will there be different solutions during and post construction? Note nrw's preference for wooden single hinged gates, and their suggestion of a sprayed tar and chip finish to make it look more rural in the longer term

Site access 4 D044 – need to ease earthworks gradients much as possible and feather to blend with existing. Also minimise area of tarmac (no white lines). May be need for different short term and long term gate proposals. Ensure no hedgerows are shown here... [NB some of the colours used in the key are still mv similar e.g. verge and hedgerow look the same on this drawing]. Fencelines are a bit confusing. The 'propoosed fence' label is pointing to a pink line (fence to be lost)... Will there be different solutions during and post construction? Note nrw's preference for wooden single hinged gates, and their suggestion of a sprayed tar and chip finish to make it look more rural in the longer term.,....

2.3B Neintherion - ON SITE IT WAS SUGGESTED THAT THERE SHOULD BE NO PARAPET ON THE NEW BRIDGE (AT LEAST NOT IN THE LONG TERM). To COMPENSITE FOR LOSS OF STONE WALL, WE SHOULD REBUILD THE PART DERELICT STONE WALL (SEE PHOTO IN SITE NOTES). Also the line of trees visible in the photo should be strengthened using similar species (Mick to confirm) – to help screen views from the Glyndwr's Way. This could be part of the HMP (Mick to note). The height of the 'causeway' on which the track is located should vary in height along its length and the earthworks be feathered into the existing ground levels so it doesn't looked 'engineered'. There are also some changes to the layout at the southern end – to avoid marshy grassland/peat and to use reinforced grass on sections that are visible as they climb the slope.

3.22c – NEED TO SHOW NEW HEDGEBANK ON EATSERN SIDE (NB THIS IS DIFFERENT FROM A HEDGEROW). ON EASTERN EDGE EARTHWORKS TO BE PROFILED INTO EXISTING FIELD.

Site access 2 –Aim to minimise area of tarmac (hence are of grass reinforcement. The earthworks will be very important – I believe there is to be a change to the drawing to leave the west bank intact – and

eastern earthworks should be made as gradual as possible to blend into the surrounds. Will need to keep stock embankments while they establish and perhaps consider use of a geomesh to help stabilise slopes and get grass establish.

Tallerddig Junction – preference for 'relaxed' option. Profile out embankments to look as natural as possible. Hedgerow at top, scrub on slopes (low maintenance) – currently hedgerows look different on each side...

On all drawings – might want to say that all replacement trees will be root balled extra heavy standards 14-16cm girth and around 4m tall

Rebecca Knight

3 May 2013

Llywodraeth Cymru
Welsh Government

Transport - Trafnidiaeth

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Eich cyf . Your ref
Ein cyf . Our ref

22 April 2013

Dear Llywelyn,

Strategic Traffic Management Plan for Mid Wales Wind Farms

I refer to the revised final version of Section 6 of the strategic Traffic Management Plan for Mid Wales wind farms (sTMP) dated March 2013 and received under cover of your letter dated 12 April 2013.

I can confirm that Sections 1 to 6 of the sTMP are acceptable in principle to the Welsh Government as highway authority for the A483, A5, A458, A489 and A470 trunk roads in Wales.

Please note that the sTMP covers roads for which the Welsh Government is not the highway authority. The Welsh Government has not reviewed the Supplementary Report submitted in support of Section 6 of the sTMP, as this only covers the county road route across the Vastre. We strongly advise RenewableUK Cymru to seek separate written approval in principle from all relevant highway authorities, including Chester and Cheshire West Council, the Highways Agency, Shropshire County Council and Powys County Council.

Yours sincerely,

Andy Cochran
North and Mid Wales Area Manager

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Memo

SKM ENVIROS

To	Mike Whitbread (RES)	**Date**	8 May 2013
From	Daniel Watson		
Copy	John Ferry (SKM), Duncan Saunders (Fluidec)		
Subject	**Llanbrymair access route - flood issues**		

1. Introduction

SKM have reviewed the series of plans issued by AECOM in draft relating to the proposed highway works and circulated early April 2013 (Rev B). Each area of work proposed has been separately reviewed and high level comments relating to potential flooding related issues are provided in Table 1 at the end of this memo.

2. Hydrological baseline

- **Afon Banwy:** The majority of the proposed access route falls within the catchment of the Afon Banwy which flows in a generally easterly direction to the north of the proposed Llanbrynmair wind farm and the associated access route. The watercourses that are potentially directly impacted by the proposed works are mostly tributaries of the Afon Banwy.
    - **Nant Menial:** This small stream runs parallel to the eastern section of the proposed access route and flows in a north-easterly direction confluencing with the Afon Banwy at Llanerfyl at which point it has an upstream catchment area estimated at around 6.6km^2. The proposed access route crosses this watercourse at Diosg.
    - **Afon Gam:** This small river is a tributary of the Afon Banwy and runs in a generally north-easterly direction and broadly parallel to the central section of the proposed access route. At the point where the watercourse diverges with the access route it has a catchment area of around 50km^2.
        - **Cledan:** This watercourse flows in a generally northerly direction crossing the proposed access route at Tynewydd Gosen. Shortly downstream of this location it confluences with the Afon Gam at which point it has an upstream catchment area estimated at 13.8km^2.
        - **Nant Craigyfran / Nant Ffriddycastell:** This watercourse flows in a south-easterly direction confluencing with the Afon Gam near Dolwen. The proposed

access route crosses the watercourse immediately upstream of this confluence. At this point the catchment area upstream is estimated at 5.2km^2.

- **Afon Cannon:** This watercourse flows in a south-easterly direction confluencing with the Afon Gam just downstream of the proposed Neinthirion bypass. The proposed route of the bypass crosses over this watercourse and through its floodplain. At this point the catchment area upstream is estimated at 7km^2.

- **Nant y Graig Lwyd:** This small stream flows in a generally easterly direction and enters the Afon Gam near Cwmderwen. Just upstream of this the watercourse passes beneath the proposed access route at which point its catchment area is estimated to be 3km^2.

- **Afon Laen:** The westerly section of the proposed transport route is not within the catchment of the Afon Banwy, but instead drains to the west into a watercourse called the Agon Laen

  - **Afon Tyn-y-rhos:** This tributary of the Afon Laen flows in a generally south westerly direction parallel to the western section of the proposed access route. Just prior to where the proposed route joins the A470 it passes over this watercourse at which point the watercourse has a estimated catchment area upstream of 4.6km^2.

3. Potential flood issues

1) Significant areas of new hardstanding

In a number of areas the proposals include for additional areas of asphalt. In the areas for the proposed crawler lane and widening this is potentially quite substantial and could result in a significant increase in surface water runoff. This has the potential to both;

- increase the pressure on drainage infrastructure downstream between the new road areas and the river at the base of the hill, and
- increase peak rates of discharge into the watercourse and therefore exacerbate flood risk further downstream.

We would advise that in these areas where the area of additional hardstanding is significant, additional specific mitigation works are required. These will need to seek to avoid these increases in runoff either via changes in the specified surface material, or via the capture and disposal to ground / attenuation of the flows.

2) Minor areas of new hardstanding

A significant number of additional areas of hardstanding are also proposed elsewhere along the route. These are mostly small and when viewed in isolation insignificant; however when viewed in totality may be viewed by NRW as potentially resulting in a significant increase in runoff within the catchments concerned.

Consideration should therefore be given as to whether alternative permeable surfacing materials can be used to avoid impacts. If this is not possible the net increase in impermeable coverage in each catchment should be calculated. If this is significant a strategy for reducing storm water discharges in proportion to the scale of likely impact should be developed.

We would note that discussions with NRW may be required to agree some form of pragmatic solution.

3) Loss of flood storage

A significant amount of work is proposed in areas designated as flood zone C of the Welsh Assembly Development Advice Map. This includes improvements to bridges, new passing / overrun areas and new section of road with a bridge. While in many cases the descriptions of the works are not explicit, it is likely that in many instances these works will require earthworks and more often than not in the low lying areas of the floodplain this will involve creating or extending of embankments or building up land to form new or widened approached to bridges.

Any rising of land level within the floodplain will result in a loss of floodplain storage and NRW normally have a zero tolerance approach to such impacts. As such either

- the proposals will need to be amended such that building up of land in areas of floodplain is avoided; or
- compensation storage (i.e. lowering of land) will need to be created in adjacent areas.

Where compensation storage is created this should be in the same respective area as where the losses occurred and the replacement storage must match that lost on a level for level basis.

4) Loss of functional floodplain

In one area (CH 10480 – 10530) the proposals extend the road embankment out into what is likely to be an area of functional floodplain. This is typically defined as any areas that are likely to be flooded regularly and which may be important for conveying or storing flood water.

NRW are likely to oppose any proposals that result in extending the road out into this area. We would therefore advise that an alternative solution that does not require extending the road embankment towards the river in this area should be sought.

5) Changes in flood conveyance

In most areas we have assumed that the widened bridges / culverts will all simply mirror the existing dimensions of the structures concerned. Provided that this is the case the works should not impact flood conveyance through these structures

Along the proposed Neinthirion Bypass all the structures will however be new and as such these will need to consider flood flow conveyance and be sized accordingly. Of particular significance is the crossing required over the Afon Cannon, both because this is the largest of the new crossings and because it has a floodplain which is 100-150m wide. A new embankment will presumably be required across this area and this could potentially have a significant impact of floodplain conveyance.

Additional details are therefore required regarding the type of solution likely to be employed for this river crossing and the embankment across the floodplain. These details will need to highlight how the proposed structures will be created such that flood conveyance will not be reduced as if this occurred water could back up upstream of the structure and result in an increase in the area at risk of flooding.

Typical measures would include;

- Setting the bridge soffit level 600mm above an appropriately derived design flood level; and
- Providing multiple openings over an extended section around the watercourse to allow for channel migration and out of bank flows parallel to the main channel.

6) Culverting

In one location (CH 17450) the proposals appear to include the culverting of a surface channel that currently runs parallel to the road. Whilst this is only a small feature NRW have a general policy against the culverting of watercourses. Alternative options such as simply re-aligning it to the rear of the widened passing area should therefore be considered.

In addition along the proposed Neinthirion Bypass a number of new culverts will be required to convey small channels beneath the road. Whilst these are probably unavoidable, the form and nature of these will need to be determined.

We would note that a further number of culverts will also need to be extended as the road is widened; however, these have not been flagged as major issues.

7) Works to controlled waters

The 1991 Land Drainage Act states that all engineering works to rivers, streams and other drainage channels are subject to approval from the statutory drainage authority. For main rivers this will be NRW while for smaller drainage features this will be the Local Authority; however it should be noted that many Local Authorities defer such powers back to NRW.

For main rivers this requirement was increased by the 2003 Water Resources Act to cover all works within 8m of the top of bank. This approval is known as flood defence consent

A significant number of the proposed works involve engineering to channels or in proximity to main rivers and will therefore require flood defence consent. This requirement need not change the design of the proposed works over and above the other issues highlight here; however, it should be noted that post planning and prior to construction consent should be obtained.

- **Table 1 summary of potential flood issues by work area (note: dark orange indicates significant issues, light orange minor issues and white no issue)**

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
60283248-D-001	Works at junction with A458	Flood zone A and remote from channels / watercourses							
	1.1 - OVER-RUN AREA: CH 460 – 590 (adjacent to Glen Menial Bridge)	Bridge crosses a small tributary Nant Menial. Actual works are to the road adjacent to bridge in area designated as flood zone A and will not increase impermeable area.							
60283248-D-002	1.2 - OVER-RUN AREA: CH 720 - 740	Proposed widening located in flood zone A and will not increase impermeable area							
	1.3 - OVER-RUN AREA: CH 875 – 950: (adjacent to Diosg Bridge)	The proposed overrun area is located in flood zone C associated with Nant Menial. Works will involve a small amount of build up and associated loss of flood storage over a fairly significant area. Will not increase impermeable cover.			X				
	1.4 - OVER-RUN AREA: CH 970 – 990 (adjacent to Diosg Bridge)	The proposed overrun area is located in flood zone C associated with Nant Menial. Works will involve a small amount of build up and extended asphalt over a very small area		X	X				
	1.5 - OVER-RUN AREA: CH 1045 - 1080	Proposed works are all located in flood zone A and will not increase impermeable area.							
	1.6 - OVER-RUN AREA: CH 1130 - 1175	Proposed works are all located in flood zone A and will not increase impermeable area.							
60283248-D-003	1.7 - EXISTING ACCESS: CH 1175 - 1210	No physical changes proposed							
	1.8 - OVER-RUN AREA: CH 1380 - 1450	Proposed overrun area extending into an area of flood zone C along Nant Menial. Increase in impermeable coverage <12m^2. Unclear whether any build up of land will be required however some is likely to achieve road levels.		X	X				
60283248-D-004	1.9 - OVER-RUN AREA: CH 1950 - 2000	Creation of overrun area to the south of the road. This will require the re-alignment of a drainage ditch. Works located in flood zone A but will result in a small increase in impermeable area		X					X
	1.10 - EXISTING ACCESS: CH 2055 - 2090	No physical changes proposed							
	1.11 - EXISTING ACCESS: CH 2300 - 2340	No physical changes proposed							

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
	1.12 - OVER-RUN AREA: CH 2400 - 2575	Works located in flood zone A and will not increase impermeable coverage							
	1.13 - EXISTING ACCESS: CH 2580 - 2630	No physical changes proposed							
60283248-D-005	1.14 - OVER-RUN AREA: CH 2970 - 3050	Works located in flood zone A and will not increase impermeable coverage							
60283248-D-006	1.15 - OVER-RUN AREA AND PASSING BAY: CH 3340 - 3450	Works located in flood zone A and will not increase impermeable coverage							
	1.16 - IMPROVEMENTS TO EXISTING ACCESS: CH 3870 - 3930	Works located in flood zone A but will require a small increase in impermeable coverage		X					
	1.17 - OVER-RUN AREA: CH 3875 - 4090	Works located in flood zone A and will not increase impermeable coverage							
60283248-D-007	1.18 - OVER-RUN AREA: CH 4120 - 4200	Works located in flood zone A and will not increase impermeable coverage							
	1.19 - OVER-RUN AREA: CH 4235 - 4315	Works located in flood zone A and will not increase impermeable coverage							
	1.20 - OVER-RUN AREA AND PASSING BAY: CH 4335 - 4430	Works located in flood zone A, this may however slightly increase impermeable coverage but should not directly impact the adjacent ditch.		X					
60283248-D-008	1.21 - OVER-RUN AREA: CH 4390 - 4450	Works located in flood zone A and will not increase impermeable coverage							
	1.22 - GOSEN BRIDGE: ROAD WIDENING, ROAD RETENTION AND NEW BRIDGE: CH 4440 - 4540	Work located in and area of flood zone C along the Cledan. It is understood that the areas of build up are permanent and will be significant, however it is unknown what the precise extent of cutting and build up are likely to be and whether the proposed structure mirrors the existing aperture. Proposals have the potential to impact both flood conveyance and storage and more details plans will need to be reviewed. In addition these works will also increase the area of impermeable coverage.		X	X		X		

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
	1.23 - OVER-RUN AREA WITH RETENTION: CH 4540 - 4560	Works located in flood zone A but will result in a small increase in impermeable coverage.		X					
60283248-D-009	1.24 - OVER-RUN AREA: CH 4550 - 4640	Works located in flood zone A, but will increase impermeable coverage and place additional pressure on drainage infrastructure between the widening and the river.	X						
	GOSEN CRAWLER LANE: CH 4620 TO 4970	Works located in flood zone A, but will constitute a significant increase in impermeable area. Need to confirm whether this feature will be tempory or permanent.	X						
	1.25 - ROAD WIDENING: CH 4970 - 5040	Works located in flood zone A, but will increase impermeable coverage and place additional pressure on drainage infrastructure down gradient along the road.	X						
	1.26 - ROAD WIDENING: CH 5050 - 5110	Works located in flood zone A, but will increase impermeable coverage and place additional pressure on drainage infrastructure down gradient along the road.	X						
	1.27 - OVER-RUN AREA AND WALL REMOVAL: CH 5130 - 5180	Works located in flood zone A and will not increase impermeable coverage							
	1.28 - OVER-RUN AREA: CH 5175 - 5315	Works located in flood zone A and will not increase impermeable coverage							
60283248-D-010	1.29 - OVER-RUN AREA: CH 5330 - 5430	Works located in flood zone A and will not increase impermeable coverage							
	1.30 - OVER-RUN AREA AND PASSING BAY: CH 5430 - 5700	Works located in flood zone A and will not increase impermeable coverage							
	1.31 - OVER-RUN AREA: CH 5770 - 5880	Works located in flood zone A and will not increase impermeable coverage							
	1.32 - OVER-RUN AREA: CH 6060 - 6115	Works located in flood zone A and will not increase impermeable coverage							
	1.33 - OVER-RUN AREA: CH 6090 - 6325	Works located in flood zone A and will not increase impermeable coverage							

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
	1.34 - OVER-RUN AREA: CH 6350 - 6480	Works located in flood zone A and will not increase impermeable coverage							
60283248-D-011	1.35 - PASSING BAY: CH 6560 - 6580	Works located in flood zone A and will not increase impermeable coverage							
	1.36 - PASSING BAY: CH 6730 - 6770	Works located in flood zone A and will not increase impermeable coverage							
	1.37 - OVER-RUN AREA: CH 6450 - 6950	Works located in flood zone A and will not increase impermeable coverage							
	1.38 - OVER-RUN AREA: CH 6950 - 7130	Works located in flood zone A but asphalt passing bay will result in an increase in impermeable coverage. The overrun area does extend across an existing channel, but the width of the area will not extend beyond the length of the existing culvert. Checks will be required to ensure that this structure is strong enough.		X					X
	1.39 - OVER-RUN AREA: CH 7100 - 7200	Works located in flood zone A and will not increase impermeable coverage							
	1.40 - OVER-RUN AREA: CH 7150 - 7290	The western extent of this works area extend down to the river and into an area designated as flood zone C. Flood impact in relation to this are however discussed in relation to the Dolwen Isaf bridge options. The remainder of these works are located in flood zone A and will not increase impermeable coverage							
60283248-D-012 (001)	DOLWEN ISAF BRIDGE - OPTION 1: OVER-RUN AREA: CHAINAGE 7250 - 7300	The western extent of this works area extends down to the Afon Gam and into an area designated as flood zone C. The works should not however alter levels in the area immediately adjacent to the bridge or increase impermeable coverage.							X
	DOLWEN ISAF BRIDGE - OPTION 1: BRIDGE WIDENING	The proposed extension described to the bridge over the Afon Gam will have the same cross-sectional dimension as the existing structure and should therefore not alter conveyance. The area of overrun proposed on the eastern approach will however involve some building up of levels in land designated as flood zone C and therefore a loss of flood storage.			X				X
	DOLWEN ISAF BRIDGE - OPTION 1: OVER-RUN AREA: CHAINAGE 7330 - 7530	The area of overrun proposed immediately to the west of the bridge over the Afon Gam will involve some building up of levels in land designated		X	X				X

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
		as flood zone C and therefore a loss of flood storage. Changes in level across the remainder of this overrun area (in an area of flood zone C associated with both the Afon Gam and the Nant Craigyfran / Nant Ffriddycastell) level need to be confirmed as there is again a potential for changes in flood storage. A small area of asphalt overrun on the southern side of the road will result in a small increase in impermeable coverage.							
60283248-D-012 (002)	DOLWEN ISAF BRIDGE - OPTION 2: OVER-RUN AREA: CHAINAGE 7250 - 7300	The western extent of this works area extends down to the Afon Gam and into an area designated as flood zone C. The works should not however alter levels in the area immediately adjacent to the bridge or increase impermeable coverage.							X
	DOLWEN ISAF BRIDGE - OPTION 2: BRIDGE WIDENING	The proposed structure across the Afon Gam will have the same cross-sectional dimension as the existing structure and should therefore not alter conveyance. There should also be no requirement for changes in level close to the channel although there may be some small changes in impermeable cover		X					X
	DOLWEN ISAF BRIDGE - OPTION 2: NEW OFF-ROAD BYPASS: CHAINAGE 7330 - 7530	The proposed new off road bypass would run through an area designated as flood zone C associated with both the Afon Gam and the Nant Craigyfran / Nant Ffriddycastell. Required changes in level along this route therefore need to be confirmed as there is again a potential for changes in flood storage.			X				
60283248-D-013	1.41 - OVER-RUN AREA: CH 7500 - 7670	These works are located in an areas designated as flood zone C associated with both the Afon Gam and the Nant Craigyfran / Nant Ffriddycastell. The required changes in level therefore need to be determined and checked to allow impact on flood storage to be assessed. The works should not however increase impermeable coverage.			X				
	1.42 - OVER-RUN AREA: CH 7660 - 7720	Works located in flood zone A and will not increase impermeable coverage							
	1.43 - OVER-RUN AREA: CH 7700 - 7780	Works located in flood zone A and will not increase impermeable coverage							
	1.44 - OVER-RUN AREA: CH 7950 - 8040	Works located in flood zone A and will not increase impermeable coverage. The area of overrun will however extend across and existing							

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
		small channel requiring the extension of an existing culvert							
60283248-D-014	1.45 - OVER-RUN AREA: CH 8150 - 8240	Works located in flood zone A and will not increase impermeable coverage.							
	SITE ACCESS: CH 8250	Works located in flood zone A, but will increase impermeable coverage.		X					
60283248-D-015	2.1 - OVER-RUN AREA: CH 8280 - 8320	Works located in flood zone A and will not increase impermeable coverage. The over-run will however extend across the course of two channels and the culverts passing beneath the existing road will probably need to be extended.							X
	2.2 - OVER-RUN AREA: CH 8330 - 8580	Works located in flood zone A but will result in a small increase in impermeable coverage. In addition the proposals require an existing surface drain to be re-aligned.		X					
	2.3 - OVER-RUN AT NEINTHIRION BYPASS ACCESS: CH 8500 - 8850	Works located in flood zone A and will not increase impermeable coverage.							
60283248-D-016	2.3 - OVER-RUN AT NEINTHIRION BYPASS ACCESS: CH 8850 - 8950	Works located in flood zone A but will result in an increase in impermeable coverage.		X					
60283248-D-045	NEINTHIRION BYPASS: New bridge (CH 130)	The proposed bridge over the Afon Cannon will be located in flood zone C and the structure has the potential to impact both flood storage and conveyance and these issues will need to be considered through the design process.			X	X	X		X
	NEINTHIRION BYPASS: Approach to new bridge (CH 140-250)	The approaches to the new bridge will pass through the floodplain of the Afon Cannon (flood zone C) particularly on the western side of the bridge (~100m length). Due to the topography a new embankment will probably be required and this has the potential to alter flood flows through the floodplain and result in a loss of flood storage			X		X		
	NEINTHIRION BYPASS: channel culvert and realignment (CH 250-300)	The bypass will cross a channel with a catchment of around 0.7km^2. This channel will need to be culverted beneath the bypass and plans also show its re-alignment. Work will need to be undertaken to assess likely flows along this channel and design both the culvert and re-aligned					X	X	X

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
		channel in such a way that flows are unimpeded.							
	NEINTHIRION BYPASS: channel culvert (CH 650)	The bypass will cross a channel. This channel will need to be culverted beneath the bypass. Work will need to be undertaken to assess likely flows along this channel and size the culvert such that flows are unimpeded.					X	X	X
	NEINTHIRION BYPASS: channel culvert (CH 825)	The bypass will cross a channel. This channel will need to be culverted beneath the bypass. Work will need to be undertaken to assess likely flows along this channel and size the culvert such that flows are unimpeded.					X	X	X
	NEINTHIRION BYPASS: channel culverts (CH 890-900)	The bypass will cross a channel. This channel will need to be culverted beneath the bypass. Work will need to be undertaken to assess likely flows along this channel and size the culvert such that flows are unimpeded.					X	X	X
	NEINTHIRION BYPASS: channel culverts (CH 960)	The bypass will cross a channel. This channel will need to be culverted beneath the bypass. Work will need to be undertaken to assess likely flows along this channel and size the culvert such that flows are unimpeded.					X	X	X
60283248-D-017	2.4 - OVER-RUN AT NEINTHIRION BYPASS EGRESS: CH 9550 - 9680	Works located in flood zone A but will result in an increase in impermeable coverage.		X					
	2.5 - OVER-RUN: CH 9680 - 9840	Works located in flood zone A and will not increase impermeable coverage. The widening will however require a surface channel to be realigned to the rear of the over-run area.							X
	2.6 - OVER-RUN ADJACENT TO CATTLE GRID: CH 9770 - 9980	Works located in flood zone A and will not increase impermeable coverage.							
60283248-D-018	2.7 - OVER-RUN OPPOSITE ACCESS 2 AND DOWN TO RIVER BANK: CH 9980 - 10440	Works located in flood zone A but will result in an increase in impermeable coverage.		X					
	SITE ACCESS 2: CH 10140	Works located in flood zone A but will result in an increase in impermeable coverage.		X					
	2.8 - ROAD WIDENING: CH 10410 - 10500	Located on the edge of the floodplain these widening works require cutting into the slope and so will increase flood storage and increase flood storage (positive). There will however also be a small increase in		X					

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
		impermeable coverage.							
60283248-D-019	2.9 - OVER-RUN ADJACENT TO RIVER BED: CH 10480 - 10530	Works involve extending the road embankment out into the active area of river floodplain (possible functional floodplain) along the Afon Gam. The works will result in a loss of flood storage which should be compensated for and check should also be made regard other hydraulic impacts. There will also be a very small increase in impermeable coverage.			X	X	X		
	2.10 - OVER-RUN: CH 10530 - 10610	Works involve extending the road embankment away from the Afon Gam but still with an area designated as flood zone C. The works will result in a loss of flood storage which should be compensated for.			X				
	2.11 - OVER-RUN NORTH OF CATTLE GRID: CH 10620 - 10730	Works involve extending the road embankment away from the Afon Gam but still with an area designated as flood zone C. The works will result in a loss of flood storage which should be compensated for. A small surface drain will also need to be re-aligned northwards to accommodate the over-run			X				X
	2.12 - WIDENING OF CULVERT AND ROAD: CH 10750 - 10800	Works all shown to be located in flood zone A (north side of road) and as such the widened road running up to the watercourse crossing should not result in any loss of flood storage. These works will increase the amount of impermeable cover and require works to the culvert (Nant y Graig Lwyd) beneath the road to be extended		X					X
	2.13 - OVER-RUN AND CULVERT PARAPET: CH 10675 - 10950	Works on culvert parapet to south of the road should not cause any flood issues. The overrun will however extend into the floodplain and confirmation as to any associated level changes need to be determined so that impact of flood storage can be assessed. There is also a very small increase in impermeable coverage.		X	X				X
	2.14 - OVER-RUN: CH 10920 - 11120	Western side of the road where over-run proposed is outside for floodplain and there is no increase in impermeable coverage							
60283248-D-020	2.15 - OVER-RUN: CH 11100 - 11390	Along this section the road runs adjacent to and then through areas designated as flood zone C along the Afon Gam. The plans indicate that the over-run area will involve widening of the road embankment into the floodplain area which will therefore result in a loss of floodplain storage.		X	X				

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
		Work will also result in an increase in impermeable coverage.							
	2.16 - OVER-RUN: CH 11390 - 12000	The northern part of this section runs through an area of flood zone C and the southern most part runs immediately adjacent to and then through a further area designated as flood zone C (both relating to the Afon Gam). In both sections the proposed over run area appears to require an extension of the road embankment into the floodplain which would result in a loss of floodplain storage. Work will also result in a small increase in impermeable coverage and a requirement to extend a number of small existing culverts (4 no) beneath the roadway.		X	X				X
60283248-D-021	2.17 - OVER-RUN: CH 12000 - 12390	This section runs parallel to the Afon Gam through an area of flood zone C. The proposed over run area appears to require an extension of the road embankment into the floodplain which would result in a loss of floodplain storage. Work will also require a number of small existing culverts (2 no) beneath the roadway 2 be extended.			X				X
60283248-D-022	SITE ACCESS 4: CH 12390	Junction works are on the edge of the area designated as flood zone C, but will require cutting back into the slope to widen the junction and so will only potentially increase flood storage (positive impact) . The work will however also result in a small increase in impermeable coverage		X					
60283248-D-023	3.1 - EXISTING PASSING AREA: CH 12700	No physical changes proposed							
	3.1A - EXISTING PASSING AREA, IMPROVED: CH 12950	Works located in flood zone A, but will result in a small increase in impermeable area and an alteration to land drain culvert arrangements.		X					X
60283248-D-024	3.1B - EXISTING PASSING AREA, IMPROVED: CH 13160	Works located in flood zone A, but will result in a small increase in impermeable area.		X					
	3.1C - EXISTING PASSING AREA: CH 13330	No physical changes proposed							
	3.2 - EXISTING PASSING AREA, IMPROVED: CH 13460	Works located in flood zone A and will not increase impermeable coverage							
	3.2A - EXISTING PASSING AREA: CH 13550	No physical changes proposed							

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
	3.3 - EXISTING PASSING AREA, IMPROVED: CH 13700	Works located in flood zone A, but will result in a small increase in impermeable area.							
60283248-D-025	3.4 - NEW PASSING AREA AT ACCESS: CH 13840	Works located in flood zone A and will not increase impermeable coverage							
	3.5 - EXISTING PASSING AREA, IMPROVED: CH 14075	Works located in flood zone A and will not increase impermeable coverage							
	3.6 - EXISTING PASSING AREA: CH 14250	No physical changes proposed							
	3.7 - EXISTING PASSING AREA AT CATTLE GRID: CH 14300	No physical changes proposed							
60283248-D-026	3.8 - EXISTING PASSING AREA, IMPROVED: CH 14520	Works located in flood zone A, but will result in a small increase in impermeable area.		X					
	3.9 - EXISTING PASSING AREA AT ACCESS: CH 14695	No physical changes proposed							
	3.10 - EXISTING PASSING AREA AT ACCESS: CH 14850	No physical changes proposed							
	3.11 - EXISTING PASSING AREA: CH 15000	No physical changes proposed							
	3.12 - EXISTING PASSING AREA: CH 15150	No physical changes proposed							
60283248-D-027	3.13 - EXISTING PASSING AREA AT ACCESS: CH 15350	No physical changes proposed							
	3.14 - NEW PASSING AREA AT ACCESS: CH 15570	Works located in flood zone A, but will result in a small increase in impermeable area.		X					
	3.15 - EXISTING PASSING AREA, IMPROVED: CH 15780	Works located in flood zone A and will not increase impermeable coverage, but will necessitate an extension to a culvert beneath the roadway which conveys a small stream							X
60283248-D-028	3.16 - EXISTING PASSING AREA, IMPROVED CH 15950	Works located in flood zone A and will not increase impermeable coverage, but may require improvement works to a culvert which conveys a small stream and passes beneath the existing passing area.							X

Drawing ID no.	Work area reference	Comment	Significant areas of new hardstanding	Minor areas of new hardstanding	Loss of flood storage	Loss of functional floodplain	Changes in flood conveyance	Culverting	Works to controlled waters
	3.17 - NEW PASSING AREA CH 16275	Works located in flood zone A, but will result in a small increase in impermeable area.		X					
	3.17A - EXISTING PASSING AREA: CH 16330	No physical changes proposed							
	3.18 - EXISTING PASSING AREA AT PANTGLAS: CH 16480	No physical changes proposed							
60283248-D-029	3.19 - NEW PASSING AREA: CH 16550	Works located in flood zone A and will not increase impermeable coverage							
	3.20 - EXISTING PASSING AREA, IMPROVED: CH 16715	Works located in flood zone A and will not increase impermeable coverage							
	3.21 - EXISTING PASSING AREA, IMPROVED: CH 16840	Works located in flood zone A and will not increase impermeable coverage							
	3.22 - EXISTING PASSING AREA, IMPROVED AT EXISTING CATTLE GRID: CH 17080	Works located in flood zone A and will not increase impermeable coverage							
	3.22A - EXISTING PASSING AREA, IMPROVED: CH 17200	Works located in flood zone A, but will result in a small increase in impermeable area.		X					
60283248-D-029	3.23 - NEW PASSING AREA: CH 17450	Works located on the edge of an area of flood zone C along the Nant y Graig Lwyd, but should have no impact of flood storage. Works will however result in a small increase in impermeable area and culverting of an existing surface channel which runs parallel to the road.		X				X	X
	A470 ACCESS JUNCTION - TALLERDIG	Works located in flood zone A, but detailed drawings not available so unclear whether proposals will increase impermeable coverage		X					

Reid, Sebastian

From: Watson, George
Sent: 28 May 2013 15:24
To: Helen Tatchell (CSP - Countryside Services)
Cc: Kevin Straw (CSP - Countryside Services); Martin, Kevin W; Carmody, Steven D.; Reid, Sebastian
Subject: RE: Request for information - Public Right Of Way Footpaths along on Llanerfyl to Talerddig road

Helen

I tried to call regarding our correspondence with respect to GDW below. As discussed with Kevin Straw earlier today, planning permission has not yet been granted for the Windfarm development and as such we have not yet progressed detailed design. Contractors would be appointed, as the project progresses, who would ultimately need to take ownership of the GDW management plan.

On this basis, as discussed with Kevin Straw, we feel that it would be most appropriate for the GDW management plan to be submitted to you post-planning (i.e. subject to a planning condition), prior to the commencement of works on site, when all parties responsible for its implementation are known. It would be much appreciated if you could please reply to this e-mail to confirm that this would be acceptable.

Kind Regards

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From: Kevin Straw (CSP - Countryside Services) [mailto:kevin.straw@powys.gov.uk]
Sent: 23 May 2013 14:53
To: Watson, George
Cc: Helen Tatchell (CSP - Countryside Services)
Subject: RE: Request for information - Public Right Of Way Footpaths along on Llanerfyl to Talerddig road

George

I have now had chance to discuss this issue with Helen Tatchell, the Glyndwr's Way (GDW) National Trail Officer.

She has asked that the route along the proposed road link is given high regard during the proposed operation. The GDW at this point is available for multi-users, namely on foot, horse, bike and horse/carriage. As such it would be required to have this length of route open and available throughout the operation period. Helen has requested that a specific management plan for the section of the GDW is produced to cover the operation period, so that she may satisfy herself that all due consideration has been given to the GDW National Trail and that all users will be able to access the route at all times un-impeded. Therefore please forward your comments/plans with regard to the management of the GDW route along this section to me and I will disseminate information through to Helen as required.

I trust you will find this information helpful and should you require the need to discuss any issue relating to the GDW or any other public right of way in the neighbouring area then please feel free to contact me directly.

Regards

Kevin

From: Watson, George [mailto:george.watson@aecom.com]
Sent: 20 May 2013 16:55
To: Kevin Straw (CSP - Countryside Services)
Cc: James, Will K; Reid, Sebastian; Carmody, Steven D.; Martin, Kevin W
Subject: RE: Request for information - Public Right Of Way Footpaths along on Llanerfyl to Talerddig road

Kevin

Many thanks for your comments and we look forward to future correspondence.

Can you advise what the cost would be for the current Definitive Map(s) to be made available to us in paper copy form and sent to us via e-mail or post for the Llanerfyl to Talerddig road?

Kind Regards

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From: Kevin Straw (CSP - Countryside Services) [mailto:kevin.straw@powys.gov.uk]
Sent: 20 May 2013 16:43
To: Watson, George
Cc: James, Will K; Reid, Sebastian; Carmody, Steven D.; Martin, Kevin W
Subject: RE: Request for information - Public Right Of Way Footpaths along on Llanerfyl to Talerddig road

George

Thank you for your additional comments.

I can confirm that your proposals have been looked at by Countryside Services and that there would appear to be the potential for public rights of way to be affected by your proposals.

In particular there are several locations where public rights of way terminate at the road side you are planning to utilise. At these locations (and all locations throughout the development area) I would recommend that no operations impact upon the rights of way and at no time should any materials be placed or stored on the rights of way. Any damage caused to the surface condition must be made good to its prior condition or better. Should any operations look to impact upon a right of way to the extent where a temporary closure is required prior to works taking place, then please contact Countryside Services directly, as soon as possible. Temporary closures of paths would need to be advertised for closure and the relevant paperwork drawn up, which naturally takes time to complete.

At other locations the public rights of way appear to pass directly across the road in question, without a break in the line, as such the public rights would continue right across the road and would need to be considered in your plans for operations at these points. It would be a possibility to utilise a person on-site to ensure path users can cross the line of the road on the public right of way safely, without being impeded by any ongoing operations. Again any temporary closures would need to be discussed with Countryside Services as soon as possible in advance.

In two locations along your highlighted route there would appear to be a public right of way recorded on top of the line of the road. These are known as dual status routes and as such carry two lines of public rights on the same line. As such any closure or modification to the public rights of the road would not affect the public rights of the right of way.

The locations in question are; approx grid ref:295835 305416 to 294929 304476, this is recorded as a public footpath; and, approx grid ref:293965 301694 to 293698 301412 this is recorded as a public restricted byway. It might be prudent to consider a short term closure of these two sections of public right of way if you feel that their existence may conflict with your proposals. (Please note that public rights of way are classified into four different user statuses

I would strongly recommend that you consult the current Definitive Map for the area in question rather than relying purely on the O/S data mapping, which although is based on the Definitive Map, can be open to error and will not show sections of dual status routes and where rights of way actually cross the road network. The Definitive Map can be viewed here in Llandrindod Wells during office hours or can be requested in paper copy form at a charge.

In terms of management of rights of way it must be made clear that any users of the rights of way network have a right to access the paths unhindered, (unless constrained by a closure or diversion notice) and as such the management of the scheme must include the consideration of path users. Should any of the proposed 'localised highway widening' look to impact directly upon a public right of way then please contact Countryside Services to discuss, prior to any ground works taking place.

I will be contacting you again after Thursday this week, once I have spoken with Helen, the officer in charge of the Glyndwr's Way.

I trust you find this information helpful in your project developments.

Regards

Kevin

From: Watson, George [mailto:george.watson@aecom.com]
Sent: 20 May 2013 15:05
To: Kevin Straw (CSP - Countryside Services)
Cc: James, Will K; Reid, Sebastian; Carmody, Steven D.; Martin, Kevin W
Subject: RE: Request for information - Public Right Of Way Footpaths along on Llanerfyl to Talerddig road

Kevin

Further to our discussion earlier, our ongoing discussions with David Williams at PCC, and your correspondence with my colleague Will James below, we can confirm the following:

- The study area is the Llanerfyl to Talerddig road which extends from the junction with the A458 to the junction with the A470. There is a small length of this road, circa 2km, at the southern extent, not shown on the plan attached. If you could advise on public rights of way on this section, we would be most appreciative.
- With regards our request for your requirements along the route, we would ask if you require us to consider anything further than the following:
    - We are aware that Glyndwr's Way is a national trail along the road from Dolwen to Dolau-ceimion. We have noted that traffic management for any road improvement works along Glyndwr's Way would need to consider public access for the duration of the works and as a result accessibility for non-motorised users along this route will be maintained at all times during our enabling works programme. You also noted in our conversation that you will be speaking with Helen Tatchell, the Officer for Glyndwr's Way, this Thursday and that you will be in a position to comment further on Glyndwr's Way after this meeting.
    - Other than Glyndwr's Way, we note that there are several points along the Llanerfyl to Talerddig road used as pedestrian crossings to connect existing public rights of way, where the footpaths meet the highway, circled on the attached plan. Are there any engineering measures which you feel would need to be considered in our study area to maintain the public rights of way? Currently, we are not proposing any additional works along the route other than to provide enabling works for our construction traffic, in the form of localised highway widening.

As discussed, we would be most grateful if you could please confirm today if the points above are sufficient for the consideration of public rights of way.

Many thanks

Kind Regards

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From: Kevin Straw (CSP - Countryside Services) [mailto:kevin.straw@powys.gov.uk]
Sent: 07 May 2013 15:51
To: James, Will K
Subject: RE: Request for information - Public Right Of Way Footpaths along on Llanerfyl to Talerddig road

Dear Will

Thank you for your request, it is always useful to look at issues that could have the potential to affect public rights of way well in advance of any likely operations.

It would be useful to have some additional information from you to allow Countryside Services to give a full response.

The sketch attached from you seemed to be cut off at the bottom, is there further information available to show the end of the area in question or is that the end?

You request our requirements along the route, can you clarify exactly what you mean by this, in what context? Are you referring to improved path surface/structures or signage?

It would be useful to understand further your requirements, if you could forward any additional mapping or documentation relating to this then it would be appreciated.

Once a clearer idea of your specific requirements are understood then I would be happy to work with you to provide any information and advice as necessary.

We do have the Definitive Map showing all legally recorded public rights of way, which can be viewed at our office in Llandrindod Wells, unfortunately this is not available electronically. We can also make A4 extracts available to you for a nominal charge to cover officer and printing costs.

I look forward to hearing back from you with any additional information you can provide.

Regards

Kevin

From: James, Will K [mailto:will.james@aecom.com]
Sent: 01 May 2013 17:15
To: Kevin Straw (CSP - Countryside Services)
Cc: Reid, Sebastian
Subject: Request for information - Public Right Of Way Footpaths along on Llanerfyl to Talerddig road

Dear Kevin,

Request for information - Public Rights Of Way (PROW) along the Llanerfyl to Talerddig road

We are working on a highways improvement scheme associated with the wind farm scheme at Llanbrynmair which uses the road between Llanerfyl to Talerddig junctions [refer to attached PROW Assessment Sketch for details] for construction traffic and abnormal load access. We have assessed the PROWs along the route and issue this sketch

to yourselves to request your views and confirmation of the interactions between the existing PROWs, the routing of the PROWs, and the mitigation that may be required to reduce the impact of our improvement works along this road on the existing PROWs.

The attached sketch PROW Assessment Sketch highlights the following in the 'key':

1. Highlighted 'blue' is the believed to be PROW footpath routes.
2. Highlighted 'green' is the existing highway.
3. Highlighted with a circle and reference letter is every point the PROW footpath is believed to inter-act with the highway.

We request your requirements along this route from a PROW perspective and advise if you are satisfied with the routes not shown on our highway improvements package. Can you confirm that what is shown are the only PROWs to consider? If you have any record plans which illustrate the PROW in more details, please could you issue these to us for our information and review.

Regards,

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Reid, Sebastian

From: Watson, George
Sent: 31 May 2013 14:32
To: Martin, Kevin W; Carmody, Steven D.; Reid, Sebastian
Subject: FW: Comments relating to the Glyndwr's Way National Trail - Llanerfyl to Talerddig

FYI

From: Kevin Straw (CSP - Countryside Services) [mailto:kevin.straw@powys.gov.uk]
Sent: 31 May 2013 14:29
To: Watson, George
Cc: Helen Tatchell (CSP - Countryside Services)
Subject: Comments relating to the Glyndwr's Way National Trail - Llanerfyl to Talerddig

George

I have now received comments from the Glyndwr's Way Officer in relation to the management plan for the road linking Llanerfyl to Talerddig.

It is acceptable that the Glyndwr's Way National Trail management plan be subject to a planning condition that allows it to be submitted for Powys County Council and Natural Resources Wales approval, post planning consent. It should be emphasised that PCC and NRW must fully approve the management plan before any development works take place on site.

I trust you find this information of use.

Regards

Kevin

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
Llanerfyl Access.	DURING CONSTRUCTION: PROPOSED ACCESS TRACK TO BE CONSTRUCTED OF GRASS FRINFORCEMENT TO BLEND WITH THE SURROUNDING FIELD. SLOPES TO BE BELNDED AND FEATHERED INTO EXISTING LANDFORM AND SEEDED TO MATCH ADJACENT FIELD. BOLLARD WILL BE TEMPORARY. AFTER CONSTRUCTION: REINFORCED GRASS SOLUTION WILL ENSURE IT APPEARS PART OF THE WIDER FIELD. TEMPORARY FENCING ALONGSIDE ACCESS TRACK AND GATES AT EITHER END OF TRACK REMOVED. WOODEN POST AND RAIL FENCE WILL BE CONSTRUCTED (WHICH CAN BE REMOVED IF A REPLACEMENT BLADE IS REQUIRED). REPLACEMENT GATES TO BE WOOD. The current roadside hedge is relatively newly planted Hawthorn. Any replanted hedge can be improved by the addition of other species such as blackthorn and hazel to match other hedges in the vicinity.
1.1 - OVER-RUN AREA AND BRIDGE PARAPET WORKS CH 460 - 590	<u>GLEN MENIAL BRIDGE</u> EXISTING STONE PARAPETS ON BRIDGE TO BE REDESIGNED TO INCREASE THE ROAD WIDTH TO MIN 4m WIDTH THROUGH THE BRIDGE FOR AILS. NEW PARAPETS TO BE CONSTRUCTED AND INSTALLED ON BRIDGE FOR PERMANENT WORKS, FACING WITH STONE TO MATCH EXISTING. DETAILS TO BE DEFINED POST-PLANNING BUT WILL LIKELY INCLUDE A PRE-FABRICATED SOLUTION TO MINIMISE IMPACT ON LLANERFYL VILLAGE AND TRAFFIC. <u>OVER-RUN</u> OVER-RUN AREA REQUIRED IN THE NORTHERN VERGE AFTER THE GLEN MENIAL BRIDGE TO BE GRASS REINFORCEMENT CONSTRUCTION TO MINIMISE IMPACT ON THE RURAL CHARACTER OF THE ROAD. MINIMAL EARTHWORKS IMPACT DUE TO LEVELS BEING SIMILAR TO THOSE IN THE VERGE. THERE IS MINIMAL DRAINAGE IMPACT AS THE PROPOSED OVER-RUN IS DRAINING AWAY FROM THE CARRIAGEWAY BACK INTO THE FIELD AND IS OF POROUS GRASS REINFORCEMENT CONSTRUCTION. EXISTING HEDGE will be replanted at the THE REAR OF THE PROPOSED REINFORCED GRASS OVER-RUN. THE HEDGE will be planted with a mix of hawthorn, blackthorn, hazel and cherry to match the existing species mix. In addition the soil from the existing hedge base will be used to form a small mound into which the new hedge is planted to maintain existing ground flora. HEDGEROW REMOVED = 70m HEDGEROW REPLANTED = 73m IMPACT ON OVERHEAD BT LINE WHICH WILL NEED TO BE RELOCATED TO BEHIND THE PROPOSED HEDGELINE WITH TWO POLES IMPACTED OVERALL.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.2 - OVER-RUN AREA CH 720 - 740	OVER-RUN AREA REQUIRED IN THE SOUTHERN VERGE OPPOSITE EXISTING JUNCTION. AREA OF PROPOSED OVER-RUN IS <0.5M AND IT IS PROPOSED TO WIDEN THE ROAD CONSTRUCTION USING ASPHALT IN THIS AREA. EXISTING HEDGE BANK IS IMPACTED BY THIS WIDENING AND THE EXISTING HEDGEROW WILL BE REMOVED AND A NEW MIXED HEDGE REPLANTED1.5M TO THE SOUTH. Species mix will reflect the existing mix of sycamore, hawthorn and blackthorn. HEDGEROW REMOVED = 35m HEDGEROW REPLANTED = 32m MINIMAL EARTHWORKS IMPACT DUE TO LEVELS IN THE FIELD TO THE SOUTH BEING SIMILAR TO THOSE ALONG THE ROAD CHANNEL LINE. THE PROPOSED ASPHALT OVER-RUN WILL NOT INCREASE THE IMPERMEABLE ROAD AREA SIGNIFICANTLY AND WILL NOT IMPACT THE EXISTING DRAINAGE. ACCESS FOR CONSTRUCTION AVAILABLE VIA FIELD ACCESS TO THE NORTH.
1.3 - OVER-RUN AREA CH 875 - 950	OVER-RUN AREA REQUIRED IN THE NORTHERN VERGE ALONG THE BEND TO ALLOW AILS TO ALIGN PRIOR TO DIOSG BRIDGE AND PRIOR TO OVER-RUN 1.4. WIDENING OF 6M ON THE BEND OPPOSITE THE JUNCTION. PROPOSED CONSTRUCTION FOR WIDENING IS GRASS REINFORCEMENT TO MINIMISE LANDSCAPE AND VISUAL IMPACT. THIS CONSTRUCTION CONSISTS OF A COMPACTED UNBOUND SUB-BASE WITH AN INTERLOCKING GEOGRID SURFACING INFILLED WITH TOPSOIL AND LOCAL GRASS SEED. EXISTING HEDGE IS IMPACTED BY THIS WIDENING AND A NEW MIXED HEDGE WILL BE PLANTED. EXISTING FIELD ACCESS ADJACENT TO THE DIOSG BRIDGE TO BE RELOCATED INTO THE NEW HEDGELINE. Species mix will reflect the existing hedge of sycamore, blackthorn, hawthorn, holly ash and hazel. HEDGEROW REMOVED = 50m HEDGEROW REPLANTED = 50m ADDITIONAL IMPACT ON OVERHEAD BT LINE WHICH IS PROPOSED TO BE RELOCATED TO BEHIND THE PROPOSED HEDGELINE WITH TWO POLES IMPACTED OVERALL. OVERHEAD LINES WILL NEED TO BE CHECKED POST-PLANNING FOR HEIGHT CLEARANCE ABOVE AIL VEHICLES. MINIMAL EARTHWORKS IMPACT DUE TO LEVELS IN THE FIELD TO THE NORTH BEING SIMILAR TO THOSE ALONG THE ROAD CHANNEL LINE. PROPOSED WORKS WILL DRAIN AWAY FROM CARRIAGEWAY INTO EXISTING VERGE AND FIELD AREA. WORKS CONSTRUCTED FROM FIELD AREA WITH A TEMPORARY COMPOUND AREA TO ENABLE OTHER WORKS IN THE VICINITY.
1.4 - OVER-RUN AREA WITH STRUCTURE CH 970 - 990	OVER-RUN AREA REQUIRED IN THE EXISTING VERGE ADJACENT TO THE EXISTING PROPERTY TO THE SOUTH OF THE ROAD AT DIOSG. WORKS WILL REQUIRE THE EXISTING VERGE PLATEAU TO BE WIDENED WITH A NEW WALL CONSTRUCTED TO SUPPORT THIS OVER-RUN. AREA OF PROPOSED OVER-RUN IS LESS THAN 0.5M IN WIDTH. PROPOSED WIDENING USING ASPHALT IN THIS AREA. EXISTING KERBS, HALF BATTERED, TO BE REPLACED WITH REDUCED UPSTAND SPLAYED KERBS WITH A FURTHER 300mm OF ASPHALT CONSTRUCTED TO THE TOP OF THE NEW WALL. THE WALL MAY BE CONSTRUCTED USING GRAVITY RETAINING BRICKS, OR ANOTHER WALL SOLUTION TO BE DEFINED POST PLANNING. EXISTING DRAINAGE ARRANGEMENTS WILL BE MAINTAINED AND THIS SMALL AREA OF ASPHALT WIDENING WILL NOT SIGNIFICANTLY IMPACT THE EXISTING DRAINAGE CHANNEL ADJACENT TO THE PROPERTY OR ALONG THE ROAD. WORKS TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT IN PLACE TO REDUCE IMPACT ON THE ROAD.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.5 - OVER-RUN AREA CH 1045 - 1080	OVER-RUN AREA REQUIRED IN THE NORTHERN VERGE, MINIMUM DIMENSION 1m. OVER-RUN TO BE COMPRISED OF GRASS REINFORCEMENT TO MINIMISE IMACT ON THE CHARACTER OF THE ROAD. EXISTING HEDGE IS NOT IMPACTED BY THIS WIDENING, ALTHOUGH IT MAY NEED TO BE TRIMMED. PROPOSED OVER-RUN WILL NOT IMPACT ON EXISTING DRAINAGE AS IT IS WITHIN EXISTING VERGE AREA. WORKS CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT USED.
1.6 - OVER-RUN AREA CH 1130 - 1175	OVER-RUN AREA REQUIRED IN THE SOUTHERN VERGE, MINIMUM DIMENSION 1m. OVER-RUN CONSTRUCTED OF GRASS REINFORCEMENT TO MINIMISE IMACT ON THE CHARACTER OF THE ROAD. EXISTING HEDGE IS NOT IMPACTED BY THIS WIDENING, ALTHOUGH IT MAY NEED TO BE TRIMMED. EXISTING TREE AT CH 1150 IS LIKELY TO NEED TO BE REMOVED AND WILL BE REPLCED BY A STANDARD OAK TREE. AREA OF WIDENING IS MINOR AND WILL NOT IMPACT ON EXISTING DRAINAGE AS IT IS WITHIN EXISTING VERGE AREA.
1.7 - EXISTING ACCESS CH 1175 - 1210	EXISTING ACCESS JUNCTION INTO PROPERTY AVAILABLE FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS IF REQUIRED.
1.8 - OVER-RUN AREA CH 1380 - 1450	2M OVER-RUN AREA REQUIRED IN THE SOUTHERN VERGE AND 1M OVER-RUN IN TRAFFIC ISLAND OPPOSITE PROPERTY. ISLAND OVER-RUN TO BE CONSTRUCTED FROM ASPHALT WITH THE OVER-RUN IN THE VERGE TO BE OF GRASS REINFORCEMENT TO MINIMISE IMPACT ON THE CHARACTER OF THE VERGE. ALTHOUGH THE SMALL TREES ARE NOT DIRECTLY AFFECTED, COPPICING AND LAYING THEM INTO A HEDGE WILL IMPROVE LANDSCAPE CONDITION AND AVOID CONFLICT WITH RELOCATED POLES. Currently this is a tall, unmanaged hedge of very spindly hazel and hawthorn that would lend itself to laying. IMPROVEMENT WORKS WITHIN THE ISLAND WILL BATTER BACK TO EXISTING ROAD LEVELS AT 1 IN 2 AND EXISTING GRIT BIN, CURRENTLY LOCATED TO THE SOUTH OF THE ISLAND, IS TO BE RELOCATED AT A LOCATION TO BE AGREED POST PLANNING. IMPROVEMENT WORKS TO THE ISLAND WILL NOT SIGNIFICANTLY IMPACT THE EXISTING DRAINAGE ARRANGEMENTS WHEREBY THE SURFACE WATER FLOWS DOWNHILL TOWARDS THE RIVER AND IS INTERCEPTED LATER. PROPOSED OVER-RUN AREA WILL DRAIN BACK INTO THE EXISTING HEDGEROW AT THE BOTTOM OF THE EARTHWORKS. ACCESS TO THE WORKS TO BE UNDERTAKEN ON-LINE USING TRAFFIC MANAGEMENT.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.9 - OVER-RUN AREA CH 1950 - 2000	OVER-RUN AREA REQUIRED IN THE SOUTHERN VERGE. AREA OF PROPOSED OVER-RUN IS UP TO 0.5M IN WIDTH AND IT IS PROPOSED TO WIDEN THE ROAD USING ASPHALT IN THIS AREA WHERE AN EXISTING HEDGE BANK IS LOCATED APPROXIMATELY 0.8M TO THE SOUTH. THE HEDGE WILL BE COPPICED BACK AND IF LOSS IS UNAVOIDABLE, A NEW HEDGE TO MATCH AND TIE IN WITH THE EXISTING HEDGE WILL BE PLANTED. SINGLE BT OVERHEAD LINE IMPACTED, TO BE RELOCATED. MINIMAL EARTHWORKS IMPACT DUE TO LEVELS IN THE FIELD TO THE SOUTH BEING SIMILAR TO THOSE ALONG THE ROAD CHANNEL LINE. PROPOSED WIDENING OF ROAD WILL NOT IMPACT ANY EXISTING GULLIES ALONG THIS SECTION. EXISTING ROAD DRAINS INTO THE VERGE OR INTO GULLIES LOCATED IN NORTHERN CHANNEL. WORKS TO BE CONSTRUCTED ON-LINE USING TRAFFIC MANAGEMENT.
1.10 - EXISTING ACCESS CH 2055 - 2090	EXISTING ACCESS JUNCTION INTO PROPERTY AVAILABLE FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS IF REQUIRED.
1.11 - EXISTING ACCESS CH 2300 - 2340	EXISTING ACCESS JUNCTION INTO PROPERTY AVAILABLE FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS IF REQUIRED.
1.12 - OVER-RUN AREA CH 2400 - 2575	1M WIDE OVER-RUN AREA LOCATED ON THE SOUTHERN VERGE TO AVOID TREE LOSS TO NORTH WEST OF THE ROAD. OVER-RUN TO BE GRASS REINFORCEMENT TO MINIISE IMACT ON THE CHARACTER OF THE ROAD. THE HEDGE WILL BE COPPICED BACK TO ALLOW AIL VEHICLES TO PASS. IF LOSS IS UNAVOIDABLE, A NEW HEDGE TO MATCH AND TIE IN WITH THE EXISTING HEDGE WILL BE PLANTED. POTENTIAL IMPACT ON EXISTING TREE ROOTS TO THE SOUTH AT CHAINAGE 2515 ADJACENT TO TWO ELECTRICITY POLES. IF TREES ARE LOST STANDARD Ash TREES WILL BE re-PLANTED IN THEIR PLACE. ALL WORKS LOCATED IN EXISTING VERGE WHICH THE EXISTING ROAD DRAINS INTO. EXISTING DRAINAGE IS NOT IMPACTED. WORKS CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.
1.13 - EXISTING ACCESS CH 2580 - 2630	EXISTING ACCESS JUNCTION INTO PROPERTY AVAILABLE FOR USE AS A PASSING PLACE FOR SMALL VEHICLES DURING AIL MOVEMENTS IF REQUIRED.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.14 - OVER-RUN AREA CH 2970 - 3050	AREA OF PROPOSED OVER-RUN ON SOUTHERN VERGE UP TO 2M WIDE. TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD. PART OF THE EXISTING COPPICE (45M IN LENGTH) WILL BE LOST TO ENABLE EARTHWORKS. SOIL TO BE EXCAVATED AND REUSED AND ADDITIONAL HAZEL COPPICE PLANTED ON NEW BANK.. This is currently a solid row of mainly hazel which has been previously coppiced along with occasional elder and hawthorn. The loss of this row will leave the more scattered coppice behind exposed. The row should be replanted on the new bank once earthworks are complete. It may be possible to leave the existing rootstock of the row whilst undertaking earthworks, and allowing this to re-grow through the new bank, with planting up to fill any gaps. This area was surveyed for dormouse previously and no signs were found. ONE BT POLE TO BE RELOCATED. OVER-RUN LOCATED IN EXISTING VERGE. WORKS TO FALL AWAY FROM EXISTING HIGHWAY TOWARDS WATERCOURSE TO THE SOUTH. ADDITIONAL DRAINAGE FOR EMBANKMENT TO BE PROVIDED AND DEFINED POST PLANNING. ACCESS FOR THESE WORKS TO BE FROM THE EXISTING ROAD TO THE EAST. SOME ON-LINE WORKS REQUIRED USING TRAFFIC MANAGEMENT.
1.15 - OVER-RUN AREA CH 3340 - 3450	AREA OF PROPOSED OVER-RUN UP TO 3M WIDE ON VERGE TO SOUTH WEST OF EXISTING BEND.TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD. PART OF THE EXISTING COPPICE (107m in length) WILL BE LOST TO ENABLE EARTHWORKS. SOIL TO BE EXCAVATED AND REUSED AND ADDITIONAL HAZEL COPPICE PLANTED ON NEW BANK. As 1.14. Also, possibility of extending area of coppice in the field behind to increase habitat subject to landowner agreement. PROPOSED WORKS LOCATED IN VERGE TO DRAIN AWAY FROM EXISTING CARRIAGEWAY. NEW DRAINAGE TO BE PROVIDED FOR EARTHWORKS AND TO INTERCEPT ROAD RUN-OFF PRIOR TO EXISTING WATERCOURSE LOCATED TO THE SOUTH OF THE PROPOSED WORKS ON EXISTING ROAD. ACCESS TO BE MADE FROM THE EXISTING VERGE AND HIGHWAY AND FROM THE EXISTING ROAD TO THE NORTH OF THE WORKS. TRAFFIC MANAGEMENT REQUIRED ON BEND.
1.16 - EXISTING ACCESS CH 3870 - 3930	EXISTING ACCESS JUNCTION INTO PROPERTY AVAILABLE FOR USE AS A HOLDING AREA FOR SMALL VEHICLES DURING AIL MOVEMENTS IF REQUIRED.
1.17 - OVER-RUN AREA CH 3875 - 4090	AREA OF PROPOSED OVER-RUN IS OF VARIABLE WIDTH UP TO 2M WIDE IN THE SOUTHERN VERGE AND CONSTRUCTED FROM GRASS REINFORCEMENT. ONE LARGE Ash tree to be felled. Another ash on the southern side, an oak and a sycamore on the northern side to be retained. NEW TREES TO BE PLANTED OUTSIDE OF THE IMPACTED WORK AT LOCATIONS TO BE AGREED POST PLANNING. EXISTING HEDGEROW ALONG THE SOUTHERN EDGE FROM CH 3950 - 4080 IMPACTED AND RELOCATED TO TOP OF PROPOSED EARTHWORKS AT REAR OF OVER-RUN. ANY VEGETATION LOSS IS TO BE REPLACED. HEDGEROW REMOVED = 110m AND HEDGEROW REPLACED = 110m. Southern hedge is hazel hedge to be replaced. This hedge has previously been surveyed for dormouse and no signs found. Northern section of hedge to be trimmed is mainly hawthorn with some hazel and blackthorn. EXISTING GULLIES WITHIN THE EXTENT OF THESE WORKS WITHIN EXISTING ROAD TO BE RETAINED AND REINFORCED FOR PROPOSED LOADING WITH UPGRADED GRATINGS. PROPOSED OVER-RUN TO DRAIN AWAY FROM HIGHWAY AND NEW DRAINAGE TO BE PROVIDED FOR EARTHWORKS, TO BE DEFINED POST PLANNING. WORKS ACCESSIBLE FROM FIELD TO THE SOUTH, WITH TRAFFIC MANAGEMENT EMPLOYED FOR WORKS ADJACENT TO THE CARRIAGEWAY.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.18 - OVER-RUN AREA CH 4120 - 4200	AREA OF PROPOSED OVER-RUN OF VARIABLE WIDTH, UP TO 4M WIDE IN THE SOUTH EASTERN VERGE AND INTO THE ADJACENT FIELD. TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMACT ON THE CHARACTER OF THE ROAD. 108M OF EXISTING HEDGEROW WILL NEED TO BE MOVED/REMOVED AND WILL BE REPLACED BY 100M OF SPECIES RICH MIXED HEDGE TO TIE INTO THE CONTINUOUS HEDGELINES ON EITHER SIDE OF THE WORKS. EARTHWORKS TO BE BLENDED INTO THE EXISTING LANDFORM TO LOOK AT NATURAL AS POSSIBLE AND SEEDED TO MATCH ADJACENT AREAS.This is a hawthorn and hazel hedge on a low bank that should be able to be translocated. EXISTING OVERHEAD BT TELEGRAPH POLES WILL NEED TO BE RELOCATED. PROPOSED OVER-RUN DOES NOT IMPACT ANY EXISTING IDENTIFIED DRAINAGE FEATURES AND DRAINS AWAY FROM THE PROPOSED HIGHWAY. NEW DRAINAGE TO BE PROVIDED TO SUPPORT EARTHWORKS, TO BE DEFINED POST PLANNING. WORKS ACCESSIBLE FROM FIELD TO THE SOUTH, WITH TRAFFIC MANAGEMENT EMPLOYED FOR WORKS ADJACENT TO THE CARRIAGEWAY.
1.19 - OVER-RUN AREA CH 4235 - 4315	AREA OF PROPOSED OVER-RUN IS OF VARIABLE WIDTH, UP TO 1.5M WIDE IN THE NORTHERN VERGE. CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMACT ON THE CHARACTER OF THE ROAD. 70M OF HEDGEROW WILL NEED TO BE MOVED/REMOVED AND WILL BE REPLAVCED BY 73M OF SPECIES RICH MIXED HEDGE TO TIE INTO EXISTING HEDGES. FENCELINES TO REPLACE EXISTING. EARTHWORKS TO BE BLENDED INTO THE EXISTING LANDFORM TO LOOK AT NATURAL AS POSSIBLE AND SEEDED TO MATCH ADJACENT AREAS. Re-plant to reflecvt existing mix of dominant hazel with occasional hawthorn and blackthorn. PROPOSED WORKS WILL DRAIN INTO THE FOOT OF THE PROPOSED EARTHWORKS. NEW DRAINAGE TO BE PROVIDED ALONG PROPOSED EMBANKMENT, TO BE DETAILED POST PLANNING. ACCESS FOR WORKS FROM FIELD ACCESSES TO THE WEST AT LOCATION 1.20.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.20 - OVER-RUN AND PASSING PLACE CH 4335 - 4430	OVER-RUN AREA REQUIRED IN THE NORTHERN VERGE TO ACCOMMODATE HGV PASSING DURING THE CONSTRUCTION OF THE GOSEN BRIDGE. OVER-RUN AREA TO BE CONSTRUCTED IN THE AREA OF SEMI HARD STANDING AND EXTENDED INTO ADJACENT FIELD. TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD .. THE CORNER OF THE FIELD TO THE NORTH WILL BE USED AS CONSTRUCTION COMPOUND FOR THE GOSEN BRIDGE WORKS TO THE SOUTH AND A TEMPORARY COMPOUND FOR MATERIAL STORAGE AND PLANT. IT WILL CONTAIN TEMPORARY WELFARE FACILITIES FOR THE OTHER ENABLING WORKS ALONG THE ROAD. 58M OF HEDGEROW WILL NEED TO BE REMOVED. THIS WILL BE REPLACED BY 83M OF NEW MIXED HEDGE TO FOLLOW THE CURVE OF THE ROAD AND TIE INTO THE EXISTING HEDGEROWS. FENCES WILL BE REPLACED LIKE WITH LIKE AND EXISTING FIELD ACCESS TO BE RELOCATED BACK INTO THE FIELD. THE AIM IS TO IMPROVE THE CONDITION AND CHARACTER OF THIS SECTION OF THE ROAD. Replacement hedge will reflect existing mix of sycamore, hawthorn and hazel. Further enhancement can include hedging around the construction compound. MINIMAL EARTHWORKS EXPECTED BUT WORKS TO EXISTING DRAINAGE CHANNELS WILL BE REQUIRED. ALL WORKS WITHIN THE HIGHWAY ARE DESIGNED TO EXISTING LEVELS. EXISTING STREET FURNITURE AND SIGNAGE ON APPROACH TO THE GOSEN BRIDGE IS TO BE RELOCATED OUTSIDE OF THE IMPACTED AREA. THESE WORKS WILL BE DETAILED POST PLANNING. WORKS WILL BE CONSTRUCTED FROM THE ADJACENT FIELD. PROPOSED WORKS TO DRAIN INTO EXISTING DITCH. EXISTING CULVERT TO BE CONFIRMED BETWEEN EXISTING DITCHES AND IS TO BE REINFORCED AND REPLACED TO SUIT PROPOSED LOADING. TO BE DETAILED POST PLANNING.
1.21 - OVER-RUN AREA CH 4390 - 4450	OVER-RUN AREA REQUIRED OF VARIABLE WIDTH, UP TO 6.5M, IN THE EASTERN VERGE. WORKS TO BE CUT INTO THE BANK AT 1:1 TO MINIMISE AREA AFFECTED BY WORKS. OVER-RUN AREA TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD. 70M OF HEDGEROW WILL NEED TO BE REMOVED. THIS WILL BE REPLACED BY 78M OF NEW MIXED HEDGE TO FOLLOW THE CURVE OF THE ROAD AND TIE INTO THE EXISTING HEDGEROWS. THIS IS SHOWN ON SECTION C-C. Replacement hedge will reflect the existing species mix of sycamore, hawthorn and blackthorn. LEVELS DESIGNED TO ALLOW FOR DRAINAGE INTO EXISTING ROAD GULLIES. EXISTING DRAINAGE INFRASTRUCTURE TO BE MAINTAINED.PROPOSED OVER-RUN AREA WILL DRAIN TOWARDS THE HIGHWAY. EXISTING ROAD GULLIES WITHIN EXTENT OF WORKS TO BE REINFORCED TO SUIT THE PROPOSED LOADING. EXISTING GULLIES TO THE NORTH TO BE RETAINED WITH EXISTING DRAINAGE PROVISION UPDATED TO SUIT REQUIREMENTS FOR RETENTION AND ROAD WIDENING AT GOSEN BRIDGE. EXISTING OUTFALLS TO THE SOUTH OF GOSEN BRIDGE TO BE INVESTIGATED POST PLANNING.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
	ROAD IS TO BE WIDENED TO THE NORTH AND THROUGH GOSEN BRIDGE FOR THE AIL MOVEMENTS. All of the options will necessitate the removal of a numbers of trees on the embankment. These are currently a number of rather spindly trees and a mix of hazel, birch and ash. There is little ground flora under the trees. Recent winds have caused several trees to fall opening up the bank and de-stabilising the soil at some points. All of the trees on this bank will need to be cleared to enable the proposed works. In addition a small section of hedge, comprising blackthorn, hawthorn, ash and hazel, will be removed to allow access to the works. None of the mature trees adjacent to the existing property will be felled. An otter survey was carried out within the river and no signs of otter were found. This will be repeated immediately prior to construction. A bat assessment of the trees was also carried out (bsg to confirm and provide results) No felling or hedge clearance will be carried out during the bird breeding season (March – August). Following the works a selection of trees will be replanted at the top of the new retaining wall. These will be of a similar species mix to those lost. The trees will be planted fairly close together, and managed by coppicing to keep a dense cover and to prevent them getting too spindly causing future windblow problems. The hedge will be replanted at the top of the new retaining wall and will use the same species previously in the hedge, sourced from local provenance.
1.22 - GOSEN BRIDGE: ROAD WIDENING, ROAD RETENTION AND NEW SECTION OF BRIDGE CH 4440 - 4540	<u>CHAINAGE 4440 - 4455 - NORTH</u> ASPHALT ROAD WIDENING TO BE PROVIDED ON THE NORTHERN CORNER ADJACENT TO EXISTING PROPERTY. WIDENING TO BE LOCATED IN AREA OF VERGE AT FOOT OF EMBANKMENT. NEW DRAINAGE CHANNEL PROVIDED TO BACK OF WORKS ALONG EDGE OF NEW ROAD WIDENING INTO OUTFALL TO THE NORTH OF THE BRIDGE. <u>CHAINAGE 4455 - 4470 - NORTH</u> GENERAL FILL TO THE NORTH OF THE BRIDGE. THIS AREA WILL BE USED IN THE CONSTRUCTION PERIOD FOR ACCESS AND CAN SERVE AS A MAINTENANCE ACCESS FOR FUTURE WORKS. A NEW VEHICLE RESTRAINT SYSTEM OR GATE WILL SPAN THIS CONSTRUCTION ACCESS PERMANENTLY. NEW TEMPORARY CONSTRUCTION PLATFORM TO BE PROVIDED TO THE NORTH OF THE BRIDGE TO CONSTRUCT THE RETAINING WALLS AND THE BRIDGE WIDENING AT RIVER BED LEVEL. ACCESS FOR CONSTRUCTION VEHICLES AND PERSONNEL TO BE CONFIRMED POST PLANNING WHEN CONSTRUCTION METHODOLOGY IS FURTHER DEFINED POST PLANNING. <u>CHAINAGE 4470 - 4500 - NORTH</u> AREA OF ROAD WIDENING UP TO NEW BRIDGE STRUCTURE SPANNING THE EXISTING RIVER. RETAINING STRUCTURES TO TIE INTO NEW BRIDGE ALIGNMENT AND CONSTRUCTED INTO ROCK FACE. NEW DRAINAGE PROVISIONS TO BE PROVIDED FOR BRIDGES AND CONSTRUCTION DETAILS TO BE DEFINED POST-PLANNING. WORKS TO BE CONSTRUCTED FROM THE TEMPORARY CONSTRUCTION PLATFORM TO THE NORTH USING PREFABRICATED RETAINING SYSTEMS TO REDUCE IMPACT OF WORKS. <u>GOSEN BRIDGE WIDENING</u> NEW SECTION OF BRIDGE TO BE PROVIDED ADJACENT TO THE EXISTING BRIDGE SPANNING THE RIVER. PROPOSED BRIDGE HAS A SPAN OF UP TO 15m AND IS FOUNDED ON NEW ABUTMENTS. BRIDGE DECK TO BE THE SAME LEVEL AS THE EXISTING GOSEN BRIDGE AND IS TO TIE INTO THE EXISTING BRIDGE DECK AND ROAD LEVELS. CONSTRUCTION DETAILS AND FURTHER STRUCTURAL DETAILS ARE TO BE DETAILED POST PLANNING. NEW BRIDGE AND RETAINING WORKS TO UTILISE THE STONE REMOVED FROM THE EXISTING BRIDGE PARAPETS AND OTHER LOCAL STONE FOR FASCIAS AND PARAPETS. DRAINAGE OF THE ROAD AT GOSEN BRIDGE AND FOR THE NEW SECTION OF BRIDGE STRUCTURE TO BE DETAILED POST PLANNING.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.23 - ROAD WIDENING FOR OVER-RUN CH 4540 - 4560	ROAD WIDENING FOR AIL OVER-RUN IS REQUIRED ACROSS AN AREA BETWEEN THE TWO EXISTING ROADS. THE EXISTING LAND IS TO BE CUT BACK AND VEGETATION CLEARED WITH THE AREA BETWEEN THE ROADS CONSTRUCTED IN ASPHALT. JUNCTION IMPROVEMENTS TO BE PROVIDED AS WELL AS AN IMPROVED WHITE LINING SCHEME THROUGH GOSEN BRIDGE. THIS IS DETAILED FURTHER WITHIN A GOSEN BRIDGE REPORT INCLUDED AS PART OF THE LTMP DOCUMENTATION. EXISTING VEGETATION WILL BE CLEARED TO ALLOW FOR CONSTRUCTION. CONSTRUCTION TO BE UNDERTAKEN FROM THE MINOR ROAD TO THE NORTH USING TRAFFIC MANAGEMENT.
1.24 - ROAD WIDENING FOR OVER-RUN CH 4550 - 4640	OVER-RUN AREA REQUIRED IN THE EASTERN VERGE AT CHAINAGE 4520 TO LEAD INTO THE GOSEN TO SYCHTYN OFF-ROAD TRACK. AREA OF PROPOSED ROAD WIDENING IS UP TO 4.5M WIDE AND TO BE CONSTRUCTED OF ASPHALT AS PERMANENT ROAD IMPROVEMENTS. CONSTRUCTION WILL RESULT IN LOSS OF SOME SCRUB VEGETATION AND 3 SMALL TREES(birch and hawthorn). A NEW MIXED HEDGE WITH HEDGEROW OAK and Birch TREES WILL BE PROVIDED TO REPLACE VEGETATION LOST. ADDITIONAL SHRUBS such as hawthorn and blackthorn AND TREES including birch and cherry WILL BE PLANTED RUNNING EAST/WEST TO THE SOUTH-WEST OF CHAPEL ON RAISED GROUND TO SCREEN VIEWS FO CRAWLER LANE FROM THE ROAD. EXISTING GULLY TO BE REPLACED WITH NEW ALONG THE REAR OF NEW CHANNEL LINE ON THIS CORNER. ACCESS FOR CONSTRUCTION WORKS TO BE PHASED WITH THE GOSEN WIDENING SO THAT THIS ADDITIONAL ROAD AREA CAN ASSIST WITH TRAFFIC MANAGEMENT AT GOSEN BRIDGE. ACCESS FOR CONSTRUCTION MADE FROM WITHIN ADJACENT FIELD TO THE EAST.
GOSEN TO SYCHTYN OFF-ROAD TRACK CH 4620 TO 4970	NEW 350M LENGTH OF OFF-ROAD TRACK TO BE PROVIDED TO AVOID THE VERTICAL CONSTRAINTS ON THE EXISTING ROAD AND ALLOW AILS TO BYPASS THE EXISTING ROAD. AND FOR A PASSING PLACE FACILITY. THE AIM HAS BEEN TO MAKE LANDFORMS AS GENTLE AS POSSIBLE TO BLEND THE LANDFORMS INTO THE EXISTING FIELD. OFF-ROAD TRACK WILL HAVE A SHORT STRETCH OF ASPHALT CARRIAGEWAY AT EITHER END TO PROVIDE TRACTION FOR THE AIL VEHICLES. ACCESS TO BE SECURED USING GATED ACCESS AND EGRESS. THE TRACK WILL BE CONSTRUCTED OF CRUSHED STONE. A NEW HEDGEROW WILL BE PLANTED ALONG THE EDGE OF THE EXISTING ROAD TO ENHANCE THE CHARACTER OF THE ROAD AND MINIMISE VISIBILITY OF THE PROPOSED OFF-ROAD TRACK. The hedge will reflect the general species mix of hedges in the area and comprise hawthorn, blackthorn, ash and hazel. DRAINAGE FOR THE PROPOSED OFF-ROAD TRACK TO BE DEFINED POST PLANNING. CONSTRUCTION OF THESE WORKS WILL NOT IMPACT TRAFFIC FLOW ON THE EXISTING ROAD.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.25 - ROAD WIDENING CH 4970 - 5040	APPROXIMATELY 70m OF 1.5m WIDE ROAD WIDENING REQUIRED AFTER THE EGRESS FROM THE OFF-ROAD ACCESS TRACK. WIDENING TO BE CONSTRUCTED FROM ASPHALT AS PERMANENT ROAD IMPROVEMENT. THE EXISTING ACCESS DOWN TO SYCHTYN FARM WILL REQUIRE REGRADING AND RESURFACING ACROSS THIS AREA OF OVER-RUN TO TIE INTO THE PROPOSED LEVELS. ADDITIONAL HIGHWAY DRAINAGE TO BE PROVIDED ALONG THE BACK OF THE VERGE. WORKS TO BE UNDERTAKEN IN EXISTING AREA OF WIDE VERGE WITHIN HIGHWAY BOUNDARY. VEGETATION LOSS WILL BE AVOIDED AS FAR AS POSSIBLE, BUT OF ANY LOSS IS UNAVOIDABLE IT WILL BE REPLACED LIKE WITH LIKE.IMPACT ON A SINGLE OVERHEAD POLE WHICH WILL NEED TO BE RELOCATED. CONSTRUCTION OF THESE WORKS TO BE UNDERTAKEN ON-LINE USING TRAFFIC MANAGEMENT.
1.26 - ROAD WIDENING CH 5050 - 5110	APPROXIMATELY 60m OF 1.5m WIDE ROAD WIDENING REQUIRED. WORKS TO BE UNDERTAKEN IN EXISTING AREA OF VERGE ALONG TRAFFIC ISLAND SEPARATING THE HIGHWAY ACCESS LEADING INTO THE SYCHTYN FARM BUILDINGS. ROAD TO BE WIDENED INTO EXISTING ISLAND AND BATTERED BACK TO EXISTING LEVELS EITHER USING ENGINEERED FILL, REINFORCED EARTH OR OTHER APPROVED RETAINING SOLUTION TO BE DETAILED POST PLANNING. ROAD WIDENING TO BE CONSTRUCTED FROM ASPHALT AS PERMANENT ROAD IMPROVEMENT. EXISTING DRAINAGE IN NORTHERN VERGE IS NOT IMPACTED AND IS RETAINED.
1.27 - OVER-RUN AREA AND WALL REMOVAL CH 5130 - 5180	EXISTING WALL AT CHAINAGE 5130 IS TO BE RELOCATED PERMANENTLY. OVER-RUN TO BE CONSTRUCTED IN ITS PLACE FROM GRASS REINFORCEMENT. THERE WILL BE IMPACT TO EXISTING HEDGEROW ADJACENT TO THE WALL WHICH WILL NEED TO BE REMOVED. LOCATION OF REPLACEMENT HEDGEROW TO BE DETAILED POST PLANNING, BUT ADDITIONAL LENGTHS CAN BE INCORPORATED INTO THE WIDENING AT LOCATIONS 1.28 AND 1.29. PROPOSED OVER-RUN IS POROUS AND IS GRADED AWAY FROM EXISTING HIGHWAY. EXISTING DRAINAGE PROVISION NOT IMPACTED. ADDITIONAL IMPACT TO THE EXISTING OVER-HEAD CABLE POLES LOCATED ON BOTH SIDES OF THE CARRIAGEWAY WHICH WILL NEED TO BE REMOVED AND RELOCATED. WORKS TO BE CONSTRUCTED BOTH ON-LINE USING TRAFFIC MANAGEMENT AND FROM EXISTING FIELD ADJACENT TO THE WORKS TO THE SOUTH.
1.28 - OVER-RUN AREA CH 5175 - 5315	1M OVER-RUN LOCATED IN THE NORTHERN VERGE. OVER-RUN TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMACT ON THE CHARACTER OF THE ROAD. 73M OF HEDGEROW WILL BE AFFECTED. THE HEDGEROW, comprising hazel with a few hawthorn and blackthorn bushes, is on a low bank and WILL BE TRANSLOCATEDAT THE REAR OF THE VERGE LINE BEFORE THE EARTHWORKS PROFILE. ALL WORKS LOCATED IN EXISTING VERGE AND FIELD. EXISTING ROAD DRAINS INTO NORTHERN VERGE ALONG THIS SECTION. EXISTING DRAINAGE TO BE RETAINED AND RELOCATED TO BACK OF NEW OVER-RUN AREA. TO BE DEFINED POST PLANNING. EXISTING OVERHEAD BT TELEGRAPH POLES WILL BE IMPACTED AND ARE TO BE RELOCATED.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.29 - OVER-RUN AREA CH 5330 - 5430	OVER-RUN LOCATED IN THE SOUTHERN VERGE. OVER-RUN TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD. 30M OF HEDGE, 0.5M ABOVE ROAD LEVEL, WILL BE IMPACTED. This is currently a hedge of old previously layered hazel and hawthorn. It is considered to woody to translocated and therefore A NEW MIXED SPECIES RICH HEDGE, mainly of hazel and hawthorn, WILL BE PLANTED AT THE REAR OF THE VERGE AT THE FOOT OF NEW CUT EARTHWORKS. EXISTING DRAINAGE GULLIES LOCATED IN VERGE TO BE UPGRADED TO SUIT PROPOSED LOADING AND RETAINED AS A PART OF THE PROPOSED SCHEME. DRAINAGE WORKS TO BE DEFINED POST PLANNING. EXISTING DRAINAGE TO NORTH NOT IMPACTED. TWO OVERHEAD BT TELEGRAPH POLES ARE IMPACTED AND WILL NEED TO BE RELOCATED. WORKS CONSTRUCTED FROM ADJACENT FIELD TO MINIMISE IMPACT ON THE ROAD.
1.30 - OVER-RUN AREA AND IMPROVED PASSING PLACE CH 5430 - 5700	OVER-RUN AREA LOCATED TO THE NORTH OF THE CARRIAGEWAY IN AREA OF DENUDED HEDGEROW TO MINIMISE IMACTS ON THE CHARACTER OF THE ROAD, UTILISING EXISTING PASSING PLACES BETWEEN CHAINAGE 5510 AND 5550 WHICH WILL BE LENGTHENED. MINIMUM WIDTH OF WIDENING 1M, INCREASING TO 2.5M WIDE. OVER-RUN TO BE CONSTRUICTED FROM REINFORCED GRASS LAID ALONG VERGE WITH NEW MIXED HEDGES PLANTED TO REAR OF VERGE TO ENHANCE THE CHARACTER OF THE ROAD IN THE LONG TERM. Existing hawthorn bushes, which are covered with several species of lichen, to be retained. WIDENING OF EXISTING PASSING BAY TO BE ASPHALT CONSTRUCTION. MINIMAL EARTHWORKS PROVIDED DUE TO EXISTING FIELD BEING AT SIMILAR LEVELS TO THE ROAD. EXISTING DRAINAGE CONSISTS OF SLOT GULLIES IN THE NORTHERN VERGE. GULLIES TO BE RETAINED AND UPGRADED, WITH DRAINAGE CARRIER SYSTEM ASSESSED FOR PROPOSED LOADING. DRAINAGE DETAILS TO BE DEFINED POST PLANNING. FENCEC TO BE RELOCATED TO THE BACK OF THE WORKS. OVERHEAD BT LINES BETWEEN 5430 AND 5560 TO BE RELOCATED AS EXISTING POLES ARE IMPACTED. WORKS CONSTRUCTED FROM ADJACENT FIELD TO NORTH TO MINIMISE IMPACT ON THE ROAD.
1.31 - OVER-RUN AREA CH 5770 - 5880	OVER-RUN LOCATED IN THE WESTERN VERGE ON BEND OPPOSITE EXISTING PROPERTY. EXISTING VERGE IS MOUNDED AND WIDE WITH AN AREA OF SCRUB LOCATED TO THE BACK OF THE VERGE. PROPOSED OVER-RUN TO BE IN VERGE AREA ONLY WITH MINIMAL IMPACT ON EXISTING TREES EXCEPT FOR PRUNING. OVER-RUN TO BE CONSTRUCTED FROM REINFORCED GRASS TO MINIMISIE IMPACT ON THE CHARACTER OF TE ROAD. PROPOSED POROUS OVER-RUN IN EXISTING VERGE TO FALL TOWARDS EXISTING CHANNEL ALONG WHICH EXISTING GULLIES ARE LOCATED. GULLIES TO BE UPGRADED TO SUIT PROPOSED AIL LOADING. WORKS CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.
1.32 - OVER-RUN AREA CH 6060 - 6115	1.8M WIDE OVER-RUN LOCATED IN THE SOUTHERN VERGE ADJACENT TO AN EXISTING PASSING BAY. OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO MINIMISE IMACT ON THE CHARACTER OF THE ROAD. EXISTING VEGETATION AND COPPICE TO BE TRIMMED BACK/COPPICED WHERE NECESSARY. PROPOSED POROUS OVER-RUN IN EXISTING VERGE TO FALL TOWARDS EXISTING CHANNEL ALONG WHICH EXISTING GULLIES ARE LOCATED. GULLIES TO BE UPGRADED TO SUIT PROPOSED AIL LOADING. WORKS CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.33 - OVER-RUN AREA CH 6090 - 6325	OVER-RUN (MINIMUM WIDTH OF 1M, UP TO A WIDTH OF 3.5M) WILL BE LOCATED IN AREA OF EXISTING FIELD TO THE NORTH AND OPPOSITE THE HAFOD FARM ACCESS. TO BE CONSTRCUTED FROM GRASS REINFORCEMENT TO MINIMISIE IMPACT ON THE CHARACTER OF THE ROAD. EXISTING FENCELINES AND OVERHEAD POLES TO BE RELOCATED OUTSIDE OF THE PROPOSED WORKS INTO ADJACENT FIELD. . EXISTING CULVERT ALONG THE ROAD TO BE WIDENED UNDER OVER-RUN AREA. THERE WILL BE UNAVOIDABLE LOSS IF FIVE TREES(one sycamore and 4 beech) AND THESE WILL BE REPLACED BY 5 root balled extra heavy standard beech trees. A NEW MIXED SPECIES HEDGE WILL BE PLANTED ALONG THE NEW OVER-RUN TO ENHANEC THE CHARACTER OF THE THIS SECTION OF ROAD IN THE LONG-TERM. FOUR OVERHEAD BT TELEGRAPH POLES WILL BE IMPACTED AND WILL NEED TO BE RELOCATED. OVER-RUN AREA WILL BATTER BACK INTO EXISTING LEVELS WITH FILL. NEW DRAINAGE TO BE PROVIDED AT THE BACK OF THE OVER-RUN AREA AND EARTHWORKS TO DRAIN WIDER VERGE AND OVER-RUN. WORKS CONSTRUCTED FROM WITHIN FIELD TO THE NORTH VIA FIELD ACCESS OPPOSITE HAFOD FARM.
1.34 - OVER-RUN AREA CH 6350 - 6480	OVER-RUN LOCATED IN AREA OF VERGE TO SOUTH OF THE CARRIAGEWAY. AREA OF OVER-RUN UP TO 1.5M WIDTH, CONSTRUCTED OF GRASS REINFORCEMENT. WORKS TO BE UNDERTAKEN UP TO THE FOOTING OF THE EXISTING EARTHWORK PROFILE ALONG THIS VERGE EDGE. EXISTING HEDGEROW AND VEGETATION TO SOUTH TO BE TRIMMED BACK TO ENABLE WORKS TO BE UNDERTAKEN. NO IMPACT ON EXISTING DRAINAGE EXPECTED DUE TO WORKS BEING IN EXISTING VERGE. EXISTING ROAD DRAINS TO BOTH NORTH AND SOUTH CHANNELS. WORKS CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT USED TO MANAGE EXISTING ROAD.
1.35 - OVER-RUN AREA CH 6450 - 6575	OVER-RUN LOCATED IN AREA OF VERGE TO NORTH OF THE CARRIAGEWAY. APPROXIMATELY 75m OF 1m VERGE WIDENING ALONG VERGE EDGE USING GRASS REINFORCEMENT. EXISTING HEDGEROW LOCATED ON A BANK TO THE NORTH OF THE CARRIAGEWAY WILL BE IMPACTED. MITIGATION OF IMPACT INCLUDES RELOCATION OF THE HEDGEROW INTO THE FIELD OR REPLACING THE EXISTING HEDGEROW WITH NEW PLANTINGS. ANY VEGETATION LOSS IS TO BE REPLACED. THERE ARE NO GULLIES LOCATED IN THE AFFECTED AREA TO THE NORTH. IT IS ASSUMED THAT THE ROAD DRAINS INTO THE EXISTING VERGE AND THE PROPOSED POROUS GRASS REINFORCEMENT OVER-RUN AREA. NEW DRAINAGE TO BE PROVIDED AT THE BACK OF PROPOSED EARTHWORKS AS REQUIRED AND TO BE DEFINED POST PLANNING. THERE ARE SOME IMPACTS ON THE EXISTING HEDGEROW DUE TO PROPOSED FILL EARTHWORKS AND IN ALL CASES, NEW HEDGEROW WILL BE PLANTED TO MATCH THE EXISTING LENGTH OF HEDGEROW AT THE BACK OF THE PROPOSED WORKS, PRIOR TO THE EARTHWORK BATTER INTO THE FIELD TO THE SOUTH. EXISTING FIELD ACCESS AT 6625 USED FOR ACCESS INTO FIELD TO THE SOUTH FOR CONSTRUCTION WORKS.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.36 - OVER-RUN AND PASSING PLACES CH 6530 - 6770	TWO EXISTING PASSING PLACES AND An ACCESS AT CHAINAGE 6550 TO THE SOUTH ARE TO BE IMPROVED AND WIDENED USING OVER-RUN CONSTRUCTED OF GRASS REINFORCEMENT. THIS OVER-RUN IS TO SPAN BETWEEN THE TWO PASSING PLACES. ADDITIONAL ROAD WIDTH ACHIEVED THROUGH CUTTING INTO THE EXISTING SLOPE AND CONSTRUCTING A NEW HEDGE BANK AT THE REAR OF THE WORKS, WITH A NEW HEDGEROW LOCATED ON TOP OF THE EMBANKMENT. THIS WILL ALLOW HEDGEROW TO SPAN BETWEEN THE TWO PASSING PLACES, TYING INTO THE TWO SMALL AREAS OF EXISTING HEDGEROW. EXISTING GULLIES ALONG THIS VERGE TO BE IMPROVED TO SUIT AIL LOADING, WITH NEW DRAINAGE FEATURES TO BE DETAILED POST PLANNING. ALTHOUGH SOME WORKS CAN BE UNDERTAKEN OUTSIDE OF THE HIGHWAY VIA THE FIELD TO THE SOUTH, SOME WORKS WILL BE REQUIRED WITHIN THE HIGHWAY, WHICH WILL BE MANAGED WITH TRAFFIC MANAGEMENT. EXISTING OVERHEAD LINES TO BE DIVERTED AS THEY CONFLICT WITH THESE WORKS.
1.37 - OVER-RUN AREA CH 6730 - 6950	OVER-RUN LOCATED IN AREA OF VERGE TO NORTH OF THE CARRIAGEWAY. APPROXIMATELY 220m OF 1m VERGE WIDENING ALONG VERGE EDGE USING GRASS REINFORCEMENT. EXISTING HEDGEROW LOCATED ON A BANK TO THE NORTH OF THE CARRIAGEWAY WILL BE IMPACTED. MITIGATION OF IMPACT INCLUDES RELOCATION OF THE HEDGEROW INTO THE FIELD OR REPLACING THE EXISTING HEDGEROW WITH NEW PLANTINGS. ANY VEGETATION LOSS IS TO BE REPLACED. THERE ARE NO GULLIES LOCATED IN THE AFFECTED AREA TO THE NORTH. IT IS ASSUMED THAT THE ROAD DRAINS INTO THE EXISTING VERGE AND THE PROPOSED POROUS GRASS REINFORCEMENT OVER-RUN AREA. NEW DRAINAGE TO BE PROVIDED AT THE BACK OF PROPOSED EARTHWORKS AS REQUIRED AND TO BE DEFINED POST PLANNING. THERE ARE SOME IMPACTS ON THE EXISTING HEDGEROW DUE TO PROPOSED FILL EARTHWORKS AND IN ALL CASES NEW HEDGEROW WILL BE PLANTED TO MATCH THE EXISTING LENGTH OF HEDGEROW of hazel and hawthorn AT THE BACK OF THE PROPOSED WORKS. This is currently a thin hedge and the NEW HEDGEROW will be an improvement and will be PLANTED PRIOR TO THE EARTHWORK PROFILE INTO THE FIELD TO THE SOUTH. EXISTING FIELD ACCESS AT CHAINAGE 6625 USED FOR ACCESS INTO FIELD TO THE SOUTH FOR CONSTRUCTION WORKS.
1.38 - OVER-RUN AND PASSING PLACE CH 6950 - 7130	OVER-RUN LOCATED IN AREA OF EXISTING VERGE TO NORTH. AREA BETWEEN CH 6950 AND 7010 TO BE WIDENED WITHIN THE EXISTING VERGE UP TO A WIDTH OF 4M WITH A NEW PASSING AREA TO BE CONSTRUCTED FROM ASPHALT AS A BETTERMENT TO THE ROAD. FROM 7010 TO 7130, MAX AREA OF 1m WIDE GRASS REINFORCEMENT TO BE LAID IN THE VERGE TO ALLOW FOR OVER-RUN. NEW DRAINAGE TO BE PROVIDED AT REAR OF OVER-RUN AREA AT FOOT OF EARTHWORK PROFILE AND TO TIE INTO THE EXISTING DRAINAGE TOWARDS RIVER.TO BE DEFINED POST PLANNING. HEDGEROW IMPACT TO THE NORTH. THIS WILL BE CUT BACK OR REPLANTED WITHIN THE EXISTING FIELD AS SHOWN. MAXIMUM EXPECTED IMPACTED LENGTH TO BE 15m OF HEDGEROW comprising blackthorn, hazel and hawthorn. ANY VEGETATION LOSS IS TO BE REPLACED and current hedgbank soil to be used in construction of new hedge. SINGLE BT POLE TO BE RELOCATED. WORKS TO BE CONSTRUCTED FROM THE EXISTING VERGE AREAS AND ON-LINE USING TRAFFIC MANAGEMENT.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.39 - OVER-RUN AREA CH 7100 - 7170	OVER-RUN LOCATED IN NORTHERN VERGE ON APPROACH TO THE DOLWEN ISAF BRIDGE. OVER-RUN TO CONSIST OF 1M WIDE GRASS REINFORCEMENT UP TO THE FOOTING OF THE EXISTING FILL EMBANKMENT TOWARDS THE EXISTING RIVER BANK. REINFORCMENT TO BE LAID OVER EXISTING FILTER TRENCH WHICH WILL NEED TO BE RETAINED. Embankement can be planted with a variety of shrubs such as hawthorn, birch and hazel to enhance the section. ALL WORKS ARE WITHIN THE HIGHWAY WITH MINIMAL VEGETATION IMPACT. THERE IS MINIMAL IMPACT ON THE EXISTING DRAINAGE IN THIS AREA. WORKS TO BE CONSTRUCTED ON-LINE USING TRAFFIC MANAGEMENT.
1.40 - OVER-RUN AREA CH 7170 - 7290	OVER-RUN LOCATED IN NORTHERN VERGE WITH FILL EARTHWORKS DOWN TO THE EXISTING RIVER BANK. EXISTING VEGETATION (MOSTLY SMALL BUSHES AND TREES) TO BE CLEARED TO ALLOW FOR EARTHWORKS. FILL EARTHWORKS TO BE CONSTRUCTED UP TO EXISTING FENCELINE ALONG THE BANK OF THE RIVER. OVER-RUN TO CONSIST OF GRASS REINFORCEMENT UP TO 1.5M WIDTH. EXISTING DRAINAGE TO BE ENGINEERED TO SUIT PROPOSED EARTHWORKS AND EMBANKMENT DRAINAGE, TO BE DETAILED POST PLANNING. WORKS REQUIRED HERE NEEDED REGARDLESS OF WIDENING (OPTION 1) /NON-WIDENING (OPTION 2) AT DOLWEN ISAF BRIDGE. WORKS TO BE CONSTRUCTED FROM THE EXISTING VERGE AREAS AND ON-LINE USING TRAFFIC MANAGEMENT.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
DOLWEN ISAF - OPTION 1: BRIDGE WIDENING WITH OVER-RUN CH 7270 - 7530	CHAINAGE 7270 - 7330 - SOUTH OVER-RUN TO THE SOUTH OF THE BRIDGE WITHIN AREA OF COPPICE. CUT EARTHWORKS TO TIE INTO EXISTING WITH REINFORCED EARTH OR OTHER APPROVED RETAINING SOLUTION. EXISTING DRAINAGE CHANNEL ALONG THE FOOT OF THE EXISTING EARTHWORK PROFILE STARTING FROM CHAINAGE 7100 ON THE SOUTH SIDE. THIS CHANNEL LEADS INTO THE RIVER TO THE SOUTH. THIS CHANNEL WILL BE MODIFIED TO ALLOW FOR OVER-RUN BY AIL VEHICLES. WORKS IN THIS SECTION UNDERTAKEN ON-LINE WITH TRAFFIC MANAGEMENT. BRIDGE WIDENING BRIDGE TO BE WIDENED BY 6.2M TO THE EAST BY CONSTRUCTING EXTENDED ABUTMENTS, WING WALLS AND PIER CONSTRUCTED TO THE EAST OF THE EXISTING STRUCTURE. AREA OF OVER-RUN TO BE INSTALLED ON THE EASTERN APPROACH TO THE BRIDGE WITHIN THE EXTENTS OF THE NEW WING WALL. WORKS IN THIS SECTION CONSTRUCTED FROM A COMPOUND TO THE NORTH EAST OF THE BRIDGE ON THE OPPOSITE SITE OF THE RIVER FROM THE WOODED AREA BETWEEN THE DOLWEN ISAF AND UCHAF BRIDGES. CHAINAGE 7330 - 7530 OVER-RUN AREA TO BE PROVIDED TO THE NORTH OF THE BRIDGE TO ALLOW VEHICLES TO TURN AROUND ONTO THE ROAD AND ON APPROACH TO THE DOLWEN UCHAF BRIDGE TO THE WEST. NEW HEDGEROW AND FENCE TO BE PROVIDED AROUND THE BACK OF THE OVER-RUN AREA. NEW FIELD ACCESS TO BE LOCATED IN NEW GAP IN HEDGEROW. OVER-RUN AREA OPPOSITE EXISTING PROPERTY ACCESS TO BE CONSTRUCTED IN EXISTING VERGE. EXISTING ROAD TO BE KEPT AS EXISTING WITH RESURFACING. MINIMAL EARTHWORKS EXPECTED AS ROAD IS AT SIMILAR LEVEL TO EXISTING FIELDS. NEW TEMPORARY COMPOUND LOCATED TO THE NORTH IN FIELD BETWEEN THE DOLWEN ISAF AND UCHAF BRIDGES TO PROVIDE WELFARE FACILITIES FOR WORKS ALONG THE COUNTY ROAD. ALTERNATIVE ARRANGEMENT SHOWN IN THE OPTION 2 FOR NORTH OF THE WORKS. OVER-RUN IS AVAILABLE WHICH OFFERS SCREENING OF THE NEW TRACK FROM THE ROAD. The works at the bridge will involve the loss of a mature Ash tree and a small amount of scrub. The bank works into the conifer plantation will involve the loss of some hazel bushes, although these have recently been trimmed back extensively by highway works. The bushes currently screen the conifers and should be replanted at the top of the new embankment. There was a small amount of badger activity noted in the conifer plantation, but there is no sett in the wood. A re-survey for badgers will take place immediately before any works commencing. Planting on new embankments to the bridge will be of ash, hazel, birch and hawthorn to replicate the species currently present. An otter survey was carried out under the bridge and immediately up and down stream and no signs were found. This will be repeated immediately prior to construction.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
DOLWEN ISAF - OPTION 2: MINOR BRIDGE WORKS, OVER-RUN TO SOUTH AND NORTH OF BRIDGE, OFF-ROAD ALIGNMENT CH 7220 - 7530	CHAINAGE 7220 - 7330 THE OVER-RUN TO THE SOUTH OF THE BRIDGE WITHIN AREA OF COPPICE IS LARGER THAN FOR OPTION 1. OVER-RUN CONSTRUCTED FROM GRASS REINFORCEMENT. CUT EARTHWORKS TO TIE INTO EXISTING SLOPE PROFILE WITH EITHER REINFORCED EARTH OR OTHER APPROVED RETAINING SOLUTION AT A MAX 1:1 PROFILE. EXISTING TREES TO BE CUT BACK TO SUIT THE REQUIRED EARTHWORKS. MITIGATION OF EARTHWORKS BY PLANTING AT TOP OF EARTHWORKS. NEW HEDGEROW PLANTED AT THE BOTTOM OF THE PROPOSED EARTHWORKS IN VERGE. WORKS IN THIS SECTION UNDERTAKEN ON-LINE WITH TRAFFIC MANAGEMENT ON THE ROAD. EXISTING DRAINAGE CHANNEL ALONG THE FOOT OF THE EXISTING EARTHWORKS, LEADING FROM CHAINAGE 7100 ON THE SOUTH SIDE. THIS CHANNEL LEADS INTO THE RIVER TO THE SOUTH. THIS CHANNEL WILL BE MODIFIED TO ALLOW FOR OVER-RUN BY AIL VEHICLES WITH A DIVERSION AROUND THE BASE OF THE CUT EMBANKMENT. BRIDGE WORKS EXISTING FIXED PARAPETS TO BE REPLACED WITH A SOLUTION TO CATER FOR THE AIL MOVEMENTS. CHAINAGE 7330 - 7530 NEW OFF-ROAD BYPASS TO BE CONSTRUCTED WITH A NEW WIDENED OVER-RUN ON EXIT FROM THE BRIDGE. BYPASS TO BE MIN 5.5m WIDE, WITH WIDENING ON THE LEFT TURN ONTO THE BYPASS. BYPASS TO BE SCREENED FROM THE ROAD BY A NEW HEDGEROW REPLACING THE EXISTING FIELD BOUNDARY FENCE GIVING APPROXIMATELY 100m OF NEW HEDGEROW ALONG THE ROUTE. NEW FENCE TO BE PROVIDED ACROSS THE NORTHERN EDGE OF THE BYPASS. REMOVABLE FENCE ACROSS THE BYPASS TO SECURE ACCESS ONTO THE BYPASS. NEW FIELD ACCESS TO BE PROVIDED AS SHOWN ON DRAWING. TIE INTO THE EXISTING ROAD ALIGNMENT AT THE EXISTING PROPERTY ACCESS. NEW FIELD DRAINAGE TO BE PROVIDED AND THIS WILL BE DEFINED POST PLANNING. NEW TEMPORARY COMPOUND LOCATED TO THE NORTH OF THE WORKS TO PROVIDE WELFARE FACILITIES FOR WORKS ALONG THE COUNTY ROAD. ALTERNATIVE ARRANGEMENT SHOWN IN THE OPTION 1 FOR THESE WORKS. THIS OPTION 1 CAN ALSO BE USED FOR EXIT FROM DOLWEN ISAF BRIDGE.
1.41 - OVER-RUN AREA CH 7500 - 7670	OVER-RUN CONSTRUCTED FROM GRASS REINFORCEMENT, LOCATED IN THE FIELD OPPOSITE THE EGRESS FROM THE DOLWEN UCHAF BRIDGE TO ENABLE AIL MOVEMENTS TOWARDS DOLWEN FARM. EXISTING HEDGEROW AND FENCELINES IMPACTED AND ARE TO BE RELOCATED TO THE REAR OF THE WORKS. APPROXIMATELY 15m OF HEDGEROW AND 105m OF FENCING REMOVED WHICH IS TO BE REPLACED WITH 140m OF NEW HEDGEROW AROUND THE OVER-RUN AREA. NEW FIELD DRAINAGE TO BE PROVIDED AROUND THE EXTENTS OF WORKS. TO BE DEFINED POST PLANNING. TWO EXISTING OVERHEAD LINE POLES ARE IMPACTED BY THE WORKS AND WILL NEED TO BE RELOCATED. WORKS CONSTRUCTED FROM THE EXISTING FIELD WITH MINIMAL IMPACT ON THE ROAD.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.42 - OVER-RUN AREA CH 7660 - 7720	OVER-RUN LOCATED TO THE NORTH EAST OF THE CARRIAGEWAY TO ALLOW THE AILS TO TURN LEFT AT THE DOLWEN FARM ENTRANCE. NEW GRASS REINFORCEMENT CONSTRUCTION TO BE INSTALLED IN THE EXISTING VERGE UP TO THE EXISTING FENCELINE (APPROXMATELY 1.2m). THE VERGE FALLS AWAY TOWARDS THE EXISTING WATERCOURSE TO THE NORTH AND THESE ARE TO BE RETAINED AS A PART OF THE OVER-RUN CONSTRUCTION. MINIMAL EXPECTED IMPACT ON VEGETATION WHICH IS LOCATED BEHIND THE FENCELINE. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AS WORKS ARE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.
1.43 - OVER-RUN AREA CH 7700 - 7780	OVER-RUN INSTALLED ON THE INSIDE OF THE BEND AND CONSTRUCTED WITHIN AN AREA OF CUT ON CORNER OPPOSITE THE DOLWEN FARM ACCESS. WORKS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT. CONSTRUCTION OF OVER-RUN WILL IMPACT EXISTING HEDGEROW AND FENCING ON THE FENCE BOUNDARY. EXISTING GATED ACCESS TO BE RELOCATED TO CHAINAGE 7780. NEW DRAINAGE TO BE PROVIDED AT BACK OF OVER-RUN AREA TO TIE INTO EXISTING FIELD DRAINAGE. LEVELS FOR OVER-RUN TO FALL AWAY FROM EXISTING ROAD. The current hedge is of hazel and hawthorn on a small bank and can be translocated. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.
1.44 - OVER-RUN AREA CH 7950 - 8040	OVER-RUN INSTALLED ON THE INSIDE OF THE BEND ON AREA OF STEEP SLOPE AND A SLIGHT S BEND. OVER-RUN IS CONSTRUCTED FROM GRASS REINFORCEMENT IS 1.5m WIDE AND IMPACTS AN EXISTING PIPED CULVERT AND THE FENCELINE AT THE REAR OF THE OVER-RUN AREA. WORKS. MINIMAL EARTHWORKS REQUIRED TO TIE INTO THE EXISTING LEVELS AT THE BACK OF THE VERGE AND ADJACENT TO EXISTING CULVERT. PROPOSED LEVELS TO FALL AWAY FROM THE EXISTING ROAD WITH DRAINAGE TO BE PROVIDED AT BACK OF WORKS TO OUTFALL INTO EXISTING WATERCOURSE. TO BE DEFINED POST-PLANNING. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
1.45 - OVER-RUN AREA CH 8150 - 8240	OVER-RUN TO BE CONSTRUCTED ON INSIDE OF THE BEND IN AN AREA OF CUT EARTHWORKS AND TO TIE INTO THE PROPOSED SITE ACCESS 1. PROPOSAL PROVIDES A 2.4m X 70m VISIBILITY SPLAY. PROPOSED WORKS TO IMPACT EXISTING TREE ON INSIDE OF BEND AS WELL AS AREA OF VEGETATION ON INSIDE OF BEND. ANY VEGETATION LOSS IS TO BE REPLACED AND DEFINED POST PLANNING. NEW DRAINAGE TO BE PROVIDED TO NORTH OF THE PROPOSED OVER-RUN ALONG THE BOTTOM OF EARTHWORK PROFILE TO TIE INTO PROPOSED DRAINAGE AT NEW ACCESS JUNCTION. TO BE DEFINED POST PLANNING. ACCESS 1 ARRANGEMENT SHOWN ON DRAWING 60283248-D-042. NEW FENCLINE TO BE PROVIDED AT THE TOP OF THE EARTHWORKS AND TO TIE INTO THE FENCELINE ASSOCIATED WITH ACCESS 1. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.
SITE ACCESS 1 CH 8250	NEW SITE ACCESS TO BE CONSTRUCTED FROM ASPHALT. AIL OVER-RUN TO BE GRASS REINFORCEMENT TO MINIMISIE EXTENT OF TARMAC VISIBLE. GATE WITH FENCELINE TO BE LOCATED AT A SET BACK DISTANCE SUITABLE TO ALLOW A HGV TO PULL INTO THE JUNCTION AND THEN SECURE/UNSECURE THE GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. AIL OVER-RUN FOR THE JUNCTION LOCATION TO SUIT LEFT TURN MOVEMENT INTO THE JUNCTION. JUNCTION DESIGNED BASED ON A 2.4m X 70m VISIBILITY SPLAY. PROPOSED EARTHWORKS PROFILE SHOWN IS AT A 1:2 PROFILE TO MATCH THOSE CURRENTLY ON SITE. WORKS AT THE JUNCTION WILL IMPACT THE EXSTING FENCELINE AND SITE ACCESS WHICH WILL BE INTEGRATED INTO THE NEW JUNCTION. EXISTING OVERHEAD POLE TO BE RELOCATED. NEW DRAINAGE TO BE PROVIDED TO OUTFALL INTO ADJACENT SMALL WATERCOURSE. DRAINAGE TO BE DEFINED POST PLANNING. ACCESS 1 ARRANGEMENT SHOWN ON DRAWING 60283248-D-042. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE EXISTING FIELD ACCESS WITH CONSTRUCTION BEING UNDERTAKEN FROM THE ADJACENT FIELD.

General principles:

No habitat clearance will take place within the bird breeding season of March to August.

Re-planting will take place using stock of local provenance (where that is available – provenance should be sourced within Wales if immediately local plants are not available).

Where hedge translocation has been suggested this is where the hedge is growing on an existing earth bank. This can be pushed back using suitable equipment (bulldozer blade or similar) where there is sufficient room for manoeuvre. The whole bank with hedgerow bushes is pushed back to its new location. The hedge is then monitored and if some bushes do not take in their new location they will be replaced with new plants.

Where translocation is not possible the earth under the existing hedge will be used to create a new hedgebank in order to retain as much of the existing ground flora within the new hedgeline.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
2.1 - OVER-RUN AREA CH 8280 - 8320	OVER-RUN TO BE CONSTRUCTED ON THE OUTSIDE OF THE BEND FROM GRASS REINFORCEMENT. OVER-RUN AREA MIN 1M WIDE LOCATED IN VERGE TO THE SOUTH. OVER-RUN AREAS CROSS EXISTING CULVERTS AND THESE ARE TO BE ASSESSED FOR LOADING CAPABILITY POST PLANNING. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AS WORKS ARE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT. THIS OVER-RUN CAN FUNCTION AS AN IMPROVED VERGE FOR FUTURE USE BY BRIDLEWAY USERS.
2.2 - OVER-RUN AND PASSING PLACE CH 8330 - 8580	THIS SECTION OF OVER-RUN IS ALSO SUITABLE FOR HGV PASSING. WORKS CONSTRUCTED FROM GRASS REINFORCEMENT LOCATED TO THE SOUTH OF THE CARRIAGEWAY IN AN AREA OF CUT. EXISTING EMBANKMENTS HAVE AN OPEN CHANNEL APPROX 0.1m WIDE RUNNING DOWN FROM CHAINAGE 8450 TO A CULVERT LEADING DOWN TO THE RIVER TO THE SOUTH EAST. OVER-RUN AREA IS 6m WIDE, WITH VERGE AND NEW HEDGEROW/FENCELINE TO REAR PRIOR TO EARTHWORKS. EXISTING ROAD DRAINAGE TO BE RETAINED WITH EXISTING GULLY AND CHANNEL INCORPORATED INTO DESIGN. CHANNEL TO BE DIVERTED TO THE FOOT OF THE PROPOSED EARTHWORKS WITH NEW CONNECTION INTO THE EXISTING GULLIES. NEW GULLIES TO BE PROVIDED IN AREA OF ASPHALT WIDENING FOR PASSING BAY ON CORNER. 3 NO. EXISTING TREES ARE IMPACTED AND WILL NEED TO BE REMOVED AND REPLANTED/REPLACED OUTSIDE OF THE WORKS These are 2 small ash trees and a small hawthorn. An additional hawthorn in the centre of this section will also be lost, along with a small patch of gorse. These will be replaced in similar positions outside the new works. A larger area of gorse will be planted adjacent to the current bushers on the inside of the bend. . WORKS TO BE CONSTRUCTED FROM WITHIN THE FIELD TO THE SOUTH. 4 NO OVERHEAD BT/ELECTRICITY POLES IMPACTED BY THE PROPOSAL AND WILL NEED TO BE RELOCATED. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS.THE WORKS TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT WITH SOME WORKS CONSTRUCTED FROM THE ADJACENT FIELD. THIS OVER-RUN CAN FUNCTION AS AN IMPROVED VERGE FOR FUTURE USE BY BRIDLEWAY USERS.
2.3A - OVER-RUN AREA CH 8500 - 8850	OVER-RUN CONSTRUCTED FROM GRASS REINFORCEMENT IN EXISTING NORTHERN VERGE OF MINIMUM 1m WIDTH. WORKS TO NORTH TO TIE IN WITH THE EXISTING CARRIAGEWAY AT CANNON FARM ACCESS. THERE IS MINIMAL TO NO IMPACT ON EXISTING TREES, DRAINAGE OR VEGETATION ON THIS SECTION. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS AS WORKS ARE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT. THIS OVER-RUN CAN FUNCTION AS AN IMPROVED VERGE FOR FUTURE USE BY BRIDLEWAY USERS.
2.3B - NEINTHIRION BYPASS ACCESS AND OVER-RUN AREA CH 8850 - 8950	THIS OVER-RUN AREA IS CONSTRUCTED FROM GRASS REINFORCEMENT LOCATED TO NORTH OF THE ROAD TO ALLOW FOR A STRAIGHT ALIGNMENT OVER THE RIVER AT A LOCATION WHERE THERE IS AN EXISTING ROCK OUTCROP AND A REDUCED RIVER WIDTH TO MINIMISE IMPACT ON THE EXISTING WATERCOURSE. BYPASS JUNCTION TO HAVE GATED ACCESS TO ALLOW VEHICLES TO PULL INTO THE ACCESS AND OPEN THE GATE. JUNCTION DESIGNED TO SUIT RIGHT TURNING IN, LEFT TURNING OUT HGV TRAFFIC AND HAS A 2.4m X 70m VISIBILITY SPLAY FOR ONCOMING TRAFFIC. JUNCTION IS DESIGNED AS A GIVE WAY JUNCTION SO THAT VEHICLES USING THE NEINTHIRION BYPASS WILL GIVE WAY TO TRAFFIC USING THE COUNTY ROAD AND THIS IS DETAILED ON THE LINING SCHEME. NEW DRAINAGE TO BE PROVIDED ALONG VERGE AND AT TOE OF PROPOSED EARTHWORKS. WORKS ARE TO DRAIN AWAY FROM EXISTING CARRIAGEWAY TO REDUCE IMPACT ON EXISTING DRAINAGE. NEW FENCE TO BE ERECTED AROUND WORKS AND TIED INTO THE NEW GATED ACCESS. THE EXISTING BRIDLEWAY IS RETAINED THROUGH NEINTHIRION.WORKS ON THE BYPASS AND THE ACCESS JUNCTION TO BE TAKEN FROM THE EXISTING FIELDS ADJACENT TO THE ROAD TO THE NORTH.

NEINTHIRION BYPASS - DRAWING 60283248-D-045. 900m OF NEW ROAD	NEW ACCESS ROAD TO CARRY AIL AND HGV TRAFFIC FROM CHAINAGE 8950 ON THE COUNTY ROAD TO CHAINAGE 9600 TO THE SOUTH OF NEINTHIRION. THE BYPASS IS 5.5m WIDE ALONG ITS LENGTH, WITH WIDENED SECTIONS TO SUIT THE AIL MOVEMENT AND THE HORIZONTAL ALIGNMENT OF THE ROAD. ADDITIONAL EARTHWORK BUNDS TO BE PROVIDED AND DEFINED AS PART OF THE LANDSCAPE SCHEME TO SCREEN THE BYPASS TO BE DETAILED POST PLANNING. BYPASS REQUIRES CULVERTS AND A BRIDGE STRUCTURE. ALL CHAINAGES ON THE SCHEDULE BELOW ARE BASED WITH CH0 AT CH8860 ON THE COUNTY ROAD. NEW BRIDGE - MIN 10m SPAN BETWEEN CH 120 AND 30 NEW CULVERT ON EXISTING WATERCOURSE - CH 460 NEW ACCESS DOWN TO EXISTING FARM TRACKS AT CH 490 NEW CULVERT AT CH 550 NEW CULVERT AT CH 780 NEW CULVERT AT CH 790 NEW CULVERT AT CH 860 THE BYPASS FORMS IS A PASSING PLACE ALLOWING TRAFFIC ON THE COUNTY ROAD TO BYPASS AILS DURING MOVEMENTS AND IS A PART OF THE PASSING AREA STRATEGY DETAILED IN THE LTMP DOCUMENTATION. THE BYPASS PROVIDES PASSING PLACES FOR HGVS AT CHAINAGE 260, BETWEEN CHAINAGE 400 TO 550, 700 TO 900 AND AT THE EGRESS JUNCTION AT CHAINAGE 1000. THESE PASSING PLACES ARE ALL INTERVISIBLE. The by-pass involves the loss of a small area of scrub where it leaves the existing road and crosses the stream. This will be replanted on the embankment of the new by-pass using a mix of ash and hawthorn. An otter survey was undertaken and no signs were found. This will be repeated immediately prior to construction. The by-pass then crosses a series of improved fields. Where the track is raised on an embankment scrub should be allowed to develop along the banks to provide habitat and screen the track. However, the scrub should be kept trimmed to ensure the open nature of the area is maintained and to ensure it does not provide nesting habitat for crows. Towards the Western end the route crosses an area of marshy grassland over peat. This section is approx 150 metre and peat depths vary between 20 cm in the south, 85cm in the centre and 65 cm at the North. This has been extensively drained but still retains marshy habitat, mainly *Molinia*. The area between the marshy grassland and where the by-pass rejoins the road is damp but is on mineral soil. There will be an impact on peat for the section crossing the marshy grassland.
2.4 - NEINTHIRION BYPASS EGRESS AND OVER-RUN CH 9550 - 9680	OVER-RUN AREA IS LOCATED TO THE WEST OF THE EXISTING ROAD. APPROXIMATELY 50M LONG CONSISTING OF GRASS REINFORCEMENT FOR AIL MOVEMENTS AND TO ALLOW HGVS TO PASS PRIOR TO THE BYPASS. NEW GATE TO BE PROVIDED 20m BACK FROM THE EXISTING HIGHWAY TO ALLOW VEHICLES TO PULL INTO THE ACCESS AND OPEN THE GATE . EXISTING DRAINAGE AT FOOT OF EXISTING ROAD PLATEAU TO BE RELOCATED AT THE TOE OF NEW EARTHWORKS FOR THE OVER-RUN AND EGRESS. JUNCTION DESIGNED TO SUIT RIGHT TURNING IN, LEFT TURNING OUT HGV TRAFFIC AND HAS A 2.4m X 70m VISIBILITY SPLAY FOR ONCOMING TRAFFIC. JUNCTION IS DESIGNED AS A GIVE WAY JUNCTION SO THAT VEHICLES USING THE NEINTHIRION BYPASS WILL GIVE WAY TO TRAFFIC USING THE COUNTY ROAD AND THIS IS DETAILED ON THE LINING SCHEME. FURTHER AREA OF GRASS REINFORCEMENT OVER-RUN REQUIRED TO THE SOUTH OF THE EGRESS. DRAINAGE DETAILS FOR JUNCTION TO BE PROVIDED POST-PLANNING. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE ADJACENT FIELD. THIS OVER-RUN CAN FUNCTION AS AN IMPROVED VERGE FOR FUTURE USE BY BRIDLEWAY USERS.

2.5 - OVER-RUN AND PASSING PLACE CH 9680 - 9840	THIS SECTION CAN SUITABLE AS A HGV PASSING AREA BETWEEN CH 9760 AND 9840. OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT WITH A SECTION OF OFF-ROAD TRACK TO BE PROVIDED BETWEEN CHAINAGE 9680 AND 9840 TO REDUCE IMPACT ON EXISTING TREES AND TO STRAIGHTEN THE EXISTING ROAD FOR THE AILS. THIS SECTION OF ROAD CAN FUNCTION AS A PASSING PLACE FOR VEHICLES DURING AIL MOVEMENTS. PROPOSED TRACK CONSTRUCTED USING GRASS REINFORCEMENT. OFF-ROAD TRACK AND EXISTING ROAD DELINEATED USING A GATE AND A FENCELINE TO PREVENT USE BY NON-AIL VEHICLES. VERGE AREA TO BE PROVIDED BETWEEN THE EXISTING ROAD AND THE NEW TRACK ALIGNMENT. NEW DRAINAGE TO BE PROVIDED ON THE OUTSIDE OF THE OVER-RUN AREA TO THE WEST. EXISTING DRAINAGE CHANNEL RELOCATED TO THE BACK OF THE OVER-RUN AREA. FOR AREAS IN CUT, NEW DRAINAGE IS TO BE PROVIDED AT FOOT OF EARTHWORKS. SECTION OF TRACK IMPACTS EXISTING DRAINAGE DITCH AND CHANNEL AND WILL REQUIRE AN EXISTING CULVERT AT CHAINAGE 9790 TO BE EXTENDED UP TO CHAINAGE 9850 AS SHOWN. EXISTING HIGHWAY DRAINAGE IS NOT IMPACTED. Planting of gorse bushes along road boundaries will enhance this section. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE ADJACENT FIELD.
2.6 - OVER-RUN AND PASSING PLACE, ADJACENT TO CATTLE GRID CH 9770 - 9980	OVER-RUN ON THIS SECTION BETWEEN CHAINAGE 9870 AND UP TO 9980 AT THE EXISTING ACCESS IS SUITABLE FOR HGV PASSING IN ADDITION TO THE EXISTING HIGHWAY, WHICH IS GREATER THAN 5.5m ALONG THIS SECTION DUE TO THE EXISTING CATTLEGRID. OVER-RUN TO THE EAST OF THE EXISTING CATTLE GRID. THE EXISTING GATE AND CATTLE GRID ARE TO REMAIN. EXISTING GATE AND CATTLE GRID ARE TO BE USED BY HGVS ONLY WITH AIL VEHICLES USING THE NEW GATE AND OVER-RUN AREA, CONSTRUCTED FROM GRASS REINFORCEMENT TO THE EAST. DURING NORMAL OPERATION THIS PROPOSED GATE WILL BE CLOSED PREVENTING ACCESS THROUGH THE CATTLE GRID ACROSS THE OVER-RUN AREA. NEW GATE AND FENCE AND AT THE BACK OF THE OVER-RUN AREA. EXISTING FENCE POSTS ARE TO BE SOCKETED AT THE CATTLE GRID TO ALLOW FOR TEMPORARY REMOVAL IF REQUIRED. FENCELINE AT REAR OF WORKS TO TIE INTO EXISTING FENCELINES AT THE FIELD ACCESS. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. CONSTRUCTION OF THE ENABLING WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE ADJACENT FIELD. THIS OVER-RUN CAN FUNCTION AS AN IMPROVED VERGE FOR FUTURE USE BY BRIDLEWAY USERS.
SITE ACCESS 2 CH 10140	NEW ASPHALT SITE ACCESS DESIGNED FOR TWO WAY HGV MOVEMENT. AIL GRASS REINFORCEMENT OVER-RUN AREATO BE PROVIDED ON THE NORTH EASTERN QUARTER OF THE JUNCTION. GATE AND FENCELINE TO BE LOCATED AT A SET BACK DISTANCE SUITABLE TO ALLOW A HGV TO PULL INTO THE JUNCTION AND THEN SECURE/UNSECURE THE GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. VISIBILITY SPLAYS OF 2.4m X 70m AVAILABLE IN BOTH DIRECTIONS AT THE SITE ACCESS WIDENED VERGE TO BE PROVIDED TO THE WEST OF THE WORKS FOR THE PUBLIC BRIDLEWAY. THIS IS AN IMPROVED PROVISION FOR BRIDLEWAY USERS. BRIDLEWAY USERS TO BE SEGREGATED FROM SITE TRAFFIC DURING THE WORKS USING WIDENED VERGE WITH CROSSING AND TRAFFIC MANAGEMENT EMPLOYED AT THE JUNCTION TO ALLOW FOR CROSSING AT THE JUNCTION. EARTHWORKS PROVIDED ALONG THE NORTH EASTERN EDGE OF THE JUNCTION AS WELL AS TO THE WEST. EARTHWORKS SHOWN ARE 1:2 PROFILE WITH THE EXISTING EARTHWORKS IN THIS AREA BEING BETWEEN 1:2 AND 1:1. EXTENTS OF EARTHWORKS TO TIE INTO THE EXISTING PROFILE TO BE DETAILED POST-PLANNING.
2.7A - OVER-RUN AND PASSING PLACE TO SOUTH OF ACCESS 2 CH 9980 - 10100	THIS GRASS REINFORCEMENT SECTION IS SUITABLE FOR HGV PASSING ANDIN AN AREA OF EXISTING VERGE.THERE IS NO EXISTING VEGETATION OTHER THAN GRASSED AREAS TO THE SOUTH. THERE IS NO EXISTING FENCELINE. THIS SECTION HAS A WIDENED ASPHALT AREA FOR HGVS AFTER THE CATTLE GRID AND PRIOR TO THE ACCESS 2 SITE ACCESS. THESE WORKS ARE ON THE ROUTE OF AN EXISTING BRIDLEWAY. THE WORKS WILL BE MANAGED TO MINIMISE DISRUPTION TO BRIDLEWAY USERS. ACCESS FOR WORKS VIA THE ADJACENT FIELD. THIS OVER-RUN CAN FUNCTION AS AN IMPROVED VERGE FOR FUTURE USE BY BRIDLEWAY USERS.

2.7B - OVER-RUN AND PASSING PLACE TO EAST FROM ACCESS 2 TO RIVER **CH 10100 - 10440**	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFOCEMENT TO THE SOUTH AND EAST OF THE EXISTING CARRIAGWAY. THIS SECTION OF ROAD HAS EXISTING CUT EARTHWORKS TO THE NORTH AND WEST OF THE ROAD EXCEPT FOR WHERE THE NEW ACCESS 2 IS LOCATED. THIS SECTION OF OVER-RUN IS CONSTRUCTED IN EXISTING VERGE. THIS AREA HAS CULVERTS FROM ADJACENT LAND TO THE NORTH AND WEST WHICH CONNECT TO THE HIGHWAY DRAINAGE. THESE CULVERTS AND THE EXISTING LAND DRAINS RUNNING ALONG THE ROAD EMBANKMENT WILL BE EXTENDED AND DIVERTED AS REQUIRED. NEW ASPHALT PASSING PLACE FOR HGVS TO BE CONSTRUCTED ON THE INSIDE OF THE BEND AT CHAINAGE 10350. NEW DRAINAGE CHANNELS TO BE PROVIDED AT BASE OF EARTHWORKS AND DETAILED POST PLANNING.
2.8 - OVER-RUN AND PASSING PLACE **CH 10410 - 10500**	THIS SECTION IS ALSO SUITABLE FOR HGV PASSING. ROAD WIDENING REQUIRED ON THE INSIDE OF THE BEND IN AREA OF CUT FOR OVER-RUN. THIS REDUCES IMPACT ON THE FLOOD PLAIN TO THE SOUTH OF THE ROAD. THE WIDENING WILL REQUIRE THE EXISTING CUT EARTHWORKS TO BE EXTENDED INTO THE FIELD TO THE NORTH. THE WIDENING WILL CONSIST OF AN ASPHALT ROAD CONSTRUCTION WITH DRAINAGE ON THE INSIDE OF THE BEND REPLACING THE EXISTING GULLY POT ON THE CORNER. THE PROPOSEDEARTHWORKS WILL MATCH THE EXISTING EARTHWORKS PROFILE BY USING A REINFORCED EARTH OR OTHER ENGINEERED FILL SOLUTION AND THIS IS TO BE DETAILED POST PLANNING. EXISTING FENCELINE TO BE RELOCATED TO THE BACK OF THE NEW CUT EARTHWORKS AROUND CORNER. THERE IS NO VEGETATION IMPACT. WORKS TO BE CONSTRUCTED ON-LINE AND FROM THE FIELD, USING TRAFFIC MANAGEMENT.
2.9 - OVER-RUN AND PASSING PLACE ADJACENT TO RIVER BED **CH 10480 - 10530**	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO THE SOUTH WITHIN THE RIVER BANK AREA BETWEEN THE BEND AND THE EXISTING PASSING PLACE. EARTHWORKS WILL BE REQUIRED OUTSIDE OF THE EXISTING ROAD EMBANKMENT ON THE CORNER WHICH IS NOT EXPECTED TO HAVE A SIGNIFICANT IMPACT ON THE FLOOD PLAIN. EXISTING PASSING PLACE TO BE IMPROVED WITH ASPHALT WIDENING WITHIN THE AREA OF OVER-RUN. WORKS TO BE CONSTRUCTED ON-LINE AND WITHIN THE EXISTING VERGE AREA WITH TRAFFIC MANAGEMENT.
2.10 - OVER-RUN AREA TO NORTH CH 10530 - 10610	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO THE NORTH OF THE ROAD IN EXISTING VERGE WITH WIDENING OF THE EMBANKMENT INTO THE FIELD. LAND DRAIN TO BE RECONSTRUCTED IN THE FIELD WITH NEW FENCELINE FURTHER AWAY FROM THE EDGE OF THE ROAD EMBANKMENT. WORKS TO BE CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT IN PLACE.
2.11 - OVER-RUN AREA TO NORTH WEST OF CATTLE GRID CH 10620 - 10730	EXISTING CATTLE GRID TO HAVE ITS NORTHERN FENCE SOCKETED FOR AIL MOVEMENTS. WIDENING OF THE ROAD, MIN 2m TO THE NORTH PAST THE CATTLE GRID IN AREA OF FIELD. THESE WORKS WILL IMPACT AN EXISTING LAND DRAIN WHICH WILL NEED TO BE RELOCATED FURTHER INTO THE FIELD WITH A NEW FENCELINE. WORKS CONSTRUCTED OFF-LINE USING AREA TO THE SOUTH OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
2.12 - CULVERT WIDENING AND PASSING PLACE CH 10750 - 10800	CULVERT TO BE WIDENED TO ALLOW FOR AIL VEHICLES, WHICH WILL ALSO ALLOW TWO HGVS TO PASS AT THE BRIDGE AT A NEW PASSING PLACE. EXISTING CULVERT WITH 3 No 900 DIA. CONCRETE PIPES TO BE LENGTHENED ON NORTHERN SIDE WITH NEW BEAMS CAST IN-SITU FOR THE BRIDGE PARAPET AND EDGE RESTRAINT. EXISTING PARAPET TO BE REPLACED WITH NEW TO ALLOW FOR AIL OVER-RUN. CULVERT WIDENING TO BE DETAILED POST PLANNING. TO WEST OF CULVERT, ROAD TO BE WIDENED TO FIT NEW BRIDGE WIDTH AND TO PROVIDE TWO WAY HGV PASSING ACROSS CULVERT. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.

2.13 - OVER-RUN AND PASSING PLACE CH 10675 - 10950	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, MIN 2m WIDE IN THE SOUTH EASTERN VERGE. PASSING PLACE HAS BEEN PROVIDED AT CHAINAGE 10875 AT THE BEND OPPOSITE AN EXISTING FIELD ACCESS. THIS PASSING PLACE IS TO BE OF ASPHALT CONSTRUCTION. WORKS WILL REQUIRE THE EXISTING PARAPET ON THE CULVERT AT 10760 TO BE REPLACED FOR THE AIL OVER-RUN, AND THIS IS TO BE DETAILED POST PLANNING. BETWEEN CHAINAGE 10760 AND 10850 WIDENING TO BE MAX 2m WIDTH TO THE SOUTH. WIDENED SECTION TO HAVE A NEW ASPHALT PASSING BAY OPPOSITE THE FIELD ACCESS. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
2.14 - OVER-RUN AREA CH 10920 - 11120	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, MIN 2m WIDE TO THE WEST OF THE EXISTING ROAD. EXISTING FENCELINE TO BE SET BACK UP TO 2.5m FURTHER BACK INTO THE FIELD TO ALLOW FOR THE OVER-RUN. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
2.15 - OVER-RUN AND PASSING PLACE **CH 11100 - 11390**	THIS SECTION OF OVER-RUN IS ALSO SUITABLE FOR HGV PASSING FROM CHAINAGE 11100 UP TO 11390. OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, MINIMUM 2m WIDTH, ALONG THE SOUTHERN AND EASTERN VERGE OF THE ROAD TO REDUCE IMPACT ON VEGETATION AND FENCELINES WHICH ARE PRESENT ALONG THE NORTHERN SIDE OF THE ROAD. FROM CHAINAGE 11350 TO 11390 THE OVER-RUN AREA WILL INCLUDE AN AREA OF ASPHALT WIDENING AND THE PROVISION OF A NEW GATE ADJACENT TO THE CATTLEGRID. THE EXISTING FENCING AT THE CATTLE GRID WILL NEED TO BE SOCKETED TO ALLOW THE EXISTING FENCES TO BE REMOVED PRIOR TO AIL DELIVERY. A NEW SOCKETED GATE AND FENCE IS TO BE PROVIDED IN THE ASPHALTED AREA AND OVER-RUN AREA. A NEW HEADWALL WITH EXTENDED PIPE WILL BE REQUIRED FOR THE EXISTING CULVERT WHICH RUNS UNDER THE CATTLE GRID AREA TO THE WEST. NO EXPECTED VEGETATION IMPACT. DRAINAGE TO BE PROVIDED AT THE FOOT OF EARTHWORKS AND TO BE DEFINED POST PLANNING. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
2.16A - OVER-RUN AND PASSING PLACE **CH 11390 - 11430**	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, MINIMUM 2m WIDTH. THIS OVER-RUN IS SUITABLE FOR HGV PASSING. THIS SECTION IS AN AREA OF ASPHALT WIDENING AFTER THE CATTLEGRID. THIS IMPACTS AN EXISTING CULVERT AS DETAILED IN SECTION 2.15. NO EXPECTED VEGETATION OR EXISTING DRAINAGE IMPACT. DRAINAGE TO BE PROVIDED AT THE FOOT OF EARTHWORKS AND TO BE DETAILED POST PLANNING. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
2.16B - OVER-RUN AND PASSING PLACE CH 11430 - 11640	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, MINIMUM 2m WIDTH. THIS OVER-RUN IS ALSO SUITABLE FOR HGV PASSING. EXISTING CULVERTS AT CH 11450 AND 11640 ARE IMPACTED AND WILL NEED TO BE EXTENDED. NO EXPECTED VEGETATION OR EXISTING DRAINAGE IMPACT. DRAINAGE TO BE PROVIDED AT THE FOOT OF EARTHWORKS AND TO BE DETAILED POST PLANNING. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
2.16C - OVER-RUN AND PASSING PLACE CH 11640 - 11700	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, MINIMUM 2m WIDTH. THIS OVER-RUN IS ALSO SUITABLE FOR HGV PASSING. THIS SECTION INCLUDES A NEW ASPHALT PASSING BAY AT CHAINAGE 11650. THE EXISTING SMALL PASSING BAY AT 11670 WILL BE RESURFACED AND INTEGRATED INTO THE OVER-RUN AREA CONSTRUCTION. EXISTING CULVERT AT 11640 TO BE LENGTHENED. NO EXPECTED VEGETATION OR EXISTING DRAINAGE IMPACT. DRAINAGE TO BE PROVIDED AT THE FOOT OF EARTHWORKS AND TO BE DEFINED POST PLANNING. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.

2.16D - OVER-RUN AND EXISTING PASSING PLACE IMPROVED CH 11700 - 12000	OVER-RUN TO BE CONSTRUCTED FROM GRASS REINFORCEMENT, MINIMUM 2m WIDTH. THIS OVER-RUN IS ALSO SUITABLE FOR HGV PASSING. SECTION OF OVER-RUN UP TO 4m WIDE. THE EXISTING PASSING BAY AT CHAINAGE 11900 IS TO BE EXTENDED WITH ASPHALT TO PROVIDE A LARGER AREA FOR HGVS. THE EXISTING CULVERT UNDER THE ROAD AFTER THE EXISTING PASSING BAY AT CHAINAGE 11935 AND 11990 WILL NOT BE IMPACTED AS THE WORKS ARE WITHIN THE EXTENT OF THE HEADWALLS. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH AND EAST OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
2.17 - OVER-RUN AND PASSING PLACE CH 12000 - 12390	THIS SECTION OF OVER-RUN SPANS BETWEEN THE CATTLEGRID AT CHAINAGE 12000 AND SITE ACCESS 4 AT CHAINAGE 12390. OVER-RUN, CONSTRUCTED FROM GRASS REINFORCEMENT, MIN 2m WIDE BETWEEN CHAINAGE 12000 AND 12330. ALL WORKS ARE LOCATED IN THE SOUTHERN VERGE. NO EXISTING VEGETATION IMPACTED OTHER THAN CUTTING BACK EXISTING SHRUBS. EXISTING CULVERTS AT CHAINAGE 12100 AND 12200 NOT IMPACTED BY PROPOSALS AS WORKS ARE WITHIN THE HIGHWAY. NO EXPECTED VEGETATION OR EXISTING DRAINAGE IMPACT. WORKS CONSTRUCTED OFF-LINE USING AREAS OF OPEN LAND TO THE SOUTH OF THE ROAD FOR ACCESS WITH TRAFFIC MANAGEMENT IN PLACE ON THE ROAD.
SITE ACCESS 4 CH 12390	NEW ASPHALT SITE ACCESS DESIGNED FOR TWO WAY HGV MOVEMENTWITH OVER-RUN. AREA OF ASPHALT HAS BEEN MINIMISED BY USING REINFORCED GRASS FOR OVER-RUN AREA AND ONLY INCLUDING ENOUGH ASPHALT TO ALLOW A HGV TO PULL INTO THE JUNCTION AND SECURE/UNSECURE THE GATE WITHOUT IMPACTING TRAFFIC ON THE COUNTY ROAD. JUNCTION DESIGNED WITH 2.4m X 70m VISIBILITY SPLAYS, ACHIEVED IN BOTH DIRECTIONS. EXISTING CATTLE GRID TO THE SOUTH RETAINED. PROPOSED WORKS TO TIE INTO EXISTING HARDSTANDING AREAS. EARTHWORKS TO BE SCULPTED TO BLEND WITH THE EXISTING PROFILES ON SITE. REMODLLED AREAS TO BE SEEDED WITH LOCAL GRASS SEED TO MATCH EXISTING.GATE TO BE xxx AND NEW FENCE WILL MATCH EXISTING. WORKS TO TIE INTO THE EXISTING HIGHWAY AND THE CATTLE GRID TO THE SOUTH OF THE ACCESS. EXISTING WATER COURSE WILL BE CULVERTED UNDER THE EXISTING ACCESS. DRAINAGE FOR THE ACCESS WILL BE DETAILED POST PLANNING. ALL WORKS CONSTRUCTED FROM ADJACENT FIELD TO MINIMISE IMPACT ON THE HIGHWAY. WORKS WITHIN THE HIGHWAY UNDERTAKEN USING TRAFFIC MANAGEMENT.

General principles:

No habitat clearance will take place within the bird breeding season of March to August.

Re-planting will take place using stock of local provenance (where that is available – provenance should be sourced within Wales if immediately local plants are not available).

Where hedge translocation has been suggested this is where the hedge is growing on an existing earth bank. This can be pushed back using suitable equipment (bulldozer blade or similar) where there is sufficient room for manoeuvre. The whole bank with hedgerow bushes is pushed back to its new location. The hedge is then monitored and if some bushes do not take in their new location they will be replaced with new plants.

Where translocation is not possible the earth under the existing hedge will be used to create a new hedgebank in order to retain as much of the existing ground flora within the new hedgeline.

LOCATION TITLE AND CHAINAGE	LOCATION DESCRIPTION
3.1A - EXISTING PASSING PLACE CH 12700	EXISTING PAVED ACCESS JUNCTIONS INTO FARM YARD TO BE RETAINED FOR USE AS A PASSING PLACE FOR VEHICLES PRIOR TO THE CATTLE GRID. AREA IS USED AS AN EXISTING PASSING PLACE FOR HGVS. NO IMPROVEMENTS PROPOSED.
3.1B - EXISTING PASSING PLACE, IMPROVED CH 12950	EXISTING PAVED PASSING PLACE TO BE LENGTHENED AND WIDENED WITH ASPHALT CONSTRUCTION WITHPASSING OVER-RUN FOR HGVS CONSTRUCTED USING GRASS REINFORCEMENTTO BLEND WITH VERGES. PROPOSED WIDENING IMPACTS AN EXISTING LAND DRAIN LOCATED TO THE NORTH. EXISTING CULVERT BELOW THE EXISTING PASSING PLACE TO BE EXTENDED TO ALLOW FOR THE EXTENSION OF THE PASSING PLACE. EXISTING EARTHWORKS TO BE EXTENDED INTO THE ADJACENT FIELD BEYOND THE FENCELINEAND FEATHERED INTO EXISTING LANDFORM TO LOOK AS NATURAL AS POSSIBLE. WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD.
3.1C - EXISTING PASSING PLACE, IMPROVED CH 13160	EXISTING PAVED PASSING PLACE TO BE LENGTHENED AND WIDENED WITH ASPHALT CONSTRUCTION WITH PASSING OVER-RUN FOR HGVS CONSTRUCTED USING GRASS REINFORCEMENT TO BLEND WITH VERGES. PROPOSED WIDENING IMPACTS AN EXISTING LAND DRAIN LOCATED TO THE SOUTH WEST, EXISTING CULVERT BELOW THE EXISTING PASSING PLACE TO BE EXTENDED TO ALLOW FOR THE EXTENSION OF THE PASSING PLACE. EXISTING EARTHWORKS TO BE EXTENDED INTO THE ADJACENT FIELD BEYOND THE FENCELINEAND FEATHERED INTO EXISTING LANDFORM TO LOOK AS NATURAL AS POSSIBLE. WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD.
3.1D - EXISTING PASSING PLACE CH 13330	EXISTING PAVED PASSING PLACE TO BE RETAINED. AREA IS NOT LARGE ENOUGH TO ACCOMMODATE A HEAVY GOODS VEHICLE.
3.2A - EXISTING PASSING PLACE, IMPROVED CH 13460	EXISTING PAVED PASSING PLACE TO BE RESURFACED AND EXTENDED TO ENABLE PASSING FOR HEAVY GOODS VEHICLES. EXTENSION TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO BLEND WITH ADJACENT GRASSED AREAS. EARTHWORKS PROFILE AMENDED TO SUIT EXISTING LEVELS AT THE REAR OF THE PROPOSED PASSING PLACE CONSTRUCTIONAND FEATHERED INTO EXISTING LANDFORM TO LOOK AS NATURAL AS POSSIBLE. EARTHWORKS TO TIE INTO THE EXISTING FIELD ACCESS ON THE WESTERN SIDE. ALL PROPOSED WORKS ARE WITHIN THE EXISTING FENCELINE. WORKS TO BE CONSTRUCTED WITHIN THE FENCELINE USING AREA AND FIELD ACCESS TO REAR OF PASSING PLACE.
3.2B - EXISTING PASSING PLACE CH 13550	EXISTING PAVED PASSING PLACE TO BE RETAINED. AREA IS NOT LARGE ENOUGH TO ACCOMMODATE A HEAVY GOODS VEHICLE.
3.3 - EXISTING PASSING PLACE, IMPROVED CH 13700	EXISTING PAVED PASSING PLACE LOCATED TO THE NORTH OF EXISTING CATTLE GRID AND AT AN EXISTING ACCESS INTO FORESTRY LAND TO THE NORTH WEST. PASSING PLACE IS TO BE LENGTHENED PROVIDE MINIMUM 6m TOTAL ROAD WIDTH. WIDENING CONSTRUCTED OF GRASS REINFORCEMENT TO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD. EARTHWORKS PROFILE AMENDED TO SUIT EXISTING LEVELS AT THE REAR OF THE PROPOSED PASSING PLACE CONSTRUCTION AND FEATHERED INTO EXISTING LANDFORM TO LOOK AS NATURAL AS POSSIBLE. NEW POST AND WIRE FENCE (TO MATCH EXISTING) TO BE LOCATED AT THE REAR OF THE EARTHWORKS. WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD.
3.4 - NEW PASSING PLACE AT ACCESS CH 13840	EXISTING ACCESS JUNCTION BELLMOUTH TO BE WIDENED ON THE SOUTH EASTERN SIDE TOWARDS EXISTING VERGE AREA FOR HGV PASSING PLACE. MINIMAL IMPACT ON EXISTING VEGETATION, DRAINAGE AND FENCELINES. WORKS TO BE CONSTRUCTED OFF-LINE FROM ADJACENT VERGE AREA.

3.4A – NEW PASSING PLACE CH 13950	NEW PASSING PLACE TO BE PROVIDED ON OUTSIDE OF THE BEND TO PROVIDE MIN 6m ROAD WIDTH FOR HGVS. EARTHWORKS PROFILE TO BLEND INTO EXISTING LEVELS AND VERGE TO BE SEEDED WITH LOCAL SEED MIX. PASSING PLACE CONSTRUCTED FROM GRASS REINFORCEMENTTO MINIMISE IMPACT ON THE CHARACTER OF THE ROAD. WORKS CONSTRUCTED OFF-LINE USING THE EXISTING VERGE.
3.5 - EXISTING PASSING PLACE, IMPROVED CH 14075	EXISTING PAVED PASSING PLACES ON BOTH SIDES OF ROAD EXTENDED TO ALLOW FOR PASSING HGV MOVEMENTS. EXISTING PASSING PLACE ARRANGEMENT TO BE RETAINED WITH ADDITIONAL LENGTHS INSTALLED FOR HGVS FROM GRASS REINFORCEMENT TO THE NORTH. PROPOSED WORKS WILL HAVE MINIMAL IMPACT ON THE EXISTING DRAINAGE AND VEGETATION. WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT VERGE AREAS.
3.6 - EXISTING PASSING PLACE CH 14250	EXISTING PAVED PASSING PLACE TO BE RETAINED. AREA IS NOT LARGE ENOUGH TO ACCOMMODATE A HEAVY GOODS VEHICLE.
3.7 - EXISTING PASSING PLACE AT CATTLE GRID CH 14300	EXISTING UNBOUND PASSING PLACES ARE PRESENT PRIOR TO AND AFTER THE EXISTING CATTLE GRID AND EXISTING AREAS ARE SUFFICIENT IN SIZE TO ACCOMMODATE A WAITING HGV ON EITHER SIDE OF THE CATTLE GRID. EXISTING INFRASTRUCTURE TO BE ENHANCEDIF REQUIRED, AND RETAINED FOR USED BY CONSTRUCTION HGVS.
3.8A - EXISTING PASSING PLACE, IMPROVED CH 14520	EXISTING ASPHALT PASSING PLACE TO BE IMPROVED AT THE TOP OF THE EXISTING GRADIENT NORTH OF THE NANT-YR-ESGAIR-WEN FARM. THE EXISTING PASSING PLACE IS TO BE LENGTHENED USING ASPHALT, WITH A GRASS REINFORCEMENT AREA SURROUNDING TO ACCOMMODATE HEAVY GOODS VEHICLES. EXISTING GRIT BIN TO BE RELOCATED TO THE NORTHERN SIDE OF THE PASSING PLACE AT THE BACK OF THE GRASS REINFORCED AREA. WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT VERGE AREAS.
3.8B - NEW PASSING PLACE CH 14620	NEW PASSING PLACE TO BE PROVIDED ON CORNER IN THE MIDDLE OF THE GRADIENT UP FROM NANT-YR-ESGAIR-WEN FARM. PASSING PLACE TO BE CONSTRUCTED FROM ASPHALT ON BOTH SIDES OF THE ROAD.PASSING PLACE CONSTRUCTED TO SUIT EXISTING LEVELS ON THE ROAD. WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENTVERGE.
3.9 - EXISTING PASSING PLACE AT ACCESS, IMPROVED CH 14695	EXISTING PAVED ACCESS AND PASSING PLACE OUTSIDE NANT-YR-ESGAIR-WEN FARM. EXISTING ROAD SURFACE TO BE ENHANCEDFOR USE BY HEAVY GOODS VEHICLES. MINIMAL IMPACT ON EXISTING VEGETATION, OVERHEAD LINES AND PROPERTY. WORKS TO BE UNDERTAKEN FROM WITHIN THE EXISTING PASSING PLACE, EXISTING ACCESS JUNCTION AND VERGE AREAS.
3.10 - EXISTING PASSING PLACE AT ACCESS CH 14850	EXISTING PASSING PLACE AT TURNING AREA FOR FORESTRY SITE TO THE SOUTH EAST OF THE ROAD TO THE SOUTH OF EXISTING CATTLE GRID. TURNING AREA PAVED WITH CRUSHED STONE. NO ADDITIONAL WORKS PROPOSED.
3.11 - EXISTING PASSING PLACE CH 15000	EXISTING PAVED PASSING PLACE TO BE RETAINED. AREA IS NOT LARGE ENOUGH TO ACCOMMODATE A HEAVY GOODS VEHICLE.
3.12 - EXISTING PASSING PLACE CH 15150	EXISTING PAVED PASSING PLACE IS SUFFICIENT IN LENGTH AND WIDTH FOR HGVS AND IS TO BE RETAINED WITHOUT IMPROVEMENT.

3.13 - EXISTING PASSING PLACE AT ACCESSES CH 15350	EXISTING PASSING PLACE AT EXISTING ACCESS JUNCTIONS. AREA BETWEEN THE TWO JUNCTIONS IS LARGE ENOUGH TO ACCOMMODATE HGVS.
3.14 - NEW PASSING PLACE CH 15570	NEW PASSING PLACE TO BE PROVIDED ON CORNER. CONSTRUCTED FROM ASPHALT IN AREA FOR SMALLER VEHICLESWITH AN ADDITIONAL AREA TO BE CONSTRUCTED FROM GRASS REINFORCEMENT FOR HGVS, TO BLEND WITH ADJACENT AREAS OF GRASS. PROPOSAL IS LOCATED IN EXISTING VERGE, WITH MINOR IMPACTS ON DRAINAGE IN THE VICINITY. WORKS TO BE CONSTRUCTED OFF-LINE FROM VERGE AREA AT THE BACK OF THE WORKS.
3.15 - EXISTING PASSING PLACE, IMPROVED CH 15780	EXISTING ASPHALT PASSING PLACE ON S BEND TO BE EXTENDED FOR HGVS. GRASS REINFORCEMENT TO BE USED TO MINIMISE IMPACT ON CHARACTER OF THE ROAD. WORKS WILL IMPACT ON AN AREA OF WILLOW SCRUB WHICH WILL replaced with newly PLANTED willow FURTHER BACK BEHIND THE WORKS. WORKS WILL ALSO AFFECT FENCELINES / FIELD ACCESS TO THE NORTH OF THE ROAD AS WELL AS THE GATED ACCESS BETWEEN THE TWO NORTHERN FIELDS. ADDITIONALLY, EXISTING CULVERT UNDERNEATH THE EXISTING ROAD WILL NEED TO BE EXTENDED UNDER THE GRASS REINFORCEMENT CONSTRUCTION. WORKS WILL BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELDS.
3.16 - EXISTING PASSING PLACE, IMPROVED CH 15950	EXISTING ASPHALT PASSING PLACE LOCATED ON THE SOUTHERN SIDE OF THE ROAD AT FIELD ACCESS TO BE EXTENDED TO THE EAST INTO AN AREA OF VERGE. EXISTING PASSING PLACE TO BE RESURFACED WITH ASPHALT AND EXTENSION TO BE GRASS REINFORCEMENT. EXTENSION OF THE PASSING PLACE WILL IMPACT THE EXISTING FIELD BOUNDARY AND HEDGEROW. A NEW MIXED HEDGEROW WILLBE PLANTED ALONG BACK OF THE WORKS – this will be an improvement over the exisiting very thin hazel hedge.. THE EXISTING CULVERT UNDERNEARTH THE EXISTING PASSING PLACE AND FIELD WILL NEED TO BE REPLACED TO SUIT THE PROPOSED LOADING BY HGVS. TO BE DETAILED POST PLANNING. EXISTING FIELD ACCESS TO BE RELOCATED ALONG NEW HEDGELINE. WORKS WILL BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD TO THE SOUTH.
3.17A - NEW PASSING PLACE CH 16275	NEW PASSING PLACE TO BE CONSTRUCTED TO SOUTH OF ROAD TO AVOID IMPACT ON VEGETATION. TO BE CONSTRUCTED FROM ASPHALT IN PART FOR SMALLER VEHICLES WITH ADDITIONAL AREA FOR HGVS TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO BLEND WITH ADJACENT GRASSED AREAS. PROPOSAL IS LOCATED IN EXISTING VERGE WHICH IS RAISED SLIGHTLY ABOVE THE EXISTING CARRIAGEWAY. EXISTING LAND DRAIN LOCATED TO REAR OF VERGE WILL NEED TO BE DIVERTED AND THIS WILL BE DETAILED POST PLANNING. WORKS WILL BE CONSTRUCTED OFF-LINE FROM THE VERGE AREA AND THE ADJACENT FIELD. ANY HEDGEROW IMPACTED BY CONSTRUCTION WILL BE REPLACED WITH A NEW MIXED SPECIES HEDGE TO TIE INTO EXISTING HEDGE. Couldn't see any impact here
3.17B –EXISTING PASSING PLACE, IMPROVED CH 16370	EXISTING PASSING PLACE TO BE EXTENDED INTO EXISTING VERGE AND ADJACENT FIELDTO PROVIDE MIN 6m ROAD WIDTH FOR PASSING HGVS. GRASS REINFORCEMENT TO BE USED TO MINIMISE IMPACT ON CHARACTER OF THE ROAD. EXISTING FENCELINE TO BE RELOCATED TO BACK OF WORKS. MINIMAL VEGETATION IMPACT. WORKS WILL BE CONSTRUCTED FROM THE VERGE AREA AND THE ADJACENT FIELD.
3.18 - EXISTING PASSING PLACE AT PANTGLAS FARM CH 16480	EXISTING PASSING PLACE TO BE RETAINED AT PANTGLAS FARM TO THE NORTH WEST OF EXISTING BUILDINGS. EXISTING AREA IS CURRENTLY USED FOR STORAGE BY THE FARM AND SIZE OF THE PASSING PLACE IS SUFFICIENT TO ALSO ACCOMMODATE HEAVY GOODS VEHICLES.

3.19 - NEW PASSING PLACE CH 16550	NEW PASSING PLACE TO BE CONSTRUCTED IN EXISTING VERGE ON BOTH SIDES OF ROAD IN ORDER TO REDUCE IMPACT ON A TREE AND OTHER VEGETATION LOCATED AT THE REAR OF BOTH VERGES. PASSING PLACE TO BE CONSTRUCTED FROM GRASS REINFORCEMENT TO BLEND INTO EXISTING CHARACTER OF THE ROAD. EXISTING VERGE IS RAISED SLIGHTLY ABOVE THE EXISTING CARRIAGEWAY, BUTMINIMAL EARTHWORKS ARE REQUIRED ON BOTH SIDES OF THE ROAD. WORKS TO BE CONSTRUCTED ON-LINE USING TRAFFIC MANAGEMENT.
3.20 - EXISTING PASSING PLACE, IMPROVED CH 16715	EXISTING ASPHALT PASSING PLACE LOCATED ON THE NORTHERN SIDE OF THE ROAD ADJACENT TO A WOODED AREA WITH A FIELD ACCESS. WORKS WILL EXTEND THIS PASSING PLACE INTO THE EXISTING AREAS BEHIND THE FENCELINE AND HEDGE LINE TO ACCOMMODATE HEAVY GOODS VEHICLES.GRASS REINFORCEMENT TO BE USED TO MINIMISE IMPACT ON CHARACTER OF THE ROAD. WORKS TO THE WEST WILL ENCROACH ON THE EXISTING HEDGE WHICH WILL BE REPLACED WITH A NEW MIXED SPECIES HEDGE AND NEW FENCE BEHIND THE PROPOSED PASSING PLACE.WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD. Couldn't see any impact here – if the hedge is affected it will also affect an ash tree next to the field entrance. I think there is room to ensure no impact.
3.21 - EXISTING PASSING PLACE, IMPROVED CH 16855	EXISTING ASPHALT PASSING PLACE LOCATED ON THE WESTERN SIDE OF THE ROAD ADJACENT TO A FIELD WITH TREES LINING THE FENCELINE. THE WORKS WILL EXTEND THIS PASSING PLACE TO ACCOMMODATE HGV PASSING PLACE.GRASS REINFORCEMENT TO BE USED TO MINIMISE IMPACT ON CHARACTER OF THE ROAD. MAY IMPACT ON EXISTING TREES LOCATED ALONG THE FENCELINE. IF THESE TREES AND THE FENCELINE ARE IMPACTED, NEW TREES OAK TREES WILL BE RE-PLANTED ALONG THE RELOCATED FENCELINE. WORKS TO BE CONSTRUCTED OFF-LINE FROM THE ADJACENT FIELD.
3.22A - EXISTING PASSING PLACE, IMPROVED AT EXISTING CATTLE GRID. CH 17080	EXISTING ASPHALT PASSING PLACE TO THE NORTH OF EXISTING CATTLE GRID TO BE LENGTHENED TO ALLOW FOR HGVS TO WAIT AT THE CATTLE GRID. GRASS REINFORCEMENT TO BE USED TO MINIMISE IMPACT ON CHARACTER OF THE ROAD. EXISTING GATE AND FENCE ARRANGEMENT AT CATTLE GRID TO BE REPLACED BY A NEW GATE POST ON THE SOUTH SIDE WHICH WILL ALLOW FOR TWO WAY OPERATION THROUGH THE CATTLE GRID WHEN THE GATE IS OPENED. EXTENDED PASSING PLACE WILL REQUIRE EXISTING HEDGE AND FENCE ALONG SOUTHERN SIDE OF THE ROAD TO BE REMOVED. A NEW MIXED HEDGE WILL BE REPLANTED TO THE BACK OF THE PROPOSED WORKS AND THE FENCE REPLACED. DRAINAGE CHANNEL LOCATED TO NORTH OF THE WORKS AND EXISTING ROAD DRAINS INTO THIS CHANNEL. WORKS AT THIS LOCATION TO BE CONSTRUCTED FROM THE ADJACENT FIELD TO THE SOUTH. Appears to be room for works without impact on hedges The hedges either side of the gateway are double fenced and have probably been managed within agri- environment scheme. To the left of the gate is willow, to the right is hawthorn. If they are to be removed they can be replaced with same species – not suitable for translocation.
3.22B - EXISTING PASSING PLACE, IMPROVED CH 17200	EXISTING SMALL PASSING PLACE TO BE WIDENED TO ACCOMMODATE HGV MOVEMENTS. PROPOSED WORKS ARE WITHIN EXISTING AREA OF FLATTENED VERGE TO THE NORTH EAST OF THE ROAD ADJACENT TO EXISTING ACCESS ROAD TO FARM. MINIMAL EARTHWORKS EXPECTED AND NO IMPACT EXPECTED ON EXISTING FENCELINES. POTENTIAL MEDIUM PRESSURE GAS MAIN IS LOCATED UNDERNEATH THE VERGE AREA, TO BE CONFIRMED POST PLANNING. WORKS TO BE CONSTRUCTED FROM THE AREA OF VERGE TO THE NORTH.
3.22C - NEW PASSING PLACE CH 17290	NEW PASSING PLACE TO BE CONSTRUCTED IN EXISTING VERGE ON BOTH SIDES OF THE ROAD TO THE NORTH OF THE EXISTING BRIDGE. PASSING PLACE LOCATED ON DOWNHILL SIDE OF THE ROAD TO ALLOW HEAVY GOODS VEHICLES COMING DOWNHILL TO GIVE WAY TO ONCOMING UPHILL VEHICLES. PASSING PLACE CONSTRUCTED FROM ASPHALT– WIDENED BY 0.5M ON THE WESTERN SIDE AND xxMON THE EATERN SIDE. ON THEEASTERN SIDE THE EXISTING BANK IS TO BE MOVED EASTWARDS AND REBUILT/IMPROVED TO FORM AN INTACT HEDGEBANK, WITH EARTHWORKS ON OUTER EDGE TO BE PROFILED INTO EXISTING FIELD.EXISTING DRAINAGE CHANNEL ON WESTERN SIDE IMPACTED AND TO BE RE-LEVELLED, TO BE DETAILED POST PLANNING. WORKS ON EAST TO BE CONSTRUCTED FROM EXISTING FIELD. WORKS TO THE WEST CONSTRUCTED ON-LINE WITH TRAFFIC MANAGEMENT.

3.23 - NEW PASSING PLACE CH 17450	NEW PASSING PLACE TO BE CONSTRUCTED IN EXISTING VERGE TO THE NORTHERN SIDE OF THE ROAD. NEW ASPHALT PASSING BAY FOR SMALLER VEHICLES TO BE PROVIDED, AND SURROUNDED WITH GRASS REINFORCEMENT TO ACCOMMODATE HGV MOVEMENTS AND REDUCE AREA OF ASPHALT REQUIRED. PROPOSED WORKS WILL IMPACT ON AN EXISTING DRAINAGE CHANNEL WHICH IS TO BE DIVERTED AND CULVERTED. PROPOSED WORKS WILL IMPACT A TREE TO THE NORTH OF THE EXTENT OF WORKS WHICH WILL BE REPLACED WITH A NEW TREE OF THE SAME SPECIES. WORKS CONSTRUCTED OFFLINE FROM ADJACENT FIELD TO THE WEST.
Tallerddig Junction works	Cut slopes to be profiled out to look at natural as possible and scrub allowed to generate on banks to blend into surroundings. Mixed hedgerow – hazel, hawthorn, ash – to match other hedges nearby. - o be planted along the top of the bank (alongside road) to tie in with existing hedgerows.

General principles:

No habitat clearance will take place within the bird breeding season of March to August.

Re-planting will take place using stock of local provenance (where that is available – provenance should be sourced within Wales if immediately local plants are not available).

Where hedge translocation has been suggested this is where the hedge is growing on an existing earth bank. This can be pushed back using suitable equipment (bulldozer blade or similar) where there is sufficient room for manoeuvre. The whole bank with hedgerow bushes is pushed back to its new location. The hedge is then monitored and if some bushes do not take in their new location they will be replaced with new plants.

Where translocation is not possible the earth under the existing hedge will be used to create a new hedgebank in order to retain as much of the existing ground flora within the new hedgeline.

Technical Note

Project:	**Llanbrynmair Wind Farm**	Job No:	**60283248**
Subject:	**Gosen Bridge – Construction of Bridge and Buildability**		
Prepared by:	**Yu Chen & Sebastian Reid**	Date:	**10/05/13**
Checked by:	**John Webb & Steven Carmody**	Date:	**10/05/13**
Approved by:	**Kevin Martin**	Date:	**10/05/13**

1 Introduction

The purpose of this note is to document and preliminary buildability review of the widening of the road and bridge at the Gosen Bridge for the RES Llanbrynmair Wind Farm Scheme. The study demonstrates the means by which the improvements at the Gosen Bridge can be delivered.

2 Information Available

The information available for these comments is as follows:

- A site walkabout was undertaken by AECOM engineers to collect data of site features and photographs were taken during the site visit for desk study and record.
- An inspection and subsequent report of the site carried out by rope access methods by specialist contractor "Up and Under" on the 15th February 2013.
- Site visits on the 15th February and the 9th of May to the bridge following discussions with PCC, NRW, Landscape and Ecology consultants on the impact of the bridge widening.

3 Description of Site

3.1 Description

Gosen Bridge is located approximately 3.5km south west of the village of Llangadfan. It carries an unnamed single carriageway (local C2031 road) from northeast to southwest, crossing the Cledan River which flows to Afon Gam River to the northwest.

The north-eastern approach to the structure has an approximate downward gradient of 1:10 with the south-western approach road converging approximately 25m to the south of the structure from two separate approaches, one declining east and one incline west. There are safety barriers on both side of the carriageway.

Bedrock was found to be exposed up to a height of 1.5m above water level at the edge of the river channel at the north of the bridge.

The access to the site is via the unnamed road (local C2031 road). Early discussions with the local highways authority indicate significant preference for keeping traffic open during the works. However short time road closure during weekend midnight might be possible and is subject to agreement with local highways authority.

3.2 Survey 15th February

To summarise the findings of the survey on the 15th February 2013.

- The structure comprises a single stone masonry arch with a clear span of 5.37m. Stone masonry abutments are 4.8m in length and approximately 2m in height and are founded on bedrock. Stone parapets are nominally 7.3m in length and 1m in height. There is a clear deck

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width of 3.88m to 3.94m over the length of the structure. The arch crown is approximately 3m below carriageway level. There are no weight restriction signs visible on the approach to the structure.

- The north-eastern approach to the structure has an approximate downward gradient of 1:10 with the south-western approach road converging approximately 25m to the south of the structure from two separate approaches one declining (east) and one incline (west). There are corrugated steel vehicle containment barriers, secured to timber posts (150mm2 in section), at both sides of the carriageway, on both approaches to the structure. These terminate at the ends of the parapets. There are also safety fences comprising galvanised tubular steel horizontal rails, supported by angle steel posts at all four corners of the structure.
- Foundations – The existing bridge is founded on exposed bed rock and the depth of the channel of the river is 1m below the foundation level of the existing bridge.
- Bed rock is exposed up to a height of 1.5m above the river channel to the north of the bridge with a thin over-burden of earth bound together by light vegetation.
- Existing trees are present on all corners of the existing structure.

3.3 Site Visit 9th May 2013

The survey of the 9th May was focussed on the areas of proposed temporary working areas at Twynedd Gosen Farm, adjacent to the bridge, and in the field in the meander of the Afon Gam.

The northern side of the river is accessible from an existing road. The survey showed that a number of existing trees have fallen due to recent weather conditions and require removal. The loss of these trees has impacted the existing embankment north of the bridge in this area.

This survey has also shown that recent works undertaken by Powys for the existing bridge on the access road to the west of Gosen Bridge has included the laying of large locally quarried boulders for scour protection along the river bank. Any proposal for retaining will need to include scour protection on this meander to match what has been installed upstream on Afon Gam.

4 Gosen Bridge and Road Widening

The proposals for Gosen Bridge are shown on Drawing 60283248-008. This drawing indicates the following:

4.1 Bridge Construction - New Pre-stressed Concrete Bridge Adjacent to Existing Structure

The proposed bridge structure comprises 150mm in-situ concrete slab supported on 6 number standard precast pre-stressed concrete bridge beams and they are in turn supported on reinforced concrete bank seats benched into the existing rock.

This bridge proposal is approximately 14.6m in span and 4.8m wide located to the north of the existing masonry arch bridge. The bank seats can be in-situ concrete or precast concrete supported on prepared competent ground.

Three to four hours of road closure are required overnight in order for the construction of the bridge for the purpose of lifting the beams into position from the road using mobile cranage.

4.2 Retaining Structures for Road Widening on Approach Road

The road would need to be widened to the north to allow for the new bridge abutments and for the widened road approaches to the bridge. Due to the varying ground conditions and ground profiles, a number of solutions are suggested at this time and will be defined at the detailed design stage.

All three options will be accessed from river level and constructed using temporary construction platforms.

All options are able to be faced with local stone to assist with landscape and visual impacts.

Approach Option 1 – precast concrete retaining wall
This option will require several overnight road closures depending on the number of sections installed, with the wall being constructed in short segments and lifted into place from the road using mobile cranage. It is envisaged that the north eastern approach to the bridge can be constructed using this method in a single over-night closure.

During the road closures, a short section of the top of the embankment will be excavated and the ground prepared. The precast L shaped concrete retaining wall units will then be lifted in place and backfilled with 6N/6P fill. On completion of backfilling and compaction, the surfacing will then be reinstated and the road re-opened to the traffic. The number of concrete units will be limited to such that allows for the work to be completed within a number of step-by-step overnight road closures.

Ground Investigation (GI) is important to understand the condition of the ground on which the wall is to be founded, and the stability of the slope below the wall. If the wall is not founded on rock then the need for piles to support the wall will need to be considered.

Alternatively sheet piles can be installed to allow for the excavation without affecting the existing road. This way the disruption to the existing road can be kept to a minimum, but it can only be done if there is sufficient and suitable ground in which to drive the sheet piles without hitting rock. The driving of the sheet piles would need possession of the road during the over-night closure, and this may be difficult in the night because of noise and vibration and the impact to the nearby properties.

Approach Option 2 – ground anchors and concrete panels
In order for installation of the ground anchors, a temporary ‘crash deck’ is to be constructed from the bottom of the embankment from the proposed compound in the field on the Afon Gam meander to the north. Precast concrete walls will be fixed onto the ground anchors. Secured the anchors and the concrete panels, the back of the concrete panels will be backfilled with compacted 6N/6P fill. Precast or in-situ run on slab will be constructed on top of the fill to provide the support to the safety barriers. Between this parapet barrier and the precast units, additional vegetation can be planted to reduce the visual impact of the parapet, stabilise the fill, and to screen the road from the river.

The advantage of this option is that all the works will be carried out on the temporary crash deck, and no road closure is required, except for the tie-in of road surface which could be accomplished under a single over-night closure after the installation of the new bridge deck and beams.

Approach Option 3 – Cast in Steel Sheet Piles
Similar to Option 2, a temporary ‘crash deck’ is to be installed from the bottom of the embankment which will provide a platform for the piling rigs. Contiguous holes are to be bored into the (presumed) rock along the proposed retaining wall position at the bottom of the proposed embankment profile and steel sheet piles are then to be lowed into the holes and the gaps will be filled with concrete. The back of the retaining wall are to be backfilled with compacted 6N/6P fill. These piles may need to be laid along the existing river bank and river bed in order to provide support to the existing embankment.

The base section of the precast concrete parapet unit would be constructed on the top of the embankment to provide support to the safety barrier.

The area between the safety parapet and the top of the sheet piles and cover beam can be infilled to allow for a planting scheme to screen the works from the road and river.

5 Buildability and Access for Construction

The studies undertaken to date have focussed on the buildability of the bridge options with respect to keeping the existing road open.

All options require the temporary use of three construction points.

- The existing field opposite Twynedd Gosen Farm, for use as a turning area for HGVs and material storage. Post construction, this area would be restored as a field with additional lengths of hedgerows being provided.
- The area adjacent to the bridge to the north east will be flattened and cleared for construction access and the construction of a retaining structure. After the works, this area would be restored using a planting scheme with replacement trees and would be regraded to suit the former land form.
- The existing field in the meander of the Afon Gam, to the north of the Gosen Bridge for use as a construction area for a temporary working platform in the Afon Gam river to allow the construction of retaining walls and abutments at river level. These would be accessed via the existing road and bridge and a temporary access at the existing field access. Post construction, this field would be restored with new trees planted along the river bank and a screening scheme to screen the construction from the river.

Mobile cranes can be located on the existing carriageway to the west and east of the chapel and the Gosen Bridge to allow for the positioning of pre-cast concrete bridge components and retaining walls. Cranes will require the full width of the road and this will require closures of the road, which will likely occur over-night to reduce the impact of the closures on the road.

A further over-night closure will be required for the resurfacing of the road and the tie in of the bituminous road construction.

6 Landscape Impact and Mitigation

7 Ecological Impact and Mitigation

All of the options will necessitate the removal of a numbers of trees on the embankment. These are currently a number of rather spindly trees and a mix of hazel, birch and ash. There is little ground flora under the trees. Recent winds have caused several trees to fall opening up the bank and de-stabilising the soil at some points. All of the trees on this bank will need to be cleared to enable the proposed works. In addition a small section of hedge, comprising blackthorn, hawthorn, ash and hazel, will be removed to allow access to the works.

None of the mature trees adjacent to the existing property will be felled.

An otter survey was carried out within the river and no signs of otter were found. This will be repeated immediately prior to construction. A bat assessment of the trees was also carried out (bsg to confirm and provide results)

No felling or hedge clearance will be carried out during the bird breeding season (March – August).

Following the works a selection of trees will be replanted at the top of the new retaining wall. These will be of a similar species mix to those lost. The trees will be planted fairly close together, and managed by coppicing to keep a dense cover and to prevent them getting too spindly causing future windblow problems.

The hedge will be replanted at the top of the new retaining wall and will use the same species previously in the hedge, sourced from local provenance.

Notes from Site Visit 2/5/13

The following comments were made by NRW (Carol Fielding) /John Campion on a site visit to view the proposed offsite access works on 2 May 2013.

Overall comments:

- Red lines needed on plans including construction areas so they can be assessed in the ES
- Avoid any post planning 'to be agreed' notes
- Would be interested to see photos of materials being proposed
- Need confidence that the scheme will be built as detailed (wary of design and build contracts)
- Open ditches are preferred over culverts
- Hedges should be replaced like to like – keen to see mixed hedges including hazel and consideration of laying hedges where appropriate (Mick to advise on appropriate mixes for the area?)
- If there is any signage it should only be temporary (during construction)
- NRW would like to see an overall strategy/rational for landscape works (in LVIA?)
- Woodlands are shown incorrectly on plan
- Need to make a distinction between 'hedge' and 'scrub' or 'woodland' in drawing notes and on plans
- Would like to see some sketches/sections showing treatment of typical details such as creation of hedge banks, hedgerows, - ensure hedge banks are big enough!
- Possibly include some planting mixes for the mixed hedges?
- Ground flora is often as important as the hedge itself – where these areas are affected all soil should be reused to ensure the ground flora reinstates in its new position.
- Any trees lost should be replaced with decent size standards
- Use wooden gates where possible.
- Avoid urbanising features such as black and white posts along ditches
- Grass reinforcement to be created using a compacted unbound sub-base with an interlocking geogrid surfacing infilled with topsoil (salvaged from excavation if possible) and local grass seed.
- Site accesses – key here is to blend them into the surrounding landscape through careful design of earthworks and ensuring grass seed matches that on site.
- Would like to see method for translocating hedges (including allowance for replanting if the hedgerow does not take).
- Replacement trees to be in character with the environment – any replacement trees along Section 1 and more enclosed lower lying western section of section 3 to be oak; trees in higher areas (eastern part of section 3 and section 2) to be rowan or hawthorn.
- All replacement oaks to be root balled extra heavy standards 14-16cm girth and around 4m tall.
- Would be to include photos showing the type of features we are aiming to recreate e.g. welsh hedge banks; coppiced and laid hedgerows; oak trees at the size we are planning to plant.
- Can tree species be shown on the drawings? (is there an arboricultural survey?)

Tasks

Mick to survey hedges to be lost to identify those which should be translocated. Also note NRW's preference to lose flailed hedges over those that have grown out.

Provide method statement for translocating hedges including monitoring.

Provide species mix for hedgerow replacement.

Provide species mix for coppice replacement e.g. at Ch 3000 and 3400 (1.14 and 1.15)

Provide species mix for the steep bank on the left on the approach to DOLWEN ISAF bridge (new detail) – Mick to propose?

Suggest species of trees to strengthen line of trees visible in photo towards the Neintherion by-pass from the Glyndwr's Way – Mick to suggest? Has this area been surveyed for tree species?

Engineered cross sections required at:

Ch17300

Ch3400

Changes to drawings:

Llanerfyl Access Junction – change stone surface to grass reinforcement along full length so the new road will appear to be part of wider grassed field. Remove new hedge. Relax and feather slopes as much as possible. Will access track need to be fenced? If so can this be temporary? And can gates on wither end of the access track be removed post construction (the new wood post and rail fence with prevent access onto the area?. Footway appears to end abruptly – what is happening here? Bollards to be temporary - include wooden post and rail fence along gaps in hedgerow in the long term (can be removed if replacement blades need to be delivered). May need to show drawing during construction and post construction? Can new gates be wood?

Might be better to have a bigger difference between verge and hedgerow colours so easier to read drawings.

Ch950 – need to make it clear that the pink hatched area for parking will be reinforced grass.

1.6 – words say a tree will be lost but this is not shown on the map (the tree is black on my drawing)

1.12 – TREES ARE SHOWN RED ON MY DRAWING BUT I UNDERSTAND THESE ARE BEIG RETAINED…. NEEDS CHANGE IN COLOUR TO BLACK?

1.16/1.17 – DISCUSSIONS TO AVOID MATURE TREES – STEVE HAS DETAILS. THE AIM IS TO AVOID LOSS OF MATURE TREES. THE PROPOSAL IS TO CUT THE OUTGROWN HEDGE TO THE NORTH RIGHT DOWN TO ALLOW AIL TO OVERSAIL AND THEN LEAVE THIS TO NATURALLY REGENERATE AND GROW BACK. IF THIS OUTGROWN HEDGE HAS TO BE LOST THE PROPOSAL WILL BE TO REPLACE WITH A NEW SPECIES RICH MIXED HEDGE AND RE-USE EXISTING SOIL TO ENSURE THE GROUND COVER GROWS BACK.

1.20 AND 1.21 – MAKE HEDGEROWS CURVED TO FOLLOW THE LINE OF THE ROAD (avoiding straight lines and angles) - AS CLOSE TO THE ROAD AS POSSIBLE. DO WE NEED TWO DRAWINGS SHOW AT CONSTRUCTION AND DURING OPERATION? (BECAUSE THERE IS A TEMPORARY COMPOUND HERE….

Gosen bridge – need to show what is happening in pink hatched areas – maybe need a during construction and post construction drawing? Also changes discussed on site – Steve has details. Minimise loss of trees to north. Would it be simpler to have another drawing showing this to be removed so the lines being removed are not shown on the 'proposed' drawing? DURING CONSTRUCTION THE KEY POINT WILL BE TO MINIMISE LOSS OF MATURE TREES. DURING OPERATION THE KEY ISSUE WILL BE TO USE STONE FOR RETAINING STRUCTURES/ THE BRIDGE (AN EXISTING STONE RETAINING WALL ON THE ROAD NORTH - SEE BELOW – PROVIDES AN IDEA OF THE CHARACTER THAT COULD BE REPLICATED). ALSO TO REPLACE ALDER COPPICE ALONG RIVER BANK AFTER WORKS.

1.24 NEED TO SHOW HEDGEROW AND PLANTING. Also TO INCLUDE SOME SCREEN PLANTING RUNNING EAST/WEST TO SOUTH-WEST OF CHAPEL TO SCREEN VIEWS of CRAWLER LANE FROM THE ROAD (see photo below).

GOSEN TO SYCHTYN OFF-ROAD TRACK CH 4620 TO 4970 – EARTHWORKS NEED TO BE AS GENTLE AS POSSIBLE TO BLEND INTO THE SOUURONDING FIELD. THE LANE SHOULD REMAIN UNFENCED FROM THE REST OF THE FIELD (currently there is a fenceline shown in the drawing). THIS NEEDS A SEPARATE SOLUTION OF DURONG CONSTRUCTION AND AFTER CONSTRUCTION… ON SITE NRW PROPOSED THAT THE CRAWLER LANE SHOULD BE GRASS REINFORCEMENT IN THE LONG TERM (STONE SURFACE DURING CONSTRUCTION OK). If this is the case the offsite planting referred to above - RUNNING EAST/WEST TO SOUTH-WEST OF CHAPEL – may not be needed. As for the Llanerfyl track can the gates just be there for construction – with wooden post and rail fencing added in long term (which could be removed if replacement blades need to be transported)?

DOLWEN ISAF CH 7270 – 7530 – AMDNEMENT (STEVE HAS DETAILS)

1.41 - the idea here is to make the area of grass reinforcement appear part of the wider field – so remove hedge and fence.

Site access 1 – similar to principals for site access 4 (below) – need to ease earthworks gradients much as possible and feather to blend with existing. Also minimise area of tarmac (no white lines). May be

need for different short term and long term gate proposals. Ensure no hedgerows are shown here… [NB some of the colours used in the key are still mv similar e.g. verge and hedgerow look the same on this drawing]. Will there be different solutions during and post construction? Note nrw's preference for wooden single hinged gates, and their suggestion of a sprayed tar and chip finish to make it look more rural in the longer term

Site access 4 D044 – need to ease earthworks gradients much as possible and feather to blend with existing. Also minimise area of tarmac (no white lines). May be need for different short term and long term gate proposals. Ensure no hedgerows are shown here… [NB some of the colours used in the key are still mv similar e.g. verge and hedgerow look the same on this drawing]. Fencelines are a bit confusing. The 'propoosed fence' label is pointing to a pink line (fence to be lost)… Will there be different solutions during and post construction? Note nrw's preference for wooden single hinged gates, and their suggestion of a sprayed tar and chip finish to make it look more rural in the longer term.,….

2.3B Neintherion - ON SITE IT WAS SUGGESTED THAT THERE SHOULD BE NO PARAPET ON THE NEW BRIDGE (AT LEAST NOT IN THE LONG TERM). To COMPENSITE FOR LOSS OF STONE WALL, WE SHOULD REBUILD THE PART DERELICT STONE WALL (SEE PHOTO IN SITE NOTES). Also the line of trees visible in the photo should be strengthened using similar species (Mick to confirm) – to help screen views from the Glyndwr's Way. This could be part of the HMP (Mick to note). The height of the 'causeway' on which the track is located should vary in height along its length and the earthworks be feathered into the existing ground levels so it doesn't looked 'engineered'. There are also some changes to the layout at the southern end – to avoid marshy grassland/peat and to use reinforced grass on sections that are visible as they climb the slope.

3.22c – NEED TO SHOW NEW HEDGEBANK ON EATSERN SIDE (NB THIS IS DIFFERENT FROM A HEDGEROW). ON EASTERN EDGE EARTHWORKS TO BE PROFILED INTO EXISTING FIELD.

Site access 2 –Aim to minimise area of tarmac (hence are of grass reinforcement. The earthworks will be very important – I believe there is to be a change to the drawing to leave the west bank intact – and

eastern earthworks should be made as gradual as possible to blend into the surrounds. Will need to keep stock embankments while they establish and perhaps consider use of a geomesh to help stabilise slopes and get grass establish.

Tallerddig Junction – preference for 'relaxed' option. Profile out embankments to look as natural as possible. Hedgerow at top, scrub on slopes (low maintenance) – currently hedgerows look different on each side...

On all drawings – might want to say that all replacement trees will be root balled extra heavy standards 14-16cm girth and around 4m tall

Rebecca Knight

3 May 2013

MEMORANDUM

To:	Feidhlim McElhone	At:	Kings Langley (Beaufort Court)
	Kevin Martin	At:	AECOM
	Paul Fitzgerald	At:	Kings Langley (Beaufort Court)
	Richard Evans	At:	Cardiff
	Richard Glover	At:	Squire Sanders
	Steven Carmody	At:	AECOM
From:	Mike Whitbread	At:	Kings Langley (Beaufort Court)
Date:	26 June 2013	Ref:	01592-009431

Subject: Llanbrynmair Site Access Route Selection Reasoning

The purpose of this memo is to detail the reasoning behind the selection of site access route to the proposed Llanbrynmair wind farm.

RES and RWE Npower explored the possibility of sharing an access track during late 2008 and early 2009, prior to the submission of the Llanbrynmair Wind Farm application. A formal meeting was arranged on the 2nd February 2009 between RES and RWE Npower in Swindon to discuss the proposal.

Following the meeting it was decided that sharing an access track from their Carnedd Wen project to RES's Llanbrynmair project would not be a viable option. The key reasons were Health and Safety related to logistical management.

The logistical issues were associated with the potential conflict of running both general construction traffic and abnormal indivisible loads (AIL's) on the same section of track to access two different wind farm projects being constructed simultaneously.

Since the original discussions in 2008 and 2009, RWE npower have now specified a multiyear tree felling programme prior to commencement of their construction works. Given that both Carnedd Wen and Llanbrynmair could be successful at inquiry and gain consent at the same time, a three to four year delay to the RES programme is not a realistic commercial option. In addition, the staggered construction timescales of RES building its scheme via an alternative access route while RWE are tree felling will reduce impacts on the surrounding trunk road network, as does the revised Llanbrynmair access strategy of using the A470 for construction traffic access rather than the A458 (used by construction traffic associated with Carnedd Wen).

The original Llanbrynmair wind farm layout of 43 turbines had infrastructure and turbines located on higher slopes. 13 turbines and associated infrastructure have been deleted since the original submission was made. One of the key reasons for removal of a number of these turbines was minimisation of impact on habitat and peat. Access track links to join Llanbrynmair with Carnedd Wen would require tracks to be

added back into some of these areas which are on deep peat and have a high potential for habitat restoration to high quality habitat. The scheme has been designed to minimise impacts on peat and peat habitat, therefore these areas are included in the Habitat Management Plan.

At the same time as exploring access to Llanbrynmair via Carnedd Wen, RES were also investigating the option of access via the Llanerfyl to Talerddig road in collaboration with three other developers with projects in the area. In order to avoid all four developers trying to sign the same access land rights, an agreement was reached where all parties would work together as one access consortium, sharing rights to use the land for access to projects. Although two of the four developers have since withdrawn from schemes along the route, RES and one other developer are still working together to jointly obtain land and share future design/construction which would provide joint access along the valley.

The Llanerfyl to Talerddig route has been designed to minimise impacts while providing a long term community benefits associated with two way traffic at Gosen Bridge, off-road parking at Diosg and additional passing places which will be provided using grass reinforcement techniques to ensure a more sympathetic design in keeping with the character of the road. Indeed, many of these passing places may be adopted b y Powys County Council due to the community benefits provided by them.

APPENDIX 10.1 - C: TRAFFIC DATA

APPENDIX 10.1 – C – TRAFFIC DATA

1.1 Llanerfyl - Automatic Traffic Counts (ATC)

Site 1: Week 1

Table 1 - Llanerfyl - Site 1 Week 1: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
1	A458, Att - Ic LJ20, OSGR: SJ 03496 09709	East	40	Mon, 18 February 2013	Sun, 24 February 2013	11555	1669	1651	3083	26.7	699	6.0	56	0.5	35.2	42.3
		West	40	Mon, 18 February 2013	Sun, 24 February 2013	10756	1682	1537	2179	20.3	611	5.7	51	0.5	34.6	41.4
		Two way	40	Mon, 18 February 2013	Sun, 24 February 2013	22311	3351	3187	5262	23.6	1310	5.9	107	0.5	34.9	41.8

Site 1: Week 2

Table 2 - Llanerfyl - Site 1 Week 2: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
1	A458, Att - Ic LJ20, OSGR: SJ 03496 09709	East	40	Mon, 25 February 2013	Sun, 3 March 2013	11072	1458	1582	2960	26.7	782	7.1	72	0.7	35.3	42.5
		West	40	Mon, 25 February 2013	Sun, 3 March 2013	11217	1617	1602	2210	19.7	631	5.6	67	0.6	34.7	41.2
		Two way	40	Mon, 25 February 2013	Sun, 3 March 2013	22289	3075	3184	5170	23.2	1413	6.3	139	0.6	35.0	42.1

Site 2: Week 1

Table 3 - Llanerfyl - Site 2 Week 1: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
2	Llanerfyl Road, Att - giveway sign, OSGR: SJ 03464 09691	North	60	Mon, 18 February 2013	Sun, 24 February 2013	2341	370	334	0	0.0	0	0.0	0	0.0	15.3	18.1
		South	60	Mon, 18 February 2013	Sun, 24 February 2013	1895	303	271	0	0.0	0	0.0	0	0.0	16.2	18.8
		Two way	60	Mon, 18 February 2013	Sun, 24 February 2013	4236	673	605	0	0.0	0	0.0	0	0.0	15.7	18.3

Site 2: Week 2

Table 4 - Llanerfyl - Site 2 Week 2: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
2	Llanerfyl Road, Att - giveway sign, OSGR: SJ 03464 09691	North	60	Mon, 25 February 2013	Sun, 3 March 2013	2274	358	325	0	0.0	0	0.0	0	0.0	15.6	18.3
		South	60	Mon, 25 February 2013	Sun, 3 March 2013	1807	286	258	0	0.0	0	0.0	0	0.0	16.1	18.8
		Two way	60	Mon, 25 February 2013	Sun, 3 March 2013	4081	644	583	0	0.0	0	0.0	0	0.0	15.8	18.6

1.2 Talerddig- Automatic Traffic Counts (ATC)

Site 3: Week 1

Table 5 - Talerddig - Site 3 Week 1: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
3	A470, Att - tractor sign, OSGR: SH 93068 00208	North	60	Mon, 18 February 2013	Sun, 24 February 2013	6739	1047	963	0	0.0	0	0.0	0	0.0	33.0	36.9
		South	60	Mon, 18 February 2013	Sun, 24 February 2013	6819	1060	974	0	0.0	0	0.0	0	0.0	33.1	37.8
		Two way	60	Mon, 18 February 2013	Sun, 24 February 2013	13558	2107	1937	0	0.0	0	0.0	0	0.0	33.0	37.4

Site 3: Week 2

Table 6 - Talerddig - Site 3 Week 2: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
3	A470, Att - tractor sign, OSGR: SH 93068 00208	North	60	Mon, 25 February 2013	Sun, 3 March 2013	6925	1032	989	0	0.0	0	0.0	0	0.0	32.1	36.5
		South	60	Mon, 25 February 2013	Sun, 3 March 2013	6941	1005	992	0	0.0	0	0.0	0	0.0	32.1	37.1
		Two way	60	Mon, 25 February 2013	Sun, 3 March 2013	13866	2037	1981	0	0.0	0	0.0	0	0.0	32.1	36.9

Site 4: Week 2

Table 7 - Talerddig - Site 4 Week 2: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
4	Unnamed Road, Att - giveway sign, OSGR: SH 93107 00204	North	60	Tue, 26 February 2013	Mon, 4 March 2013	379	59	54	0	0.0	0	0.0	0	0.0	28.7	34.9
		South	60	Tue, 26 February 2013	Mon, 4 March 2013	448	72	64	0	0.0	0	0.0	0	0.0	25.5	31.5
		Two way	60	Tue, 26 February 2013	Mon, 4 March 2013	827	131	118	0	0.0	0	0.0	0	0.0	26.9	33.1

Site 4: Week 3

Table 8 - Talerddig - Site 4 Week 3: Automatic Traffic Count; February 2013 – 2687 Mid-Wales

Site No.	Location.	Direction.	Speed Limit - PSL (mph)	Start Date.	End Date.	Total Vehicles.	5 Day Ave.	7 Day Ave.	No. > Speed Limit.	%. > Speed Limit.	No. > ACPO Limit.	%. > ACPO Limit.	No. > DfT Limit.	%. > DfT Limit.	Mean Speed	85%ile Speed
4	Unnamed Road, Att - giveway sign, OSGR: SH 93107 00204	North	60	Tue, 5 March 2013	Mon, 11 March 2013	346	51	49	0	0.0	0	0.0	0	0.0	29.7	34.7
		South	60	Tue, 5 March 2013	Mon, 11 March 2013	397	61	57	0	0.0	0	0.0	0	0.0	26.0	31.5
		Two way	60	Tue, 5 March 2013	Mon, 11 March 2013	743	112	106	0	0.0	0	0.0	0	0.0	27.7	33.8

1.3 Powys - Automatic Traffic Counts (ATC)

Channel 1: Week 1

Table 9 - Powys – Channel 1 Northbound: Week 1: Automatic Traffic Count; November 2011

Powys ATC

Produced by DTS Consultancy (England) Ltd

Channel 1 - Northbound **Speed Summary** **Week 1**

Speed (MPH)	05/11/2008 Wednesday	06/11/2008 Thursday	07/11/2008 Friday	08/11/2008 Saturday	09/11/2008 Sunday	10/11/2008 Monday	11/11/2008 Tuesday
0-30	17	12	16	6	16	10	11
31-45	58	56	60	52	36	62	52
46-60	6	6	4	5	0	5	5
61-123	0	0	0	0	0	0	0
TOTAL	**81**	**74**	**80**	**63**	**52**	**77**	**68**

Table 10 - Powys – Channel 1 Northbound: Week 1: Automatic Traffic Count; November 2011

Powys ATC

Produced by DTS Consultancy (England) Ltd

Channel 1 - Northbound **Vehicle Class** **Week 1**

Classes / Day / Time	Car / LGV / Caravan - 1	OGV1 / Bus - 2,3,5,6,7,12	OGV2 - 4,8,9,10,11,13	TOTAL - 1-13
05/11/2008				
7-19	59	11	4	**74**
6-22	64	11	4	**79**
6-24	64	11	4	**79**
0-24	66	11	4	**81**
06/11/2008				
7-19	52	12	2	**66**
6-22	57	14	2	**73**
6-24	58	14	2	**74**
0-24	58	14	2	**74**
07/11/2008				
7-19	60	9	6	**75**
6-22	65	9	6	**80**
6-24	65	9	6	**80**
0-24	65	9	6	**80**
08/11/2008				
7-19	47	9	0	**56**
6-22	52	9	0	**61**
6-24	52	9	0	**61**
0-24	54	9	0	**63**
09/11/2008				
7-19	35	8	1	**44**
6-22	41	8	1	**50**
6-24	41	8	1	**50**
0-24	43	8	1	**52**
10/11/2008				
7-19	53	15	1	**69**
6-22	60	15	2	**77**
6-24	60	15	2	**77**
0-24	60	15	2	**77**
11/11/2008				
7-19	49	7	2	**58**
6-22	56	9	2	**67**
6-24	56	10	2	**68**
0-24	56	10	2	**68**
Average				
7-19	51	10	2	**63**
6-22	56	11	2	**70**
6-24	57	11	2	**70**
0-24	57	11	2	**71**

Channel 2: Week 1

Table 11 - Powys – Channel 2 Southbound: Week 1: Automatic Traffic Count; November 2011

Channel 2 - Southbound **Speed Summary** **Week 1**

Speed (MPH)	05/11/2008 Wednesday	06/11/2008 Thursday	07/11/2008 Friday	08/11/2008 Saturday	09/11/2008 Sunday	10/11/2008 Monday	11/11/2008 Tuesday
0-30	20	13	19	15	15	12	15
31-45	51	61	64	33	46	52	53
46-60	4	3	6	5	0	9	7
61-123	0	0	0	0	0	0	0
TOTAL	**75**	**77**	**89**	**53**	**61**	**73**	**75**

Table 12 - Powys – Channel 2 Southbound: Week 1: Automatic Traffic Count; November 2011

Channel 2 - Southbound **Vehicle Class** **Week 1**

Classes / Day / Time	Car / LGV / Caravan - 1	OGV1 / Bus - 2,3,5,6,7,12	OGV2 - 4,8,9,10,11,13	TOTAL - 1-13
05/11/2008				
7-19	53	7	3	63
6-22	60	8	3	71
6-24	61	9	3	73
0-24	63	9	3	75
06/11/2008				
7-19	44	16	3	63
6-22	53	17	3	73
6-24	56	18	3	77
0-24	56	18	3	77
07/11/2008				
7-19	58	11	4	73
6-22	66	11	5	82
6-24	72	11	5	88
0-24	73	11	5	89
08/11/2008				
7-19	44	4	0	48
6-22	48	4	0	52
6-24	49	4	0	53
0-24	49	4	0	53
09/11/2008				
7-19	38	4	1	43
6-22	45	5	1	51
6-24	46	6	1	53
0-24	54	6	1	61
10/11/2008				
7-19	50	9	2	61
6-22	59	9	2	70
6-24	61	10	2	73
0-24	61	10	2	73
11/11/2008				
7-19	45	14	1	60
6-22	56	15	1	72
6-24	58	16	1	75
0-24	58	16	1	75

Average				
7-19	47	9	2	59
6-22	55	10	2	67
6-24	58	11	2	70
0-24	59	11	2	72

APPENDIX 10.1 - D: STRATEGIC TRAFFIC MANAGEMENT PLAN (STMP)

RenewableUK Cymru

Strategic Traffic Management Plan for Mid Wales Wind Farms

Section 1 of 6: Overview Report

August 2012

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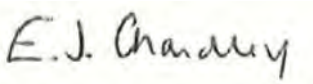
Approved By:	Elizabeth Chandley		16 August 2012

Overview of Strategic Traffic Management Plan

This strategic Traffic Management Plan (sTMP) has been developed on behalf of RenewableUK Cymru to address the likely cumulative impacts of the transportation of wind turbine components to potential wind farms in Mid Wales. The key components derived for the strategy are set out below and the justification for each is discussed in the following chapters.

Route	Turbine components will be moved as abnormal loads in convoys from Ellesmere Port docks into Mid Wales via a strategic route along the public highway network
Layover areas	Layover areas will be established off the public highway near to Mile End roundabout at Oswestry, at the Pool Quay highway depot north of Welshpool and at the Abermule highway depot north of Newtown The journey from Ellesmere Port to Mid Wales will be split into two sections by stopping overnight at one of the layover areas
Convoy size	Convoys will consist of two abnormal load vehicles up to 50m long or 4.5m wide. There may be scope to increase the number of vehicles per convoy to three, depending on the success of the delivery system
Traffic management	The aim is to limit the delay to the travelling public to a maximum of 10 minutes. South of Oswestry, police motorcyclists will travel ahead of the convoys and hold oncoming traffic wherever the carriageway is wide enough to allow the convoys to pass. A back up network of designated passing places will enable convoys to move from passing place to passing place, waiting at each to allow following and opposing traffic to clear, if required
Delivery times	Convoys will be moved during hours of daylight for safety reasons. Initially convoys will be moved through Newtown before 7am, and through Welshpool before 7am or between the morning and afternoon peak periods. No more than one convoy per day will be moved through Welshpool or Newtown between 7am and 7pm on weekdays
Public awareness	A public awareness campaign will be undertaken to ensure that local communities understand the nature and timing of the deliveries and that the travelling public is informed of the implications for their journeys
Highway improvements	Localised improvements to the public highway network will be undertaken to facilitate movement of the convoys
Structures	All structures that will be subject to the gross vehicle weight of the abnormal load vehicles will be assessed for loading capacity, and will be strengthened if required. Condition surveys of all highway and third party structures that could be affected by the convoy movements will be prior to and on completion of the delivery period for each wind farm site
Environmental impact	Environmental assessment of the highway improvements and passing places will be undertaken prior to planning consent. Environmental assessment of the layover areas will be undertaken at detailed design stage, if appropriate

1. Introduction

1.1 Background

Grontmij has been commissioned by RenewableUK Cymru to develop a strategic Traffic Management Plan (sTMP) to address the likely cumulative impacts of the transportation of wind turbine components as abnormal loads to potential wind farms in Mid Wales. The movement of turbine components along the public highway will create conflict with other traffic, unless suitably planned and managed, due to the anticipated size of the loads. This potential conflict will be intensified if more than one wind farm is constructed at the same time.

RenewableUK Cymru members and relevant public sector stakeholders have worked together to support a strategic approach to managing traffic impacts associated with the Mid Wales wind farms in a safe manner. The sTMP aims to use this collaborative work to establish a consistent and workable traffic management strategy to facilitate future onshore wind development in the region.

1.2 Scope of sTMP

The sTMP sets out the general principles for managing the delivery of turbine components as abnormal loads from Ellesmere Port to the proposed Mid Wales wind farms. It prioritises the safe, efficient delivery of the loads whilst minimising delay to the travelling public and amenity impact on local communities. It does not consider the impact of general construction traffic on the public highway network, or the total number of convoys to be moved. Developers are responsible for addressing the impact of general construction traffic for individual projects.

The sTMP has been developed through detailed discussion with key stakeholders, including the relevant local and strategic highway and planning authorities, police forces and developers. A list of the contributing organisations is given in the Acknowledgements chapter at the end of this Overview Report.

1.3 Purpose of this Overview Report

The sTMP is presented in a modular format to enable the different sections of the route to be considered separately. Sections that are not dependent on each other can therefore be approved individually, if appropriate. This Overview report comprises the first of the series of six reports as follows:

- Section 1: Overview Report
- Section 2: Ellesmere Port to Welshpool (Common Section)
- Section 3: Welshpool to SSA B (north)
- Section 4: Welshpool to Newtown
- Section 5: Newtown to SSA B (south)
- Section 6: Newtown to SSA C

The Overview report sets out the general principles and overarching strategy of the sTMP. The remaining reports address the specific issues along each section of the route.

2. Context

2.1 Policy Framework

The Welsh Government has set ambitious national targets for the generation of electricity from renewable sources. The targets are set out in Planning Policy Wales (PPW)[1] and supported by Technical Advice Note 8 (TAN 8) *Planning For Renewable Energy*[2]. TAN 8 identifies seven Strategic Search Areas (SSAs) which are preferred for development of large scale wind farms.

Progress towards achieving the targets has been slow, particularly for SSA B and C in Powys. The majority of the proposed sites in SSA B and C are reliant on the construction of new transmission infrastructure to enable connection to the grid. This is estimated to be available from 2017 at the earliest. The delay in grid connection is forecast to generate cumulative transportation impacts, as many of the wind farms proposed for Mid Wales could be constructed at the same time. The scale of potential cumulative impacts is linked to the number of proposed developments that achieve planning consent and the timing of the construction phase of each project.

Recent uncertainty regarding the nature of the grid connection into Mid Wales does not affect the recommendations of the sTMP.

2.2 Legislative Context

Turbine components that are moved by road are classified as abnormal loads under the Road Vehicles (Authorisation of Special Types) (General) Order 2003[3]. Notifications for abnormal indivisible loads are required where loads or vehicles exceed maximum gross vehicle weight or dimension limits in any of the following ways:

- a gross vehicle weight of more than 80,000kg
- a width exceeding 3m
- a length exceeding 18.75m

Each load requires at least 2 clear days' notice to the relevant police and highway authorities. The haulier must also indemnify each highway authority against any damage caused to any road, bridge or other structure. All abnormal load movements associated with the Mid Wales wind farms will be escorted by the police.

2.3 Interaction with Other Studies

RenewableUK Cymru has developed a spreadsheet based assessment tool, hereafter referred to as the Transport Tool, which will be used to control the dates of turbine component delivery into Mid Wales. It complements the sTMP by providing an estimate of the total number of abnormal load deliveries and the duration of the delivery period to the Mid Wales wind farms, but will not be a material planning consideration.

The Welsh Government has commissioned a study to investigate options to manage the movement of abnormal loads associated with turbine component delivery to all SSAs in Wales. There are areas of overlap in scope between the sTMP and the Welsh Government's strategic study, and consultation with the Welsh Government's consultant has been undertaken.

The proposed Tirgwynt Wind Farm in SSA B achieved planning consent in 2010. The Tirgwynt Traffic Management Plan (TMP)[4] proposes a number of physical highway improvement measures including the formation of passing places. Whilst the Tirgwynt TMP should not be considered a precedent, the proposed approach and physical improvement works have been considered in the development of the sTMP.

3. Strategic Route

3.1 Strategy

Turbine components will be moved as abnormal loads in convoys from Ellesmere Port into Mid Wales via a strategic route along the public highway network

The strategic route has a common section from Ellesmere Port docks:

- **M53 – A55 – A483 – A5 – A483 to Welshpool**

The strategic route diverges at Welshpool:

- **B4381 through Welshpool – A458 – SSA B (north)**
- **A483 to Newtown – A489 Llanidloes Road – A470 – SSA B (south)**
- **A483 to Newtown – A489 Kerry Road – the Vastre – A483 – SSA C**

3.2 Justification

3.2.1 Extent of Route

A strategic route has been identified for the movement of turbine components to SSAs B and C in Mid Wales. Turbine components will enter the UK at Ellesmere Port and be moved as abnormal loads south along the trunk road network to Welshpool, where the route diverges to provide access to SSA B (north), SSA B (south) and SSA C. Two route options are proposed for SSA B due to its larger area, topography and scale of highway constraints. The choice of route option between SSA B (north) and SSA B (south) route will be determined on a project-by-project basis. The strategic route is shown on Figure 1-1 in Appendix A of this Overview Report.

The sTMP covers the 175km strategic route to the furthest accessible point on the trunk road network within SSAs B and C. Individual developers will propose site specific TMPs covering the road network between the strategic route and the proposed wind farm site entry points.

It is assumed that any turbine components that may be sourced from any UK manufacturing facilities will join the strategic route at some point. Developers using UK based manufacturing facilities will be responsible for producing site specific TMPs to cover the route from the manufacturing base to where the loads will join the strategic route.

The identification of the strategic route has been based on the current known status of the transport network. There may be a need to review the route choice if there are alterations to the network prior to commencement of deliveries.

3.2.2 Port of Entry

Ellesmere Port in South Wirral is the nearest suitable UK port for access to SSA B and C. It has excellent links to the M53 which lies less than 500m from the dock entrance. Ellesmere Port is operated by Quality Freight (UK) Ltd under licence from the Manchester Ship Canal Company. The docks have experience of handling onshore and offshore wind turbine components over recent years and hold sufficient storage to accommodate the proposed developments in SSA B

and C. The current area of operational dock is 70 acres (280,000m^2). There is up to 30 acres (over 120,000m^2) of adjacent land available for development that could potentially be converted for use as additional storage if required. RenewablesUK Cymru and/or the wind farm developers would need to enter into an agreement with the owners to secure use of this land. The route from Ellesmere Port into Mid Wales offers the least physical and operational constraints compared to all other route options.

Mostyn docks in Flintshire is an alternative option. It is a similar distance from SSA B and C as Ellesmere Port. However, the available capacity at Mostyn will be severely restricted by its selection for use in the construction and operation of the 160 turbine Gwynt y Môr offshore wind farm. In addition, access for long vehicles is constrained by the proximity of the adjacent North Wales Coast Main Line railway and the main vehicular entrance to the docks crosses a railway bridge, which would require significant modification to carry turbine components. There is an alternative access across a railway level crossing, but abnormal load vehicles would have to reverse out of the docks onto the A548 and coordinate with train movements to avoid conflict. There are further constraints on the county road network before the route joins the trunk road, including a tight right turn within the town of Flint.

Use of one of the **South Wales ports** such as Newport or Swansea has been discounted for the purposes of this sTMP due to the comparatively greater distance between the port and the wind farm sites.

The **West Wales ports** including Aberystwyth, Aberaeron, Fishguard and Pembroke have also been discounted due to existing constraints relating to highway access or port capacity. Significant engineering interventions would be required to make the route from any of the West Wales ports to SSA B and C suitable for the abnormal load convoys.

An alternative port of entry may become more appropriate in the future if there are suitable changes in infrastructure and/or port facilities. Developers using alternative ports of entry would be responsible for producing site specific TMPs to cover the route from the port to where the loads would join the strategic route.

3.2.3 Road Type

The route from Ellesmere Port follows the trunk road network as far as is reasonably practical. In general, the trunk road network has been designed to carry greater volumes of traffic, and so is constructed to higher standards, compared to the county road network. There are two sections where use of the county road network is considered more appropriate.

B4381 through Welshpool for access to SSA B (north)

Use of the trunk road through Welshpool would require the convoys to turn right from Salop Road onto High Street at a highly constrained crossroads. Use of the B4381 would reduce the distance that the convoys travel through the built up area of Welshpool and avoid this constrained right turn.

A489 Kerry Road and the Vastre for access to SSA C

The Dolfor Road rail bridge on the A483 on the southern side of Newtown has a registered height restriction of 4.04m. This constraint would severely limit the size of turbine that could be moved to SSA C. The alternative route that is usually taken by loads higher than this limit is through a housing estate via Heol Treowen. This route has an amenity weight restriction and is therefore not suitable for repeated use for turbine component. For this sTMP, the use of the A489 Kerry Road and minor roads across the Vastre has been identified that would avoid the low rail bridge and

severe horizontal bends on the A483 to the south of Newtown, and reduce the distance that the convoys travel through the built up area of Newtown.

The Welsh Government is developing proposals for the A483/A489 Newtown Bypass[5]. The scheme is currently planned to start in late 2014 or early 2015, subject to the completion of statutory procedures and the availability of finance. It is likely that the implementation of the bypass would enable abnormal loads to avoid the Dolfor Road rail bridge. However, the strategic route identified in this sTMP is not predicated on the completion of the bypass, as it may not be available for access to Mid Wales wind farms.

Further details regarding the county road sections of the route are given in the separate reports covering sections 3 and 6 of the sTMP route.

3.2.4 Validation of Route Choice

The Welsh Government has commissioned a series of studies to investigate options for the delivery of turbine components into all SSAs in Wales. The studies recommend the use of Ellesmere Port as the preferred port of entry for access to SSA B and C[6]. The recommended route from Ellesmere Port follows the trunk road network into Mid Wales. Various options were considered as part of these studies for the movement of abnormal loads around or across the urban areas of Welshpool and Newtown to reduce the impact on the local communities. The strategic route set out in the sTMP is consistent with the recommended options outlined in the Welsh Government studies.

The selection of Ellesmere Port as the most appropriate port of entry complies with the Highways Agency's Water Preferred Policy[7]. This requires abnormal loads to be delivered to the port nearest to the destination site in order to minimise the distance that loads are moved by road.

National Grid has identified a potential area near Cefn Coch as the preferred site for the new Mid Wales substation. Detailed assessment and consultation with stakeholders is currently underway. Ellesmere Port is proposed as the port of entry for abnormal load deliveries, and access to the substation is likely to follow the route described in this sTMP.

3.2.5 Alternative Modes

Movement of the turbine components as abnormal loads along the public highway is considered the most suitable delivery option. Four alternative modes have been considered and discounted.

Rail	The width of the tower sections and nacelles would preclude movement by rail as the loads could not pass by other rail transport or trackside features, or under many bridges. The length of the blades would be limited by the curvature of the tracks. Road transport would be required between the railhead and the wind farm sites.
Sea	A new or upgraded berthing facility or port could be provided on the West Wales coast, but road transport entailing significant highway improvements would still be required to move the loads to the wind farm sites
Canal	The existing canal network currently has insufficient width and depth to support the movement of turbine components. A wholesale upgrade of the existing inland waterway route from Ellesmere Port to Newtown would be required, including raising

	bridges, widening locks and re-opening currently non-navigable sections. An entirely new canal route would be required from Welshpool to SSA B and from Newtown to SSA C. Road transport would be required between the wharf facilities and the wind farm sites
Air	The turbine blades are the only components that may be light enough to be moved by air. Aerial transport of blades is unlikely to be economically viable. In addition, wind farms are located for their windy characteristics, which may compromise safe and efficient delivery. Road transport may be required between the landing strip and the wind farm sites

This assessment is supported by the Welsh Government's study to investigate the use of alternative modes of transport for turbine components[8]. The study considered four potential options:

- by rail using the Cambrian Main Line or Heart of Wales Line
- along the existing waterway canal network
- by air using aircraft, airships and helicopters
- by sea to an existing or new West Wales port or berthing facility

The study concludes that the delivery of turbine components by means other than by road is limited to movement of smaller sized blades by rail or possibly by helicopter on a small scale. Significant infrastructure investment is likely to be required to facilitate either option, and it is likely there would still be an element of road transportation required. There is no feasible option for transporting the wide or heavy turbine components other than by road, so highway improvements along the route from Ellesmere Port would still be required.

4. Layover Areas

4.1 Strategy

Layover areas will be established off the public highway in three locations:

- **near to the Mile End roundabout at Oswestry**
- **at the Pool Quay highway depot north of Welshpool**
- **at the Abermule highway depot north of Newtown**

The journey from Ellesmere Port to Mid Wales will be split as follows:

SSA B (north)

- **from Ellesmere Port to the Mile End layover area**
- **from the Mile End layover area to the wind farm sites**

SSA B (south) and SSA C

- **from Ellesmere Port to the Abermule layover area**
- **from the Abermule layover area to the wind farm sites**

The Pool Quay layover area will be available for use in an emergency if required

4.2 Justification

4.2.1 Purpose

Layover areas will be provided to enable the journey between Ellesmere Port and the wind farm sites to be split. The advantages of using layover areas are that convoys can be stored off the public highway in an emergency situation or to suit particular delivery times. Delivery times through sensitive areas such as Welshpool and Newtown can be managed with greater certainty from a layover area that is located near to these areas.

For wind farm sites in **SSA B (north)**, the journey from Ellesmere Port to Mid Wales will be split into two sections:

- **Day 1**: Ellesmere Port to the Mile End layover area
- **Day 2**: the Mile End layover area to the wind farm sites

For wind farm sites in **SSA B (south) and SSA C**, the journey from Ellesmere Port to Mid Wales will be split into two sections:

- **Day 1**: Ellesmere Port to the Abermule layover area
- **Day 2**: the Abermule layover area to the wind farm sites

The Pool Quay layover area will available for use in an emergency if required. Movements to SSA B (north) may occur at the same time as movements to SSA B (south) or SSA C.

4.2.2 Duration of Use

The layover areas will be required throughout the main turbine delivery period for wind farms that are reliant on the new Mid Wales substation. This period is likely to commence in 2017, although some sites have secured agreement for a grid connection that is not dependent on the new Mid Wales substation, so may be constructed earlier. The duration of the turbine delivery period will be dependent on the number of wind farms that obtain planning consent. Further details are provided in the Transport Tool that has been developed on behalf of RenewableUK Cymru.

4.2.3 Mile End Layover Area, Oswestry

A layover area is proposed in the vicinity of the Mile End roundabout at the junction of the A483, A5 and B4579 to the east of Oswestry in Shropshire. The location of Mile End roundabout is shown on Figure 1-2a in Appendix A of this overview report.

The standard of highway changes at the Mile End roundabout. To the north of Mile End the route is motorway, dual carriageway, wide single carriageway changing to 7.3m single carriageway just north of the roundabout. To the south of Mile End the route is narrower single carriageway with some constrained and built up sections. The method of police escort may change with the reduction in highway standard at Mile End, making it an ideal location for a layover area.

Several potential sites for the Mile End layover area have been identified. The two key sites considered to be the most suitable at this stage are shown on Figure 1-2a in Appendix A of this Overview report. Whilst these sites are considered the most appropriate at this stage, alternative sites may also be considered in due course.

Shropshire Council site

The site lies to the northeast of the Mile End roundabout, adjacent to the southbound and eastbound carriageways of the A5. The site is owned by Shropshire Council and is designated for employment use in their long term strategy. It is currently vacant land used for agricultural grazing. The site area is approximately 56 acres (228,100m^2).

There is no existing vehicular access to the site, but preliminary discussions between Shropshire Council and the Highways Agency indicate that a new access onto the A483 for left in left out movements by convoys under police escort should be acceptable. In the longer term, there are plans for the Mile End roundabout to be enlarged to the west to create additional capacity. At the same time a new vehicular access to the Shropshire Council site could be formed as a new arm of the roundabout.

A secure, fenced area of hardstanding for convoy storage would be created within the site. The area would be set back from the public highway to minimise the need for hedgerow removal and to leave space to allow for a bund to screen the layover area from the eastern Oswestry urban extension planned for the western side of the A483. A new pedestrian crossing point over the A5 would be created to enable escort and haulier staff to access the existing welfare facilities at the Mile End services.

Oswestry Livestock Market

The existing Oswestry livestock market lies south of the B4579 approximately 500m west of Mile End roundabout. Planning consent has been obtained for a replacement livestock market and mixed use regeneration scheme including a supermarket, cinema and Park and Ride facility. The proposals include a dedicated lorry park for the livestock market that will only be used on market days (currently Wednesdays). The area of the proposed lorry park is approximately 20,000m^2.

The livestock market will have its own entrance off the B4579, which will be shared with the proposed Park and Ride parking area and bus facilities.

There is potential for agreement to be obtained for the convoys to use the lorry park as a layover area on non-market days, although the risk of conflict with Park and Ride services would have to be addressed. Convoys would turn right at Mile End roundabout then left into the site. Swept path analysis would be required to assess whether any highway improvement works would be required to facilitate these movements, over and above the improvements already proposed as part of the new development. Escort and haulier staff could use the welfare facilities within the proposed adjacent mixed use development.

The selection of a preferred location for the layover area at Mile End will be dependent on:

- suitability of land agreements
- ease of management for the developers
- risk of restrictions to deliveries
- obtaining approvals from the relevant authorities

Discussions between RenewableUK Cymru and the relevant landowners are ongoing. Shropshire Council Officers have indicated their support in principle for a potential layover area on Council land near to the Mile End roundabout, which demonstrates that at least one of the key sites would be achievable.

The detailed design of the Mile End layover area, its access from the public highway network and any associated planning application will be undertaken at a later stage, subject to appropriate agreement being in place.

4.2.4 Pool Quay Highway Depot, north of Welshpool

A layover area is proposed at the existing Pool Quay highway depot on the A483 to the north of Welshpool. The location of the Pool Quay highway depot is shown on Figure 1-2b in Appendix A of this overview report.

The site lies to the southwest of the priority junction between the A483 and the minor road to Wern. It is separated from the northbound lane of the A483 by a fence, sloping grass verge and footway. The land is owned by the Welsh Government and used as a highway depot by Powys County Council for storage of plant and materials associated with highway maintenance. The Welsh Government has confirmed in principle that the depot area can be used to store abnormal load convoys associated with Mid Wales wind farms.

There are two points of vehicular access to the site, both via locked gates. The main access is on the northern boundary of the site onto the minor road. There is a secondary access on the eastern boundary towards the south of the site directly onto the A483. Neither existing point of access would be suitable for abnormal loads.

A new gated access to the depot will be created at the northeastern corner to facilitate movement of southbound abnormal load vehicles off the A483. The existing gated access onto the A483 in the southeastern corner of the depot will be modified to provide a gated egress point for the abnormal load convoys to exit the depot. Both access and egress points will require hardening of some sections of the existing verge. The entry gate will be opened immediately prior to the arrival of the convoy by one of the civilian team associated with the convoy movements. A new fence may be required around the perimeter of the site for security purposes.

The available area within the depot is approximately 1,700m^2, sufficient to store one convoy of up to three abnormal loads. It is roughly triangular in shape, with the long side adjacent to the A483 and the short side adjacent to the minor road. Due to the size of the length of the abnormal load vehicles, it is likely that use will not be made of the full area of the depot. Powys County Council could therefore retain use of part of the depot area during wind farm deliveries, if required. It may be appropriate to separate the area of the depot designated for wind farm convoys from the area associated with highway maintenance activities using white lining or an internal fence. Further details regarding operational arrangements will be agreed with Powys County Council and the Welsh Government prior to commencement of deliveries.

Welfare facilities are not proposed for the Pool Quay depot, as it is only intended to be used as a layover area in an emergency situation.

4.2.5 Abermule Highway Depot, north of Newtown

A layover area is proposed at the existing Abermule highway depot on the A483 to the north of Welshpool. The location of the Abermule highway depot is shown on Figure 1-2c in Appendix A of this overview report.

The site lies to the northeast of the priority junction between the A483 and the B4386 to Abermule. It is separated from the southbound lane of the A483 by a fence and verge. The land is owned by the Welsh Government and used as a highway depot by Powys County Council for storage of plant and materials associated with highway maintenance. The Welsh Government has confirmed in principle that the depot area can be used to store abnormal load convoys associated with Mid Wales wind farms.

There is a single point of vehicular access at the northern end of the site onto the A483 via a locked gate. Although the access has wide kerb radii and tapers suitable for heavy vehicle movements, it would require some modification to ensure adequacy for abnormal load convoys. The existing gated access to the depot onto the A483 will be modified to facilitate movement of southbound abnormal load vehicles off the A483. A new gated egress point will be created in the southwestern corner for the abnormal load convoys to exit the depot. Both access and egress points will require hardening of some sections of the existing verge. The entry gate will be opened immediately prior to the arrival of the convoy by one of the civilian team associated with the convoy movements. A new fence may be required around the perimeter of the site for security purposes.

The available area within the depot is approximately 2,100m^2, sufficient to store one convoy of up to three abnormal loads. It is roughly triangular in shape, with the long side adjacent to the A483 and the short side adjacent to the B4386. Due to the size of the length of the abnormal load vehicles, it is likely that use will not be made of the full area of the depot. Powys County Council could therefore retain use of part of the depot area during wind farm deliveries, if required. It may be appropriate to separate the area of the depot designated for wind farm convoys from the area associated with highway maintenance activities using white lining or an internal fence. Further details regarding operational arrangements will be agreed with Powys County Council and the Welsh Government prior to commencement of deliveries.

Temporary welfare facilities will be provided within the Abermule depot for use by the escort team while the convoy is stored.

5. Convoy Size

5.1 Strategy

Convoys will consist of two abnormal load vehicles up to 50m long or 4.5m wide

There may be scope to increase the number of vehicles per convoy to three, depending on the success of the delivery system

Convoys could be formed of all the same type of load or mixed

A convoy will consist of turbine components associated with only one wind farm, so that each convoy will be delivered to a single site

5.2 Justification

5.2.1 Turbine Components

Wind turbines generally comprise a number of components which are transported separately as abnormal loads and then assembled on site. These are:

- three blades
- up to four tower sections
- nacelle and hub

The blade is the longest component to transport, and the base tower section is generally the widest. The largest turbine components assumed to require access to the proposed wind farm sites in SSA B and C are turbine blades up to 45m long and tower sections up to 4.5m wide. These dimensions offer a typical worst case covering the majority of 2 to 3MW machines currently available.

The exact dimensions and weights of the components depend on the turbine model. The nacelle and hub unit, transformers and cranes required to erect the turbines are assumed to be narrower and/or shorter than the tower and blade sections.

If a turbine model is selected that has larger components or delivery requirements than those stated above, the developer will be responsible for undertaking any additional assessment that may be required.

5.2.2 Abnormal Load Vehicles

The turbine components will be moved to the wind farm sites using extendible trailers that can be reduced in length to a standard sized heavy goods vehicle (HGV) once their loads are delivered. The route only requires assessment for movement of the convoys towards the sites, as the return journeys will be made with the trailers reduced to standard sized HGVs.

Abnormal load movements to the wind farms are unlikely to be required once the turbines are operational, unless a particular component requires replacement. On decommissioning, the turbines will either be broken up on site and removed using standard sized HGVs or be removed

as abnormal loads in a similar manner to their original delivery to the site. If abnormal load movements are required during decommissioning, the individual developer will be responsible for producing an appropriate TMP. Further details on site specific construction methods and number of turbine components for each wind farm site can be requested from individual developers.

5.2.3 Convoy Size

A two vehicle convoy could travel faster than a three vehicle convoy, but more convoys would be required if there are less vehicles in each convoy. At present, the police are prepared to escort convoys of up to two vehicles. It is therefore proposed to trial convoys of only two abnormal load vehicles initially, with a view to increasing the convoy size to three abnormal load vehicles if the delivery system is found to work well.

5.2.4 Composition of Convoy

The police manage the movement of long and wide loads in a different way, so a convoy comprising either only long loads or only wide loads would be more straightforward to escort. However, the long vehicles carrying the blades are likely to require more time to negotiate any pinch points along the route than the shorter, wider vehicles. If each convoy was mixed and contained only one blade vehicle, the journey times for each convoy movement would be more consistent.

The composition of the convoys will be influenced by how the turbine components are delivered to Ellesmere Port by sea. It would be inefficient use of storage space at the docks to hold a series of tower sections in anticipation of a shipment of blades so that mixed convoys could be moved to the wind farm sites. It is therefore suggested that convoys are created using the components stored at Ellesmere Port docks. Once deliveries to Mid Wales commence, the police escort teams can advise a preference for mixed or single vehicle type convoys as appropriate.

A convoy will consist of turbine components associated to only one wind farm, so that each convoy will be delivered to a single site.

6. Traffic Management

6.1 Strategy

The aim is to limit the delay to the travelling public to a maximum of 10 minutes

South of Oswestry, police motorcyclists will travel ahead of the convoys and hold oncoming traffic wherever the carriageway is wide enough to allow the convoys to pass

A back up network of designated passing places will enable convoys to move from passing place to passing place, waiting at each to allow following and opposing traffic to clear, if required

Each passing place will be large enough to hold a single convoy

Key passing places will be designated as suitable for longer term storage in the event of an emergency

6.2 Justification

6.2.1 Movement Methodology

South of Oswestry, it is likely that oncoming traffic will conflict with convoys due to the reduced carriageway width. The police escort will keep the convoy moving as much as possible, using a 'caterpillar and bubble' approach. Police motorcyclists travelling ahead of the convoy will hold oncoming traffic on straight sections of road where the convoy can pass. This will create a 'bubble' in front of the convoys, allowing the abnormal load vehicles to use the full width of the road. Following traffic will not be unduly delayed if the speed of the convoys can be maintained at a reasonable level. This method is used by the police to manage national cycle races. It has also been used in previous deliveries of turbine components to wind farm sites and was used to manage the July 2010 trial runs into Mid Wales.

Use of a 'leapfrog' method has also been considered, whereby convoys move from passing place to passing place, waiting at each to allow following and opposing traffic to clear. The stop-start nature of this strategy would increase the overall journey time compared to the 'caterpillar and bubble' approach, but has the advantage of providing storage for convoys in the event of an emergency.

It is therefore proposed to provide a back up network of passing places that would allow the convoy to 'leapfrog' if required. The passing places would provide refuge in the event of an emergency situation, and could be used to allow following traffic to overtake if the delay becomes unreasonable. The majority of these passing places will only be appropriate for short duration stops to allow following and opposing traffic to dissipate. Key passing places on each section will be designated as suitable for longer term storage.

The emergency services have confirmed that dedicated passing places for use by emergency vehicles on call will not be required. The police escorting the convoy will manage any conflict to minimise delay for fire, ambulance and/or police services attending an emergency as necessary.

6.2.2 Delay to General Traffic

Spacing of Passing Places

The passing places have been spaced along the route such that queuing traffic should be delayed by no more than 10 minutes, where practicable. The vehicle that will experience the greatest delay will be at the head of the queue of opposing traffic held by the police. This vehicle will have to wait until the convoy has passed before it can restart its journey. Following traffic will be delayed if the speed of the convoy is slower than normal traffic speed, but the following traffic will still be moving while the opposing traffic will be held.

Convoy Speeds

The time taken for the convoy to move between passing places has been calculated assuming an average speed of 30mph on A-class roads and 20mph on minor roads, with the exception of specific constraints where vehicle movement may be slower. Potential constraints comprise junctions, bends or other pinch points and are addressed in chapter 9 of this Overview report. The convoy could travel at up to 40mph along unconstrained sections, so the assumed speeds include for acceleration and deceleration of the convoy at passing places or constraints. Additional journey time has been added for the convoy to negotiate any remaining constraints, particularly if manual rear wheel steering is required.

Background Traffic Flows

Up to date hourly traffic data has been obtained from the Department for Transport (DfT) and Traffic Wales for the trunk road network. The traffic flows are assumed to be evenly distributed over the hourly count, so that the number of vehicles reaching a police holding point during a convoy movement of six minutes duration is assumed to be 10% of the total hourly flow.

It may be appropriate to commission additional traffic counts along the strategic route to supplement the DfT and Traffic Wales data during the detailed design stage. Additional data has not been obtained to inform the sTMP as the first deliveries are unlikely to commence until 2017, by which time any traffic counts commissioned in 2012 may be considered to be out of date.

Forecast Queues

The number of vehicles and length of the forecast queues of opposing and following traffic have been calculated for the movement of the convoy between each passing place. Geometric queue lengths have been calculated based on an allowance of 8m per vehicle, to include for gaps between vehicles when queuing. Estimates of the anticipated queues are set out in the separate reports covering sections 2 to 6 of the sTMP route. These estimates provide a conservative view of the anticipated delays, as they are based on the ‘leapfrog’ technique of moving from one passing place to another and letting following and opposing traffic queues dissipate. The police prefer to use the ‘caterpillar and bubble’ technique of stopping opposing traffic more regularly within the existing width of the carriageway rather than using the passing places, which further minimises delay to other traffic.

6.2.3 Passing Places

Type

The proposed passing places are a combination of:

- Hardened verges to hold the convoys **entirely off-carriageway**
- Hardened verges to hold the convoys **partly off-carriageway**, where the existing verge is too narrow to accommodate the full width of the convoy vehicles
- Existing **wide sections of carriageway**, where opposing and following traffic could pass under police direction without any physical works

Figure 1-3a in Appendix A of this Overview report shows typical cross sections through each type of passing place showing how an abnormal load vehicle would impact on other traffic.

The use of existing laybys has been avoided where possible as they would have to be closed to the travelling public prior to each movement to ensure they remained available for use by the convoys.

Construction

The hardened verges are likely to be formed in cellular grassed reinforced concrete paving such as grasscrete, or similar to maintain the free draining nature of the verges. The hardened verges would be at the same level as the adjacent carriageway with no upstand, unless the existing carriageway requires a kerb as part of a positive drainage system. In these situations a low level vehicle crossing kerb will be provided

In situations where the existing verge slopes away from the carriageway, minor earthworks may be required to reprofile the slope such that the hardened verge can be incorporated adjacent to the carriageway with minimum crossfall. A minor retaining structure may be necessary where there is insufficient width of verge to accommodate a re-profiled slope at a suitable safe angle. Application of the Road Restraint Risk Assessment Process (RRRAP)[8] may be required. Access for inspection and maintenance of any such retaining structures would be incorporated into the design.

Figure 1-3b in Appendix A of this Overview report shows typical cross sections of passing places in the following four scenarios:

- On **embankment** where slope re-profiling would be possible within the highway boundary
- In **cutting** where slope re-profiling would be possible within the highway boundary
- On **embankment** where slope re-profiling would not be feasible within the highway boundary
- In **cutting** where slope re-profiling would not be feasible within the highway boundary

Geometry

Passing places have been sized to hold up to three abnormal load vehicles 50m in length by 4.5m wide, two civilian escort vehicles and police escort control car. Vehicles will usually be pulled into a passing place in single file, but there are locations where abnormal load vehicles will need to park in parallel if there are more than two because the passing place is wide rather than long. The passing places have been designed to incorporate additional width and length to allow for slight

variation in vehicle configurations, haulier, driver or civilian escort vehicles or use by police escort motorcycles if required.

Location

Passing places have been located within the highway boundary with the aim of minimising the impact of the convoy on the safe movement of other traffic and the environmental impact, as far as possible. They are located on both sides of the road, as the police escort will be able to hold oncoming traffic to allow the convoy to enter and exit a passing place on the opposite side of the road, if required.

Further details of the location of and anticipated works at each passing place are provided in the separate reports covering sections 2 to 6 of the sTMP route.

6.2.4 Contingency Plan

The convoys will be held at the port or in one of the layover areas if there are anticipated road closures or restrictions caused by emergency repair works, severe weather conditions, or similar. In the event of an emergency situation occurring while the convoy is travelling, the convoys will either be moved to their destination sites as quickly as possible to clear the network, or will be stored temporarily at one of the layover areas or designated passing places suitable for longer term storage.

There will be an impact on other traffic when the convoy is stopped in the majority of the passing places. This impact could be reduced visibility at adjacent junctions or along the trunk road, or reduced width of available carriageway that may only permit traffic to pass the convoy in one direction at a time. While the police escort is in attendance, traffic passing the convoy or turning into or out of affected junctions or accesses can be managed by the police. However, the police escort may be called away in the event of an emergency or if the convoy is likely to be delayed for an extended period of time.

The following measures will be implemented to minimise the risk to non-wind farm traffic in the event that the police escort cannot stay with the convoy while it is stopped at a passing place, but there is an anticipated impact on other traffic:

- a **traffic management team** of at least two operatives trained in the use of stop/go boards will travel with the civilian convoy escort to assist in managing the movement of traffic around the convoy
- temporary **warning signs** to be carried with the civilian escort to be erected at appropriate distances either side of the stopped convoy to alert drivers to the presence of an obstruction on the side of the road
- a dedicated portable **temporary traffic signal** team to attend the convoy within specified response times during each convoy movement
- a dedicated vehicle repair support service that will provide instant **roadside assistance** for convoy vehicles for mechanical breakdown during each convoy movement

In the event of an emergency, the police will move the convoy to one of the layover areas, designated longer term storage passing places or destination site, if possible. The contingency plan outlined above would only be required if the convoy was unable to reach one of these locations. Nonetheless, it is assumed that the police escort will remain with the convoy if the police consider the situation unsafe without a police presence.

7. Delivery Times

7.1 Strategy

Convoys will travel during hours of daylight for safety reasons

Newtown:

- **Initially convoys are planned to move through Newtown before 7am on a weekday**
- **No more than one convoy per day will be moved through Newtown between 7am and 7pm on a weekday**

Welshpool:

- **Convoys are planned to move through Welshpool between the morning and lunchtime peaks on a weekday**
- **No more than one convoy per day will be moved through Welshpool between 7am and 7pm on a weekday**

Convoys may also be moved through Welshpool before 7am and through Welshpool and Newtown at weekends or after 7pm on a weekday

7.2 Justification

7.2.1 Night Movements

The police could escort the convoys using an estimated four cars from Ellesmere Port to the border between Cheshire and Wrexham, but would have to use up to six motorcycles and a control car within Wrexham, Shropshire and Powys. Convoys under police motorcycle escort can only be moved during daylight hours, as motorcycle working is not permitted during the hours of darkness due to safety concerns for the riders. The convoy would not be able to see, or be seen by, other traffic leading to unacceptable health and safety risks. The form of police escort can change without stopping the convoy, so there is no need for provision of additional passing places at the Cheshire/Wrexham border. It is therefore proposed to undertake all convoy movements during the hours of daylight.

Sunrise and sunset times provide a conservative interpretation of daylight hours, as the sky starts to lighten at dawn and is only dark at dusk. The time between dawn and sunrise and between sunset and dusk is called twilight. There are three subcategories of twilight, of which civil twilight is the brightest. The beginning and end of civil twilight for any location around the world can be obtained from the United States Naval Observatory. At Oswestry Mile End roundabout, civil twilight begins at 6.30am on 27 February and at 6am on 12 March, approximately 20 minutes before sunrise. However, the suitability of light conditions will be weather dependent and at the discretion of the accompanying police escort.

7.2.2 Frequency of Delivery Days

The total number of convoys and the number of convoy delivery days is defined within the Transport Tool developed by RenewableUK Cymru. A maximum of one convoy will pass through Welshpool and a maximum of one convoy will pass through Newtown between 7am and 7pm on any one weekday to limit the impact on local communities. More than one convoy may be moved during any one day between Ellesmere Port and the layover areas if appropriate.

7.2.3 Times of Day

The impact on the travelling public will be minimised if the convoys are moved at the quietest times of the day. The suitability of the planned delivery schedules will be reviewed once convoy movements commence, to take account of feedback from local communities and the travelling public.

Up to date hourly traffic data obtained from the DfT and Traffic Wales has been used to identify the quietest times of day. There is least background traffic flow along the route before 7am and after 7pm on weekdays. However, the restrictions on moving convoys during the hours of darkness limit movements at these times to the summer months when there are more hours of daylight.

Welshpool and Newtown are the most sensitive locations on the route in terms of existing congestion. Both have a defined weekday morning peak period between 8am and 10am, followed by a longer afternoon peak period that starts at lunchtime. There are also a number of schools along the route which attract traffic between 8am and 9am and between 2.30pm and 4pm. Traffic flows at weekends tend to be lower than during the week, particularly outside the holiday season.

Analysis of the traffic data demonstrates that the following four options are most the most suitable convoy delivery times:

Early morning	Convoys depart Ellesmere Port or the layover areas in the early morning to pass sensitive locations before 7am This option would only be feasible for up to 7 months of the year, depending on weather conditions
Late evening	Convoys depart Ellesmere Port or the layover areas at around 7pm to pass sensitive locations in the late evening This option would only be feasible during June and July, depending on weather conditions. There is a risk that convoys could be stranded in an emergency situation as darkness falls
Weekends	Convoys depart Ellesmere Port or the layover areas during the morning to pass sensitive locations by lunchtime This option should be feasible all year, depending on weather conditions, but could only be used for two days per week
Morning interpeak	Convoys depart Ellesmere Port or the layover areas at around 9.30am to pass sensitive locations between the morning peak period and the start of the afternoon peak period This option would be feasible all year, depending on weather conditions

The morning interpeak option has the highest background traffic flows and is therefore the worst case scenario of those listed above. However, convoy movements through Newtown between 7am and 7pm are unlikely to be permitted due to perceived amenity impacts. The A483/A489 Newtown Bypass is currently planned to start in late 2014 or early 2015, subject to the completion of statutory procedures and the availability of finance. A bypass around Newtown would reduce traffic flows through the town, which may permit greater flexibility in the timing of convoys.

For convoys moving to **SSA B (north) through Welshpool**, the following delivery times have been used as the basis of queue calculations in the separate reports covering sections 2 and 3 of the sTMP route.

- **Day 1**: Convoys depart Ellesmere Port at around 9.30am to stop at Mile End layover area before lunchtime
- **Day 2**: Convoys depart Mile End layover area at around 9.30am to pass through Welshpool before the afternoon peak period

For convoys moving to **SSA B (south) and SSA C through Newtown**, the following delivery times have been used as the basis of queue calculations in the separate reports covering sections 2, 4, 5 and 6 of the sTMP route.

- **Day 1**: Convoys depart Ellesmere Port at around 9.30am to stop at Abermule layover area before lunchtime
- **Day 2**: Convoys depart Abermule layover area at around 6.30am to pass through Newtown before 7am and avoid school start times in Dolfor

It may be feasible to move one convoy in the early morning or late evening and one convoy during the morning interpeak on the same delivery day during the summer months. Convoy movements during the holiday season may be permitted during the early morning or late evening, if it can be shown that there is limited conflict with tourist traffic. Movements to SSA B (north) may occur at the same time as movements to SSA B (south) or SSA C.

7.2.4 Journey Durations

The journey times for the movements from the layover areas to the wind farm sites have been calculated assuming that the convoys stop at each passing place to allow following and opposing traffic to clear. This is a conservative assumption, as the police prefer to keep the convoy moving if possible.

It has been assumed that the police will enable following and opposing traffic queues to dissipate at the same time where there is sufficient carriageway width. An allowance of 2.5 seconds per vehicle has been incorporated into the journey time calculations for queue dissipation. This is a robust allowance based on the general principles of saturation flows at traffic signal junctions[10].

Further details of the assumed journey durations for each section of the route are provided in the separate reports covering sections 2 to 6 of the sTMP route.

8. Public Awareness

8.1 Strategy

A public awareness campaign will be undertaken to ensure that:

- **local communities understand the nature and timing of the turbine component deliveries into Mid Wales**
- **the travelling public is informed of the implications of the movements on their journeys**

8.2 Justification

8.2.1 Local Communities

RenewableUK Cymru members are committed to ensuring that local communities along the strategic route into Mid Wales understand the scale, nature and anticipated timing of the turbine component deliveries.

Information regarding the size of vehicles, number and frequency of convoys, timings and forecast delay to following and opposing traffic will be disseminated to residents and businesses of communities likely to be affected. The information could be provided in the following forms:

- Briefing sessions to allow local residents and businesses to ask questions
- Targeted letters for residents and businesses
- Newsletters delivered door to door
- Advertisements in the local press
- Dedicated website
- Information packs for local Councils to enable Officers to respond to concerns

The details of the approach to communicating with the local communities will be agreed with the relevant planning and highway authorities after planning consent for those projects already lodged in the planning system. Pre-application consultation may be appropriate for projects seeking consent through the Infrastructure Planning Commission or the National Infrastructure Directorate of the Planning Inspectorate.

8.2.2 Travelling Public

The timing of turbine component deliveries, including anticipated delays and alternative routes, will be publicised across a range of media up to four weeks in advance. Methods of publication could include:

- Relevant websites that provide information on current traffic conditions and planned roadworks, such as Traffic Wales and Traffic England
- Local and regional radio stations
- Local and regional press

Mobile variable message signs (VMS) will be located at key points on the network to advise drivers of planned turbine component movements and the anticipated impact on journeys. The most suitable VMS locations will be agreed with the relevant highway authorities, but could include:

- A5 at Chirk
- A5 at Oswestry
- A55 at Chester
- A483 at Wrexham
- A458 at Shrewsbury
- A470 at Rhayader
- A483 at Llandrindod Wells
- A487 at Machynlleth
- A470 at Dolgellau

The wind farm developers are committed to providing a contribution towards the cost of implementing the VMS strategy. The suitability of the approach to communicating details of the convoy movements to the travelling public will be reviewed by the developers in conjunction with the highway authorities once deliveries have commenced and the local planning authorities have received any feedback from affected drivers.

9. Highway Improvements

9.1 Strategy

Localised improvements to the public highway network will be undertaken to facilitate movement of the convoys

Assessment has been undertaken of 25 pinch points along the trunk road network, as well as along the unclassified roads across the Vastre, and improvement measures proposed where required to facilitate movement of the convoys

9.2 Justification

9.2.1 Horizontal Alignment

Dry Runs

A series of dry runs to mimic the movement of a typical blade and tower vehicle along the trunk road network from Ellesmere Port to SSA B (north), SSA B (south) and SSA C were undertaken in July 2010. The route across the Vastre was trialled in a similar way in 2007. A series of 25 pinch points were identified where the dry run vehicle had difficulty negotiating the existing highway alignment along the trunk road network. The list of pinch points requiring further assessment was agreed with the Welsh Government for consistency.

Vehicle Profiles

Vehicle profiles were created using AutoTrack software for a typical vehicle carrying a 45m blade and a typical vehicle carrying a 4.5m wide base tower section vehicle as the longest and widest loads respectively. The tower section delivery vehicle that was trialled during the July 2010 dry runs was an extendible low loader rather than a specialist transporter vehicle that clamps the tower section between front and rear bogies.

For the purposes of the assessment of pinch points, it has been assumed that the base tower section is moved with an extendible low loader as it is the worst case option in terms of the swept paths at constraints. The clamped vehicle offers greater manoeuvrability, as the rear bogie unit can pivot independently of the front bogie unit, as well as independently of the cab. Details of the vehicle profiles used in the assessment of pinch points are given in Appendix B of this Overview report.

It should be noted that the extendible low loader tower transport vehicle is shorter than the clamped tower transport vehicle. For this reason, the longer clamped tower transport vehicle has been used in the design of passing places.

Swept Path Analysis

The swept paths of the blade and base tower section vehicles have been compared to identify the worst case scenario at horizontal constraints. Figure 1-4a in Appendix A of this report shows the blade vehicle requires the largest swept area for a 90 degree turn, with the exception of a very narrow area of additional oversail when the base tower section vehicle comes out of the turn. This

additional oversail area is likely to be at approximately 2.5m above ground level due to the circular nature of the tower sections. Swept path analysis has been undertaken using AutoTrack software at each of the pinch points identified through the July 2010 dry runs and along the Vastre using the blade vehicle.

It has been assumed that any cranes or transformers that may be moved to the wind farm sites will fall within the vehicle profile envelope and thus the swept area of the turbine components. Any developer aiming to transport larger components to SSA B and C will be responsible for undertaking any additional swept path analysis that may be required.

Base Mapping

The swept path analysis has been based on 1:2,500 scale Ordnance Survey (OS) mapping (Mastermap) supplemented by topographical survey data where available. Whilst OS is less accurate than topographical data, positive action has been taken to improve confidence in the outcome of the analysis. These actions include:

- **Site visits** to verify the features shown on the OS mapping represent the current situation
- **On site measurements** to accurately locate street furniture in relation to highway features such as splitter islands and land boundaries
- Detailed review of the **video survey footage** undertaken during the dry runs at each pinch point to ensure that the movement of the vehicle used in the swept path analysis reflects the actual movement of the vehicle during the dry runs.

Further details of the outcome of the swept path analysis are provided in the separate reports covering sections 2 to 6 of the sTMP route.

9.2.2 Concept Designs

Highway improvements have been proposed at each of the pinch points where the swept path analysis indicated that the vehicle may have difficulty negotiating the constraint. The improvements proposed are preliminary designs showing an indication of surfacing, edge treatment, and removal or replacement of street furniture. Any improvement works that may constitute a Departure from Standard are detailed in the separate reports covering sections 2 to 6 of the sTMP route.

Base Mapping

The concept designs are based on 1:2,500 scale Ordnance Survey mapping (Mastermap) supplemented by topographical survey data where available. A tolerance of 500mm has been incorporated into the design process to allow for slight variations in vehicle configuration, potential high level oversail of the base tower section, possible variation in vehicle position during manoeuvres or mapping details. It may be appropriate to obtain additional topographical survey data to inform the detailed design of the highway improvements, which will be undertaken after planning consent as part of a highway works agreement (such as a Section 278 Agreement).

The location of the adopted highway boundary has been assumed, based on discussions with the relevant highway authority. If this is found to be inaccurate, the designs may need to be revisited.

Manual Rear Wheel Steering

Manual rear wheel steering has been avoided at more than half of the locations assessed on the trunk road network in order to maintain the speed of the convoy. Highway improvements that

would obviate the need for manual rear wheel steering can be achieved in some locations if required, but would involve more substantial engineering solutions.

Highway Safety

The continuing safety of the travelling public has been a primary consideration during the design of the highway improvements. It is important that any changes to the public highway are in keeping with the existing route, to ensure consistent conditions for drivers.

Critical road signs that cannot be safely relocated have been avoided, and alterations to the existing carriageway have been minimised. Where possible, street furniture that may be impacted by the swept path movement will be permanently relocated rather than being replaced with demountable versions, so that street furniture is not in a demounted state when the highway is in use by normal traffic.

Overrun of footways and cycleways has been designed out along the route. Oversail of footways or cycleways may be required at up to eight locations, but this will be controlled by the civilian escort that accompanies the abnormal load convoy.

It is recommended that a Stage 1 Road Safety Audit is undertaken prior to the detailed design stage to highlight any key issues to be addressed.

Utilities

Records of utilities present along the route have not been obtained as part of this sTMP. Overhead lines and evidence of underground services observed during site visits has been incorporated into the preliminary designs. Utility records will be reviewed as part of the detailed design process for the highway works agreement, and any required protection or diversion works progressed at that stage.

Details of highway improvements proposed for each section of the route are provided in the separate reports covering sections 2 to 6 of the sTMP route.

9.2.3 Vertical Alignment

The dry runs undertaken in 2010 did not identify any areas along the route where the existing vertical alignment caused problems for the abnormal load vehicles. However, the 2010 trial runs did not model the anticipated ground clearance of the delivery vehicles. A further series of dry runs will be commissioned to test the adequacy of the highway improvements prior to the commencement of deliveries. These dry runs will also model the ground clearance of a typical delivery vehicle to ensure that the convoys can negotiate any vertical changes in level not identified in the original dry runs.

Any areas where localised changes in vertical alignment may impact the movement of the abnormal load vehicles can be overcome by raising the load to be carried at a higher level, giving greater clearance beneath. If required, the load could be raised whilst the convoy is parked in the preceding passing place and then lowered while parked in the following passing place. Additional time would have to be factored into the journey times to account for the raising and lowering operation.

The route from Newtown across the Vastre has been assessed to identify improvement works that may be necessary to ensure that the maximum longitudinal gradient does not exceed 14% and that the risk of abnormal load vehicles grounding out due to the vertical curvature of the route is

minimised. Further details are provided in the separate report covering section 6 of the sTMP route.

9.2.4 On Street Parking

There are no on street parking issues along the strategic route that would impact on the delivery of turbine components. The parked vehicles encountered during the July 2010 dry runs did not affect the convoy movement. It is not proposed to limit on street parking through the implementation of Traffic Regulation Orders. If on street parking increases between the publication of this sTMP and the commencement of deliveries such that there are concerns that the movement of the convoys may be compromised, consultation will be undertaken with the relevant highway and police authorities and the local communities to identify an appropriate solution.

9.2.5 Further Dry Runs

A further series of dry runs will be commissioned to test the adequacy of the highway improvements and to allow accurate section timings to be established prior to the commencement of deliveries. These dry runs will model the ground clearance of a typical delivery vehicle to ensure that the convoys can negotiate any vertical changes in level not identified in the original dry runs. If any further highway modifications are required, these will be identified at this stage.

10. Structures

10.1 Strategy

All structures that will be subject to the gross vehicle weight of the abnormal loads will be assessed for loading capacity, and will be strengthened if required

Condition surveys of all highway and third party structures that could be affected will be undertaken prior to and on completion of deliveries for each site

The wind farm developers will indemnify the relevant highway authorities against any damage caused to any highway structures, surfacing or adjoining slopes by the delivery of turbine components to wind farm sites, up to the statutory requirements of the relevant highways authority

10.2 Justification

10.2.1 Headroom and Width

Highway structures that pass over the route may represent a restriction in headroom or width to the movement of the abnormal load convoys. Details of all structures along the strategic route with clearances of less than 5m in height or 5m in width were requested from the relevant highway authorities. Further details are provided in the separate reports covering sections 2 to 6 of the sTMP route.

10.2.2 Listed Structures

A listed structure is officially recognised as having special historical or architectural interest and is therefore protected from demolition, extension or alteration without special permission from the local planning authority. Details of all listed structures along the strategic route were requested from the relevant highway authorities. Further details are provided in the separate reports covering sections 2 to 6 of the sTMP route.

10.2.3 Loading Capacity

The heaviest abnormal load associated with the construction of a wind farm is likely to be the nacelle, crane or transformer. The maximum gross vehicle weight of the heaviest load is assumed to be 130 tonnes. However, the delivery vehicles will be configured to comply with the Road Vehicles (Construction and Use) Regulations 1996, such that the maximum weight per axle is no more than a standard HGV.

All structures which will be subject to the gross vehicle weight will need to be assessed for loading up to 130 tonnes, unless an assessment has already been carried out. Affected structures could include bridges, retaining walls and any steep side slopes that support the carriageway. Details of any highway structures likely to be subject to the gross vehicle weight that have not been assessed up to 130 tonnes have been requested from the relevant highway authorities. Full structural assessments of these structures will be undertaken and any structures found to be inadequate will be strengthened as necessary prior to the commencement of deliveries.

Geotechnical assessments will be undertaken for any side slopes that are considered at risk of collapse from the weight of the convoys.

Details of the structures and slopes that will require further assessment are provided in the separate reports covering sections 2 to 6 of the sTMP route.

10.2.4 Condition Surveys

Repeated trafficking of heavy vehicles may impact on highway structures along the route, even though the anticipated axle weights will be no greater than standard HGVs. Third party structures close to the road may be affected by repeated vibration. A list of all highway and third party structures that may be affected by the turbine deliveries, even though they may not be subject to the gross vehicle weight, will be drawn up in conjunction with the relevant highway and planning authorities. A condition survey of each of structure on the agreed list will be undertaken prior to the commencement of turbine component deliveries. Further condition surveys will be undertaken at regular intervals in agreement with the Highway Authority. The condition survey reports will be provided to the relevant authorities within 28 days.

The wind farm developers will indemnify the relevant highway authorities against any damage caused to any highway structures, surfacing or adjoining slopes by the delivery of turbine components to wind farm sites, up to the statutory requirements of the relevant highways authority.

11. Environmental Impact

11.1 Strategy

The concept designs for the passing places, highway improvements and layover areas have been designed to minimise their environmental impact

Environmental assessment of the Pool Quay and Abermule layover areas, all highway improvements and all passing places will be undertaken prior to planning consent

Environmental assessment of the Mile End layover area will be undertaken prior to the detailed design stage, if required

11.2 Justification

11.2.1 Sustainable Design

The concept designs presented as part of this sTMP have been developed to minimise any negative environmental impact. The hardened verges associated with passing places are proposed to be constructed using cellular reinforced concrete grass, which will maintain the existing drainage regime of infiltration of surface water runoff directly into the ground. Hedgerow removal has been kept to a minimum through proposing interventions largely within the existing highway boundary.

11.2.2 Environmental Assessment

RenewableUK Cymru has commissioned environmental assessment of the Pool Quay and Abermule layover areas, all highway improvements and all passing places for the Mid Wales wind farms covered by this sTMP. The findings of the environmental assessment may impact on the form and location of the passing places and highway improvements, so there may be a need to revise the proposals included within this sTMP. The recommendations of the environmental assessment will be incorporated into the detailed design associated with the highway works agreement.

RenewableUK Cymru, or the relevant developers, will commission environmental assessment of the proposed layover areas near to the Mile End roundabout, if appropriate. It is likely that environmental assessment of the Shropshire Council owned site will be required as part of any planning application for the works. Environmental assessment of the use of the new Oswestry livestock market lorry park as a layover area may not be required. The findings of the environmental assessment may affect the choice of layover area at Mile End. The recommendations of the environmental assessment will be incorporated into the design of the Mile End layover area, if appropriate.

12. Next Steps

RenewableUK Cymru is committed to undertaking the following additional tasks to ensure that the planned turbine component deliveries can occur in a safe manner with minimal disruption to the public. Each task will be presented as a separate Addendum to the sTMP.

Before Planning Consent

- Environmental assessment of Pool Quay and Abermule layover areas, passing places and highway improvement works where required
- Stage 1 Road Safety Audit of proposed highway works

Post Planning Consent

- Public awareness campaign
- Development of plans for a layover area at Oswestry near Mile End roundabout, including appropriate environmental assessment
- Structural assessments to analyse the loading capacity of existing highway structures that will be subject to the full gross vehicle weight, and the design and implementation of any required strengthening measures
- Condition surveys of highway and third party structures that may be affected
- Detailed design and implementation of works required for highway improvements, passing places and layover areas
- Trial runs to test the highway improvements

Acknowledgements

This sTMP prioritises the interests of the following financial contributors:

- Acciona Energy UK Ltd
- Amegni Ltd
- Independent Power Systems
- Vattenfall UK
- Pennant Walters
- RES UK & Ireland Ltd
- RWE NPower Renewables
- ScottishPower Renewables

In addition, the following parties and their consultants have provided input and assisted in the development of this sTMP:

- Cheshire Police
- Cheshire West and Chester Council
- Dyfed Powys Police
- Highways Agency
- Manchester Ship Canal Company
- National Grid
- North and Mid Wales Trunk Road Agency
- Powys County Council
- Quality Freight (UK) Ltd
- Shropshire Council
- Tegni Cymru Cyf
- Welsh Government
- West Coast Energy Ltd
- West Mercia Police

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Appendix A: Figures

Figure 1-1: Strategic Routes into Mid Wales
Figure 1-2a: Potential Layover Area Locations – Mile End, Oswestry
Figure 1-2b: Potential Layover Area Locations – Pool Quay
Figure 1-2c: Potential Layover Area Locations – Abermule
Figure 1-3a: Passing Place Typical Details (Sheet 1 of 2)
Figure 1-3b: Passing Place Typical Details (Sheet 2 of 2)
Figure 1-4a: Swept Path Analysis Vehicle Comparison

Appendix B: Swept Path Analysis Vehicle Profiles

The largest turbine components assumed to require access to the proposed wind farm sites in SSA B and C are turbine blades up to 45m long and tower sections up to 4.5m wide. These dimensions offer a typical worst case covering the majority of 2 to 3MW machines currently available. The exact dimensions and weights of the components depend on the turbine model. The nacelle and hub unit, transformers and cranes required to erect the turbines are assumed to be narrower and/or shorter than the tower and blade sections.

The turbine components will be moved to the wind farm sites using extendible vehicles that can be reduced in length to a standard size heavy goods vehicle (HGV) once their loads are delivered. There are two types of vehicle that could be used to move the tower sections: an extendible low loader or a specialist transporter vehicle that clamps the tower section between front and rear bogies.

The extendible low loader vehicle is shorter than the clamped tower transport vehicle. However, the clamped vehicle offers greater manoeuvrability, as the rear bogie unit can pivot independently of the front bogie unit, as well as independently of the cab. For the purposes of the assessment of pinch points, it has been assumed that the base tower section is moved with an extendible low loader as it is the worst case option in terms of the swept paths at constraints. The vehicle profile within this Appendix models the movement of the extendible low loader option.

Passing places have been sized to hold up to three abnormal load vehicles 50m in length by 4.5m wide, plus two civilian escort vehicles. The passing places will therefore be large enough to accommodate three blade vehicles or three clamped tower section vehicles.

RenewableUK Cymru

Strategic Traffic Management Plan for Mid Wales Wind Farms

Section 2 of 6: Ellesmere Port to Welshpool

August 2012

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1. Introduction

1.1. Background

Grontmij has been commissioned by RenewableUK Cymru to develop a strategic Traffic Management Plan (sTMP) to address the likely cumulative impacts of the transportation of wind turbine components as abnormal loads to potential wind farms in Mid Wales. The movement of turbine components along the public highway will create conflict with other traffic, unless suitably planned and managed, due to the anticipated size of the loads. This potential conflict will be intensified if more than one wind farm is constructed at the same time.

RenewableUK Cymru members and relevant public sector stakeholders have worked together to support a strategic approach to managing traffic impacts associated with the Mid Wales wind farms in a safe manner. The sTMP aims to use this collaborative work to establish a consistent and workable traffic management strategy to facilitate future onshore wind development in the region.

1.2. Scope of sTMP

The sTMP sets out the general principles for managing the delivery of turbine components as abnormal loads from Ellesmere Port to the proposed Mid Wales wind farms. It prioritises the safe, efficient delivery of the loads whilst minimising delay to the travelling public and amenity impact on local communities. It does not consider the impact of general construction traffic on the public highway network, or the total number of convoys to be moved.

The sTMP has been developed through detailed discussion with key stakeholders, including the relevant local and strategic highway and planning authorities, police forces and developers.

1.3. Purpose of this Ellesmere Port to Welshpool Report

The sTMP is presented in a modular format to enable the different sections of the route to be considered separately. Sections that are not dependent on each other can therefore be approved individually, if appropriate. This Ellesmere Port to Welshpool report comprises the second of the series of six reports as follows:

- Section 1: Overview report
- Section 2: Ellesmere Port to Welshpool (Common Section)
- Section 3: Welshpool to SSA B (north)
- Section 4: Welshpool to Newtown
- Section 5: Newtown to SSA B (south)
- Section 6: Newtown to SSA C

This Section 2: Ellesmere Port to Welshpool report sets out the detailed assessment and proposals for the common section of the strategic route. It should be read in conjunction with Section 1: the Overview report.

2. Strategic Route

2.1. Whole Route Strategy

Turbine components will be moved as abnormal loads in convoys from Ellesmere Port into Mid Wales via a strategic route along the public highway network

The strategic route has a common section from Ellesmere Port docks:

- **M53 – A55 – A483 – A5 – A483 to Welshpool**

The strategic route diverges at Welshpool:

- **B4381 through Welshpool – A458 – SSA B (north)**
- **A483 to Newtown – A489 Llanidloes Road – A470 – SSA B (south)**
- **A483 to Newtown – A489 Kerry Road – the Vastre – A483 – SSA C**

2.2. Detail for Ellesmere Port to Welshpool

2.2.1. Route Description

All turbine component deliveries will be moved along the common section of the route. Convoys will depart Ellesmere Port docks and join the A5032 Merseyton Road which connects directly to the M53 at junction 9. The route follows the M53 and then the A55 as far as the Posthouse roundabout at junction 36, where it turns south along the A483 into Wales. The route follows the A483 past Wrexham towards Oswestry, where it becomes the A5 before reverting to the A483 as far as Welshpool.

Layover areas will be established close to the Mile End roundabout at Oswestry and at the Pool Quay highway depot north of Welshpool. Further details of the layover areas are given in chapter 4 of the Overview report.

The total length of the common section of the route is 81km, of which 40km is dual carriageway and 11km is wide single carriageway. The remainder of the route is single carriageway. The common section is trunk road, other than the 500m of A5032 Merseyton Road and the privately maintained docks roads. There are four different highway authorities for the common section of the route.

Further details for the common section of the route are given in the table below and shown on Figure 2-1 in Appendix A of this report.

Table 2-1: Description of Common Section of the Route

Section	Highway Authority	Description
Minor docks roads	Privately maintained	Single carriageway providing a link to the public highway network
A5032 Merseyton Road	Cheshire West and Chester Council	500m of single carriageway route designed for large vehicles associated with the docks
M53 junction 9 to junction 12	Highways Agency Area 10	Dual 2 lane motorway with 7.3m carriageway plus hardshoulder
A55 from M53 junction 12 to junction 36	Highways Agency Area 10	Dual 2 lane all purpose with 7.3m carriageway plus 1m hardstrips
A483 from A55 junction 36 to Welsh border north of junction 7	Highways Agency Area 10	Dual 2 lane all purpose with 7.3m carriageway plus 1m hardstrips
A483 from Welsh border to junction 1 at Ruabon	Welsh Government	Dual 2 lane all purpose with 7.3m carriageway plus 1m hardstrips
A483 from junction 1 to Halton roundabout	Welsh Government	Single with 7.3m carriageway
A5 from Halton to the Ceiriog Viaduct	Welsh Government	Wide single with 10m carriageway
A5 from the Ceiriog Viaduct to Mile End roundabout at Oswestry	Highways Agency Area 9	Wide single with 10m carriageway
A483 from Mile End roundabout to Welsh border at Llanymynech	Highways Agency Area 9	Single with 7.3m carriageway or less
A483 from Llanymynech to Welshpool Station Road roundabout	Welsh Government	Single with 7.3m carriageway or less

2.2.2. Traffic Flows

Traffic count data has been obtained from 26 automatic traffic counters (ATCs) along the common section of the route. Figure 2-2 shows the location of the counters, the year that the data was collected, the Annual Average Daily Traffic (AADT) and the peak hour.

It can be seen that the M53 on the northern part of the route carries up to 70,000 vehicles on an average day. This drops to around 15,000 vehicles on an average day on the A483 at Welshpool. The peak hour is generally 08.00 to 09.00 or 17.00 to 18.00.

3. Traffic Management

3.1. Whole Route Strategy

The aim is to limit the delay to the travelling public to a maximum of 10 minutes

South of Oswestry, police motorcyclists will travel ahead of the convoys and hold oncoming traffic wherever the carriageway is wide enough to allow the convoys to pass

A back up network of designated passing places will enable convoys to move from passing place to passing place, waiting at each to allow following and opposing traffic to clear, if required

Each passing place will be large enough to hold a single convoy

Key passing places will be designated as suitable for longer term storage in the event of an emergency

3.2. Detail for Ellesmere Port to Welshpool

3.2.1. Ellesmere Port to Oswestry

North of the layover area near to Mile End roundabout at Oswestry, the route is either dual carriageway or wide single carriageway, with the exception of a section of 7.3m single carriageway on the approach to and across the Newbridge viaduct between Ruabon and the Halton roundabout. Figure 2-3h in Appendix A of this report shows a proposed passing place to the south of Halton roundabout to allow following and opposing traffic queues to dissipate after the convoy leaves this narrower Newbridge viaduct section.

Opposing traffic should not otherwise conflict with the convoy movements. On the dual carriageway sections, following traffic should be able to overtake if the wide vehicles are able to overhang the hardshoulder or verge. The convoys will move at their maximum speed of 40mph on the trunk road network between roundabouts. It is not anticipated that the convoys will need to be pulled over to allow following traffic to pass along this section, so there is no requirement for passing places.

Variable Message Signing (VMS) at the on slip road at junction 11 of the M53 will be needed to give advance warning to traffic joining from the M56 of the potential conflict with a convoy.

3.2.2. Oswestry to Welshpool

South of the layover area near to Mile End roundabout at Oswestry, it is likely that oncoming traffic will conflict with convoys due to the reduced carriageway width. The police escort will keep the convoy moving as much as possible, but a backup network of passing places will be provided, as described in chapter 6 of the Overview report.

Six passing places are proposed between the Mile End roundabout at Oswestry and Welshpool. The locations of the passing places are shown on Figure 2-3a in Appendix A of this report. The

Pool Quay layover area will also be used to hold convoys to allow following and opposing traffic queues to dissipate, and is suitable for longer term storage if required.

Figures 2-3b to 2-3g in Appendix A of this report show how a mixed convoy comprising one 45m blade vehicle, two base tower section vehicles, two civilian escort vehicles and police escort control car could be stored at each passing place. The figures also suggest locations at which the police could prevent traffic, which might conflict with the convoy movement to the next passing place, from joining the route.

The table below summarises the key details of each passing place. For details of the strategy for locating passing places, see chapter 6 of the Overview report.

Table 2-2: Passing Places along Common Section of the Route

Ref	Grid reference	Location	Type
2-3h	329968, 336011	A483 Lion Quay	Wide section of carriageway
2-3b	328958, 326484	B5069 south of Oswestry	Wide section of carriageway
2-3c	328222, 324059	A483 Llynclys crossroads	Off carriageway southbound, police escort needed at all times as convoy will restrict visibility for traffic turning out of B4396
2-3d	326819, 318679	A483 Four Crosses bypass	Wide section of carriageway
2-3e	326093, 315987	A483 Arddleen	Partially off carriageway northbound
2-3f	326055, 313155	A483 Pool Quay	**Layover area** off carriageway northbound
2-3g	324607, 309692	A483 Rhalt Lane/The Moors	Partially off carriageway southbound

4. Delivery Times

4.1. Whole Route Strategy

Convoys will travel during hours of daylight for safety reasons

Newtown:

- **Initially convoys are planned to move through Newtown before 7am on a weekday**
- **No more than one convoy per day will be moved through Newtown between 7am and 7pm on a weekday**

Welshpool:

- **Convoys are planned to move through Welshpool between the morning and lunchtime peaks on a weekday**
- **No more than one convoy per day will be moved through Welshpool between 7am and 7pm on a weekday**

Convoys may also be moved through Welshpool before 7am and through Welshpool and Newtown at weekends or after 7pm on a weekday

4.2. Detail for Ellesmere Port to Welshpool

4.2.1. Ellesmere Port to Oswestry

The distance from Ellesmere Port docks to the layover area near to the Mile End roundabout at Oswestry is 57km (35.4 miles). An assessment of how the convoys will negotiate the one priority junction and seven roundabouts along the route is given in the next chapter of this report.

The anticipated duration of the journey between Ellesmere Port docks and the layover area at the Mile End roundabout is **1 hour 24 minutes**. This assumes:

- an average speed of **30mph**
- plus **one minute** for each junction
- plus an additional **two minutes** for each junction requiring manual rear wheel steering
- plus an additional **three minutes** to allow following and opposing traffic to clear whilst stopped at the A483 Lion Quay passing place (reference 2-3h)

Other traffic will be able to pass the convoy along the remainder of this section due to the width of the carriageway, and may only experience minor delays at junctions.

4.2.2. Oswestry to Welshpool

The distance from the layover area near to the Mile End roundabout at Oswestry to the most southerly proposed passing place along the common section of the route at Rhalt Lane/The

Moors to the north of Welshpool is 21km (13 miles). There are no significant constraints along this section.

The anticipated duration of the journey between Mile End roundabout at Oswestry and the Rhalt Lane/The Moors passing place is **37 minutes**. Table 2-3 sets out the details of the forecast journey duration and queue lengths for a convoy departing the Mile End layover area at approximately 9.30am, which is the worst case scenario as described in the Overview report.

The table shows that the longest queue formed along the common section is anticipated to be an average of 51 vehicles at the Four Crosses passing place. This equates to approximately 408m of queued traffic.

The passing place at Four Crosses does not have sufficient width to permit following and opposing traffic to pass the convoy at the same time. It is assumed that opposing traffic will be allowed to clear before following traffic once the convoy is at the passing place so that individual vehicles will not be delayed by more than 10 minutes.

The total duration of the journey from Ellesmere Port to the Rhalt Lane/The Moors passing place is estimated to be **2 hours 1 minutes**

If the police move the convoys using the 'caterpillar and bubble' method, and do not use any of the available passing places, the anticipated duration of the journey between Mile End roundabout at Oswestry and the Rhalt Lane/The Moors passing place is **29 minutes**, and the total duration of the journey from Ellesmere Port to the Rhalt Lane/The Moors passing place is estimated to be **1 hour 50 minutes**.

Notes associated with Table 2-3:

1. Convoy assumed to depart Mile End layover area at approximately 9.30am
2. Average speed of convoy assumed to be 30mph
3. Traffic flows are assumed to be evenly distributed over the hourly count, so that the number of vehicles reaching a police holding point during a convoy movement of six minutes duration is assumed to be 10% of the total hourly flow
4. Queue dissipation rates assumed to be 2.5 seconds per vehicle
5. Geometric queue lengths assumed to be 8m per vehicle
6. Time to allow following traffic to clear is zero if carriageway width permits opposing and following traffic to pass convoy at the same time
7. Delay to following traffic calculations assume that following traffic is stopped, however following traffic will only be delayed by the difference between the speed of the convoy and normal traffic speed
8. See chapters 6 and 7 of Overview report for details of method of calculation
9. Numbers are rounded to the nearest whole minute, vehicle and metre
10. Queues may form on other arms of affected junctions, but these are anticipated to be less than the queues along the strategic route

Table 2-3: Journey Time and Queue Lengths for Common Section of Route

Passing place from	Passing place to	Section	Distance (km)	Delay at constraints (mins)	Time taken to reach passing place (mins)	Average hourly opposing traffic (vehs)	Opposing traffic queue (vehs)	Opposing traffic queue (m)	Average hourly following traffic (vehs)	Following traffic queue (vehs)	Following traffic queue (m)	Time to allow opposing traffic to clear (mins)	Time to allow following traffic to clear (mins)	Section duration (mins)	Cumulative duration (mins)
n/a	2-3b	Oswestry Mile End to B5069	2.7	0	3	587	33	264	397	22	176	1	0	4	4
2-3b	2-3c	B5069 to Llynclys	2.7	0	3	553	31	248	348	20	160	1	0	4	8
2-3c	2-3d	Llynclys to Four Crosses	5.8	0	7	423	51	408	395	47	376	2	2	11	19
2-3d	2-3e	Four Crosses to Arddleen	3.1	0	4	346	22	176	361	23	184	1	0	6	25
2-3e	2-3f	Arddleen to Pool Quay	2.7	2	5	233	13	104	302	17	136	1	0	6	31
2-3f	2-3g	Pool Quay to The Moors	3.9	0	5	217	17	136	363	29	232	1	0	6	37

5. Highway Improvements

5.1. Whole Route Strategy

Localised improvements to the public highway network will be undertaken to facilitate movement of the convoys

Assessment has been undertaken of 25 pinch points along the trunk road network, as well as along the unclassified roads across the Vastre, and improvement measures proposed where required to facilitate movement of the convoys

5.2. Detail for Ellesmere Port to Welshpool

5.2.1. Horizontal Alignment

Swept path analysis has been undertaken at eight constraints along the common section of the route. The locations of these pinch points are shown on Figure 2-4a in Appendix A of this report. Details of the approach to the swept path analysis are set out in chapter 9 of the Overview report.

Highway improvements have been proposed at each of the constraints where the swept path analysis indicated that the vehicle may have difficulty negotiating the constraint. Details of the outcome of the swept path analysis and any proposed highway improvements are shown on Figures 2-4b to 2-4i in Appendix A of this report and summarised in the table below.

Table 2-4: Summary of Swept Path Analysis along Common Section of Route

sTMP Ref	Dry Run Ref	Location	Proposed Highway Improvements
2-4b	A1.01	A5032 Ellesmere Port	Kerb realignment, reduction in footway width to 1.8m, relocation of some street furniture, dock road to be resurfaced
2-4c	A1.04	A483 Belgrave roundabout	Overrun area on central island to support clockwise convoy movement.
2-4d	A1.05	A483 Halton roundabout	Overrun area on central island to support clockwise convoy movement, relocation of chevron board
2-4e	n/a	A5 Gledrid roundabout	None
2-4f	A1.09	A5 Five Crosses roundabout	Overrun area on central island to support clockwise convoy movement, relocation of chevron board
2-4g	A1.10	A5 Oswestry roundabout	None if manual rear wheel steering used
2-4h	A1.11	A5 Mile End roundabout	Minor overrun area on central island to support anticlockwise convoy movement
2-4i	A1.25	A483 Buttington Cross roundabout	Minor overrun area on central island to support anticlockwise convoy movement, relocation of chevron board and one way sign

Note that further swept path analysis of the Mile End roundabout may be required to support the detailed design associated with the layover area.

5.2.2. Vertical Alignment

The July 2010 dry runs demonstrated that there are no vertical alignment issues on the common section of the route.

6. Structures

6.1. Whole Route Strategy

All structures that will be subject to the gross vehicle weight of the abnormal loads will be assessed for loading capacity, and will be strengthened if required

Condition surveys of all highway and third party structures that could be affected will be undertaken prior to and on completion of deliveries for each site

The wind farm developers will indemnify the relevant highway authorities against any damage caused to any highway structures, surfacing or adjoining slopes by the delivery of turbine components to wind farm sites, up to the statutory requirements of the relevant highways authority

6.2. Detail for Ellesmere Port to Welshpool

Details have been obtained from the relevant authorities of all highway structures along the common section of the route that:

- Restrict the available **headroom** or **carriageway width** to less than 5m
- Hold **listed** status
- May require a structural assessment to identify the **loading capacity** if subject to the gross weight of the abnormal load vehicles

The locations of these structures are shown on Figure 2-6 in Appendix A of this report. The details of the structures are summarised in the table below.

Table 2-5: Highway Structures along Common Section of Route

Local Ref	Location	Description	Constraint
1120, 1230	A483 Plas Coch roundabout	Two bridges over the route	Available headroom on southbound carriageway limited to 5.09m
1180	A483 Ruthin Road	Bridge over the route	Available headroom on southbound carriageway limited to 5.49m
S001	A483 south of Pant	Side slope	Embankment above river that may require loading capacity assessment
2072	A483 Llanymynech	Masonry arch river bridge	Listed structure requires structural assessment of loading capacity

The height restrictions beneath the Plas Coch and Ruthin Road bridges on the A483 will not affect the movement of the convoys unless components are moved that are larger than those assessed within this sTMP. In that event, convoys can avoid the height restriction by leaving the A483 via the off slip and rejoining at the same junction via the on slip.

Structural assessments are held by the relevant highway authorities demonstrating that all other structures along the route that may be subject to the full gross vehicle have sufficient loading

capacity. If information is missing or out of date then new assessments will be carried out, with particular importance given to the condition and load carrying capacity of the listed structures.

7. Summary

This report has set out the detailed assessment and proposals for the common section of the strategic route. It should be read in conjunction with Section 1: the Overview report.

Route	The common section of the route is 81km in length, of which 40km is dual carriageway and 11km is wide single carriageway. The remainder of the route is single carriageway The common section is trunk road, other than the 500m of A5032 Merseyton Road and the privately maintained docks roads There are four different highway authorities
Traffic management	North of Mile End roundabout at Oswestry, the convoys will have limited impact on other traffic. One on carriageway passing place is proposed south of Halton roundabout South of Oswestry, five passing places are proposed for use by the convoys if required • Four are off or partially off carriageway, where the police escort would be required at all times due to potential impact on other traffic movements • Two are on existing wide sections of carriageway A layover area at Pool Quay highway depot will be provided for use in an emergency
Delivery times	The journey duration from Ellesmere Port to the layover area near Mile End roundabout is forecast to be 1 hour 24 minutes for convoys departing Ellesmere Port at approximately 9.30am on a weekday The journey duration from the layover area to the passing place north of Welshpool at Rhalt Lane/The Moors is forecast to be 37 minutes for convoys departing the Mile End layover area at approximately 9.30am on a weekday An average queue of 51 vehicles is anticipated at the Four Crosses passing place. Individual vehicles may be delayed more than 10 minutes if opposing traffic is allowed to clear before following traffic overtakes and the worst case scenario as presented is realised
Highway improvements	Swept path analysis has been undertaken at eight constraints. Minor highway improvements have been proposed at six constraints to facilitate the movement of the convoys. Manual rear wheel steering will be required to negotiate one of these constraints There are no vertical alignment issues along this section of the route
Structures	The listed Llanymynech bridge and the side slope to the south of the village of Pant will be assessed for loading capacity, and will be strengthened if found to be inadequate There are no highway structures along the route with restricted headroom

Appendix A: Figures

RenewableUK Cymru

Strategic Traffic Management Plan for Mid Wales Wind Farms

Section 3 of 6: Welshpool to SSA B (north)

August 2012

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1. Introduction

1.1. Background

Grontmij has been commissioned by RenewableUK Cymru to develop a strategic Traffic Management Plan (sTMP) to address the likely cumulative impacts of the transportation of wind turbine components as abnormal loads to potential wind farms in Mid Wales. The movement of turbine components along the public highway will create conflict with other traffic, unless suitably planned and managed, due to the anticipated size of the loads. This potential conflict will be intensified if more than one wind farm is constructed at the same time.

RenewableUK Cymru members and relevant public sector stakeholders have worked together to support a strategic approach to managing traffic impacts associated with the Mid Wales wind farms in a safe manner. The sTMP aims to use this collaborative work to establish a consistent and workable traffic management strategy to facilitate future onshore wind development in the region.

1.2. Scope of sTMP

The sTMP sets out the general principles for managing the delivery of turbine components as abnormal loads from Ellesmere Port to the proposed Mid Wales wind farms. It prioritises the safe, efficient delivery of the loads whilst minimising delay to the travelling public and amenity impact on local communities. It does not consider the impact of general construction traffic on the public highway network, or the total number of convoys to be moved.

The sTMP has been developed through detailed discussion with key stakeholders, including the relevant local and strategic highway and planning authorities, police forces and developers.

1.3. Purpose of this Welshpool to SSA B (north) Report

The sTMP is presented in a modular format to enable the different sections of the route to be considered separately. Sections that are not dependent on each other can therefore be approved individually, if appropriate. This Welshpool to SSA B (north) report comprises the third of the series of six reports as follows:

- Section 1: Overview report
- Section 2: Ellesmere Port to Welshpool (Common Section)
- Section 3: Welshpool to SSA B (north)
- Section 4: Welshpool to Newtown
- Section 5: Newtown to SSA B (south)
- Section 6: Newtown to SSA C

This Section 3: Welshpool to SSA B (north) report sets out the detailed assessment and proposals for the strategic route from the end of the common section north of Welshpool to the northern access to SSA B. It should be read in conjunction with Section 1: the Overview report and Section 2: Ellesmere Port to Welshpool.

2. Strategic Route

2.1. Whole Route Strategy

Turbine components will be moved as abnormal loads in convoys from Ellesmere Port into Mid Wales via a strategic route along the public highway network

The strategic route has a common section from Ellesmere Port docks:

- **M53 – A55 – A483 – A5 – A483 to Welshpool**

The strategic route diverges at Welshpool:

- **B4381 through Welshpool – A458 – SSA B (north)**
- **A483 to Newtown – A489 Llanidloes Road – A470 – SSA B (south)**
- **A483 to Newtown – A489 Kerry Road – the Vastre – A483 – SSA C**

2.2. Detail for Welshpool to SSA B (north)

2.2.1. Route Description

Turbine component deliveries to the northern access of SSA B will be moved from the Welshpool Station Road roundabout at the end of the common section of the route through Welshpool along the B4381 Severn Street and the A458 Raven Street. From Welshpool, the convoys will continue west along the A458 as far as SSA B.

The convoys will follow the existing one way system in operation in Welshpool town centre. The A458 High Street between Jehu Road and Church Street is restricted to use by westbound traffic only. Eastbound traffic is diverted onto Jehu Road and the B4381 Brook Street.

The total length of the route from Welshpool Station Road roundabout to the furthest accessible point along the A458 in SSA B is 36km. This section of the route is single carriageway trunk road maintained by the North and Mid Wales Trunk Road Agency on behalf of the Welsh Government, with the exception of 500m along the B4381 Severn Street which is maintained by Powys County Council.

Further details for the route from Welshpool to SSA B (north) are given in the table below and shown on Figure 3-1 in Appendix A of this report.

Table 3-1: Description of Route from Welshpool to SSA B (north)

Section	Highway Authority	Description
B4381 Severn Street	Powys County Council	Single with 7.3m carriageway or less
A458 from Welshpool High Street crossroads to A490 Raven Street roundabout	Welsh Government	Single with 7.3m carriageway or less
A458 from A490 Raven Street roundabout to SSA B (north)	Welsh Government	Single with 7.3m carriageway or less

2.2.2. Traffic Flows

Traffic count data has been obtained from six automatic traffic counters (ATCs) along the route from Welshpool Station Road roundabout to the northern access to SSA B. Figure 3-2 shows the location of the counters, the year that the data was collected, the Annual Average Daily Traffic (AADT) and the peak hour.

It can be seen that on the eastern side of the route, at and near to Welshpool, the A458 carries up to 5,000 vehicles on an average day. This drops to around 2,500 vehicles on an average day on the A458 at Foel, near the western end of the route. The peak hour is generally 17.00 to 18.00, although the counter at Foel recorded a peak hour of 11.00 to 12.00 and the counter at Llanfair Caereinion recorded a peak hour of 15.00 to 16.00.

3. Traffic Management

3.1. Whole Route Strategy

The aim is to limit the delay to the travelling public to a maximum of 10 minutes

South of Oswestry, police motorcyclists will travel ahead of the convoys and hold oncoming traffic wherever the carriageway is wide enough to allow the convoys to pass

A back up network of designated passing places will enable convoys to move from passing place to passing place, waiting at each to allow following and opposing traffic to clear, if required

Each passing place will be large enough to hold a single convoy

Key passing places will be designated as suitable for longer term storage in the event of an emergency

3.2. Detail for Welshpool to SSA B (north)

3.2.1. Passing Places

Oncoming traffic is likely to conflict with convoy movements between the southernmost passing place on the common section of the route at Rhalt Lane/The Moors north of Welshpool and the northern access to SSA B due to the carriageway width. The police escort will keep the convoy moving as much as possible, but a backup network of passing places will be provided, as described in chapter 6 of the Overview report.

Nine passing places are proposed between the passing place at Rhalt Lane/The Moors north of Welshpool and the northern access to SSA B. Two of these passing places are considered suitable for longer term storage. The locations of the passing places are shown on Figure 3-3a in Appendix A of this report.

Figures 3-3b to 3-3j in Appendix A of this report show how a mixed convoy comprising one 45m blade vehicle, two base tower section vehicles, two civilian escort vehicles and police escort control car could be stored at each passing place. The figures also suggest locations at which the police could prevent traffic, which might conflict with the convoy movement to the next passing place, from joining the route.

The table below summarises the key details of each passing place. For details of the strategy for locating passing places, see chapter 6 of the Overview report.

Table 3-2: Passing Places along Route from Welshpool to SSA B (north)

Ref	Grid reference	Location	Type
3-3b	321759, 307582	Raven Street roundabout	On carriageway, other traffic diverted to avoid rather than pass the convoy
3-3c	317582, 306498	Middle Sylfaen	Partially off carriageway eastbound, no requirement for police escort to stay with the convoy
3-3d	314628, 307621	Gelli Lane	Off carriageway westbound, suitable for **longer term storage**
3-3e	312021, 308246	Glascoed	Partially on carriageway westbound, police escort needed at all times
3-3g	306818, 308541	Einion	On carriageway westbound, police escort needed at all times
3-3h	304439, 309468	Gylfylchau	Off carriageway westbound, police escort needed at all times as convoy will restrict visibility for traffic turning out of private access
3-3i	299729, 311540	Foel	Off carriageway eastbound, suitable for **longer term storage**
3-3j	294622, 313345	Dol-y-maen	Partially off carriageway westbound, no requirement for police escort to stay with the convoy, uses existing layby

Note: Reference 3-3f not used

3.2.2. Temporary Diversion through Welshpool

There is insufficient carriageway width for traffic to pass the convoy on the A458 Raven Street approaching the A490 roundabout on the western side of Welshpool, as shown on Figure 3-3b.

During convoy movements across Welshpool to SSA B (north), opposing eastbound traffic will be diverted at the A490 roundabout onto the B4381 Brook Street to avoid the A458 Raven Street. This temporary diversion will act as an extension to the existing Welshpool town centre one way system, adding an additional 50m onto the journey from the A490 roundabout to the A458 Salop Road/High Street crossroads. The duration of the temporary closure of the A458 Raven Street to eastbound traffic for each convoy is anticipated to be up to 10 minutes.

Westbound traffic will have opportunity to pass the convoy by turning off at Jehu Road to continue along the Welshpool one-way system onto Brook Street, then turning left to reach the A490 roundabout. The convoy will be held at the A458 Raven Street roundabout until any westbound traffic has cleared. This optional diversion would add an additional 200m onto the journey from the A458 Salop Road/High Street crossroads to the A490 roundabout.

3.2.3. Temporary Layby Closure at Dol-y-maen

Passing place 3-3j near Dol-y-maen requires the use of part of an existing layby adjacent to the westbound lane of the A458. The layby is wide enough that an area along the rear could be designated with white lining for use as public parking. The area of the layby immediately adjacent to the carriageway would be marked as KEEP CLEAR so that the abnormal load vehicles could

use it to stop. The convoy would thereby temporarily block public access to and egress from the layby, but there would be no need to close it to public use. The layby will be supplemented by a new section of hardened verge to provide the space required for the full convoy.

3.2.4. Temporary Traffic Regulation Orders

The temporary road closure required to divert traffic through Welshpool would require a temporary Traffic Regulation Order (TRO) under section 14 of the Road Traffic Regulation Act 1984. The maximum duration of a TRO required because of the likelihood of danger to the public is 18 months, although the TRO would only be enforced on the days of convoy movements for a brief period.

It would appear that this type of TRO cannot be extended beyond 18 months. The Road Traffic Regulation Act 1984 does not refer to a minimum time period between TROs applicable to the same section of highway. However, it seems unlikely that making a TRO precludes another being made at some time in the future on the same section of highway. It is assumed that this would be at the Welsh Government's discretion as the strategic highway authority.

4. Delivery Times

4.1. Whole Route Strategy

Convoys will travel during hours of daylight for safety reasons

Newtown:

- **Initially convoys are planned to move through Newtown before 7am on a weekday**
- **No more than one convoy per day will be moved through Newtown between 7am and 7pm on a weekday**

Welshpool:

- **Convoys are planned to move through Welshpool between the morning and lunchtime peaks on a weekday**
- **No more than one convoy per day will be moved through Welshpool between 7am and 7pm on a weekday**

Convoys may also be moved through Welshpool and Newtown at weekends or after 7pm on a weekday

4.2. Detail for Welshpool to SSA B (north)

The anticipated duration of the journey between the southernmost passing place on the common section of the route at Rhalt Lane/The Moors north of Welshpool and the northern access to SSA B is **1 hour 13 minutes**. Table 3-3 sets out the details of the forecast journey duration and queue lengths for a convoy departing the Mile End layover area at approximately 9.30am, which is the worst case scenario as described in the Overview report.

The table shows that the longest opposing traffic queue formed along the route from Welshpool to SSA B (north) is anticipated to be an average of 16 vehicles at the Middle Sylfaen, Einion and Foel passing places. This equates to approximately 128m of queued traffic. The maximum number of vehicles following the convoy at any one time is anticipated to occur between the A458/A490 Raven Street roundabout and the passing place at Middle Sylfaen.

A queue of opposing traffic will not be formed at the A458/A490 Raven Street roundabout as eastbound traffic will be diverted onto the B4381 Brook Street rather than held at the passing place, as described in chapter 3 of this report.

Traffic following the convoy from beyond the Jehu Road junction in Welshpool towards Mallwyd on the A458 will not be able to overtake the convoy until the passing place at Middle Sylfaen. The duration of this part of the convoy journey is estimated to be 10 minutes. Under normal traffic conditions, vehicles would take approximately take 6 minutes to travel from the passing place at Rhalt Lane/The Moors to the passing place at Middle Sylfaen, giving a delay of approximately 4 minutes.

Several of the passing places between Welshpool and SSA B do not have sufficient width to permit following and opposing traffic to pass the convoy at the same time. It is assumed that opposing traffic will be allowed to clear before following traffic once the convoy is at the passing place so that individual vehicles will not be delayed by more than 10 minutes.

The total duration of the journey from the layover area near to the Mile End roundabout at Oswestry to SSA B (north) is estimated to be **1 hour 50 minutes**.

If the police move the convoys using the 'caterpillar and bubble' method, and do not use any of the available passing places, the anticipated duration of the journey between the Rhalt Lane/The Moors passing place and the northern access to SSA B is **59 minutes**, and the total duration of the journey from the layover area near to the Mile End roundabout at Oswestry to SSA B (north) is estimated to be **1 hour 28 minutes**.

Notes associated with Table 3-3:

1. Convoy assumed to depart Mile End layover area at approximately 9.30am
2. Average speed of convoy assumed to be 30mph on the trunk road network and 20mph on other routes
3. Traffic flows are assumed to be evenly distributed over the hourly count, so that the number of vehicles reaching a police holding point during a convoy movement of six minutes duration is assumed to be 10% of the total hourly flow
4. Queue dissipation rates assumed to be 2.5 seconds per vehicle
5. Geometric queue lengths assumed to be 8m per vehicle
6. Time to allow following traffic to clear is zero if carriageway width permits opposing and following traffic to pass convoy at the same time
7. Delay to following traffic calculations assume that following traffic is stopped, however following traffic will only be delayed by the difference between the speed of the convoy and normal traffic speed
8. Cumulative journey duration is taken to be from the layover area near to Mile End roundabout at Oswestry
9. See chapters 6 and 7 of Overview report for details of method of calculation
10. Figures are rounded to the nearest whole minute, vehicle and metre
11. Queues may form on other arms of affected junctions, but these are anticipated to be less than the queues along the strategic route

Table 3-3: Journey Time and Queue Lengths along Route from Welshpool to SSA B (north)

Passing place from	Passing place to	Section	Distance (km)	Delay at constraints (mins)	Time taken to reach passing place (mins)	Average hourly opposing traffic (vehs)	Opposing traffic queue (vehs)	Opposing traffic queue (m)	Average hourly following traffic (vehs)	Following traffic queue (vehs)	Following traffic queue (m)	Time to allow opposing traffic to clear (mins)	Time to allow following traffic to clear (mins)	Section duration (mins)	Cumulative duration from layover area (mins)
2-3g	3-3b	The Moors to Raven Street roundabout	3.1	5	9	486	n/a	n/a	367	n/a	n/a	0	0	9	46
3-3b	3-3c	Raven Street to Middle Sylfaen	2.9	3	7	146	16	128	163	18	144	1	1	9	55
3-3c	3-3d	Middle Sylfaen to Gelli Lane	5.0	0	6	146	15	120	163	17	136	1	0	7	63
3-3d	3-3e	Gelli Lane to Glascoed	2.9	1	5	146	11	88	163	12	96	0	1	6	69
3-3e	3-3g	Glascoed to Einion	6.6	1	9	103	16	128	93	14	112	1	1	11	80
3-3g	3-3h	Einion to Gylfylchau	2.9	0	4	163	10	80	215	13	104	0	0	4	84
3-3h	3-3i	Gylfylchau to Foel	5.6	0	7	136	16	128	113	13	104	1	0	8	92
3-3i	3-3j	Foel to Dol-y-maen	5.3	0	7	136	15	120	113	12	96	1	1	9	101
3-3j	end	Dol-y-maen to end (Snowdonia)	2.9	3	7	136	15	120	113	12	96	1	1	9	110

Note: Reference 3-3f not used

5. Highway Improvements

5.1. Whole Route Strategy

Localised improvements to the public highway network will be undertaken to facilitate movement of the convoys

Assessment has been undertaken of 25 pinch points along the trunk road network, as well as along the unclassified roads across the Vastre, and improvement measures proposed where required to facilitate movement of the convoys

5.2. Detail for Welshpool to SSA B (north)

5.2.1. Horizontal Alignment

Swept path analysis has been undertaken at six constraints along the route between Welshpool and SSA B (north). The locations of these pinch points are shown on Figure 3-4a in Appendix A of this report. Details of the approach to the swept path analysis are set out in chapter 9 of the Overview report.

Highway improvements have been proposed at each of the constraints where the swept path analysis indicated that the vehicle may have difficulty negotiating the constraint. Details of the outcome of the swept path analysis and any proposed highway improvements are shown on Figures 3-4b to 3-4f in Appendix A of this report and summarised in the table below.

Table 3-4: Summary of Swept Path Analysis along Route from Welshpool to SSA B (north)

sTMP Ref	Dry Run Ref	Location	Proposed Highway Improvements
3-4b	E1.02, E1.03	A483 Welshpool Bypass and Severn Street Roundabouts	None if manual rear wheel steering used, other than relocation of chevron boards and removal or relocation of a directional sign
3-4c	E1.06	A490 / A458 roundabout and A458 Raven Street	None if manual rear wheel steering used
3-4d	E1.20	B4389 Heniarth	None
3-4e	E1.25	A458 near Melin-y-ddol	Minor carriageway widening and kerb realignment on inside of bend, with associated retaining wall or steepened earthworks as necessary
3-4f	E1.44	A458 West of Foel	None if manual rear wheel steering used

5.2.2. Vertical Alignment

The July 2010 dry runs demonstrated that there are no vertical alignment issues on the route from Welshpool to SSA B (north).

6. Structures

6.1. Whole Route Strategy

All structures that will be subject to the gross vehicle weight of the abnormal loads will be assessed for loading capacity, and will be strengthened if required

Condition surveys of all highway and third party structures that could be affected will be undertaken prior to and on completion of deliveries for each site

The wind farm developers will indemnify the relevant highway authorities against any damage caused to any highway structures, surfacing or adjoining slopes by the delivery of turbine components to wind farm sites, up to the statutory requirements of the relevant highways authority

6.2. Detail for Welshpool to SSA B (north)

Details have been obtained from the relevant authorities of all highway structures along the route from Welshpool to SSA B (north) that:

- Restrict the available **headroom** or **carriageway width** to less than 5m
- Hold **listed** status
- May require a structural assessment to identify the **loading capacity** if subject to the gross weight of the abnormal load vehicles

The locations of these structures are shown on Figure 3-6 in Appendix A of this report. The details of the structures are summarised in the table below.

Table 3-5: Highway Structures along Route from Welshpool to SSA B (north)

Local Ref	Location	Description	Constraint
2180	B4381 Severn Street Howell canal bridge	Troughed steel and masonry canal bridge	Listed structure does not require structural assessment of loading capacity as span is only 11.45m. Condition surveys important due to listed status
2090	A458 Sychcoed	Masonry arch river bridge	Structure requires structural assessment of loading capacity
S002	A458 east of Glascoed	Side slope	Embankment above river that may require loading capacity assessment
2092	A458 Neuadd	Prestressed concrete river bridge	Structure requires structural assessment of loading capacity
S003	A458 west of Llanfair Caereinion	Side slope	Embankment above river that may require loading capacity assessment

Structural assessments are held by the relevant highway authorities demonstrating that all other structures along the route that may be subject to the full gross vehicle have sufficient loading

capacity. If information is missing or out of date then new assessments will be carried out, with particular importance given to the condition and load carrying capacity of the listed structures.

7. Summary

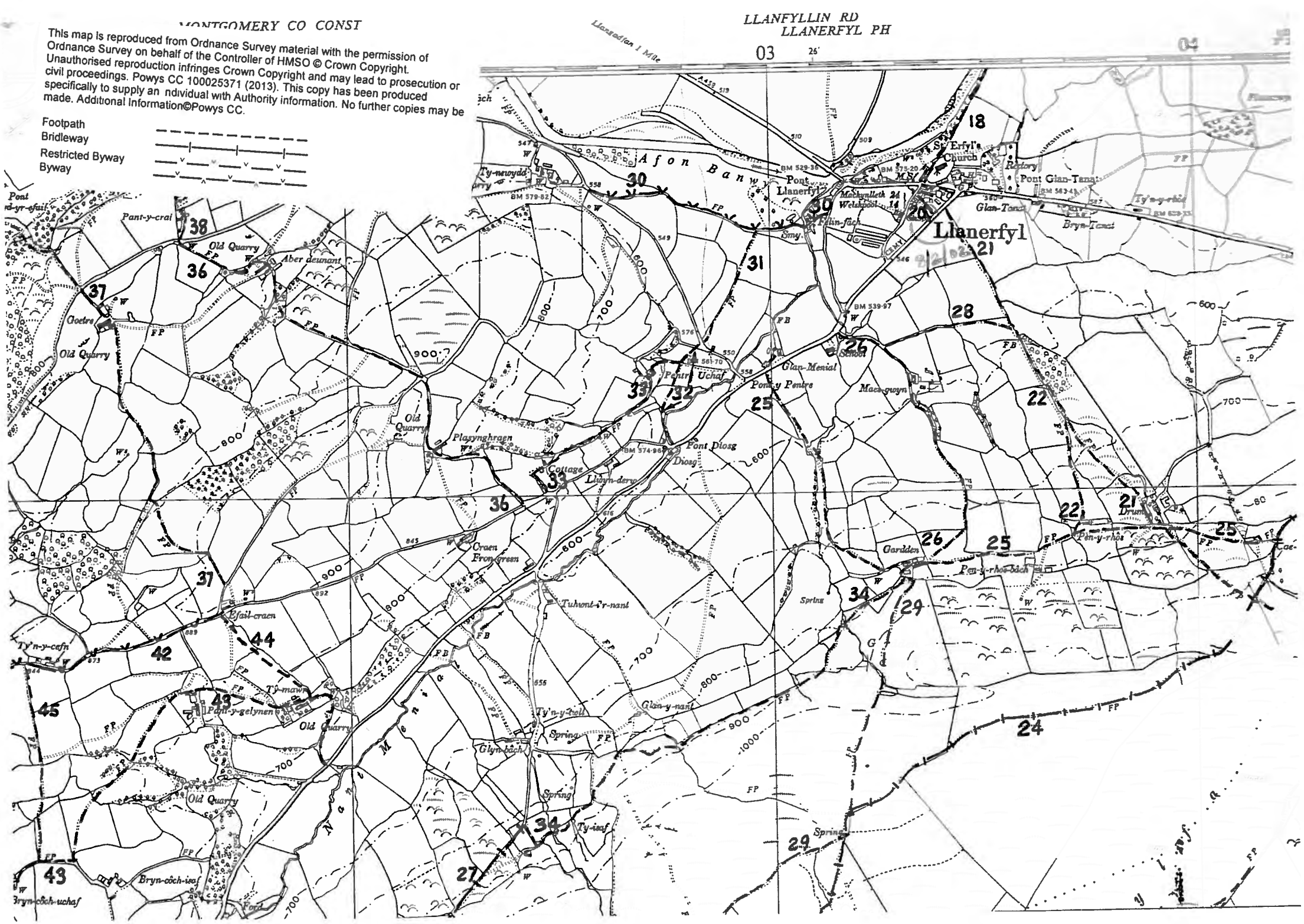
This report has set out the detailed assessment and proposals for the common section of the strategic route. It should be read in conjunction with Section 1: the Overview report.

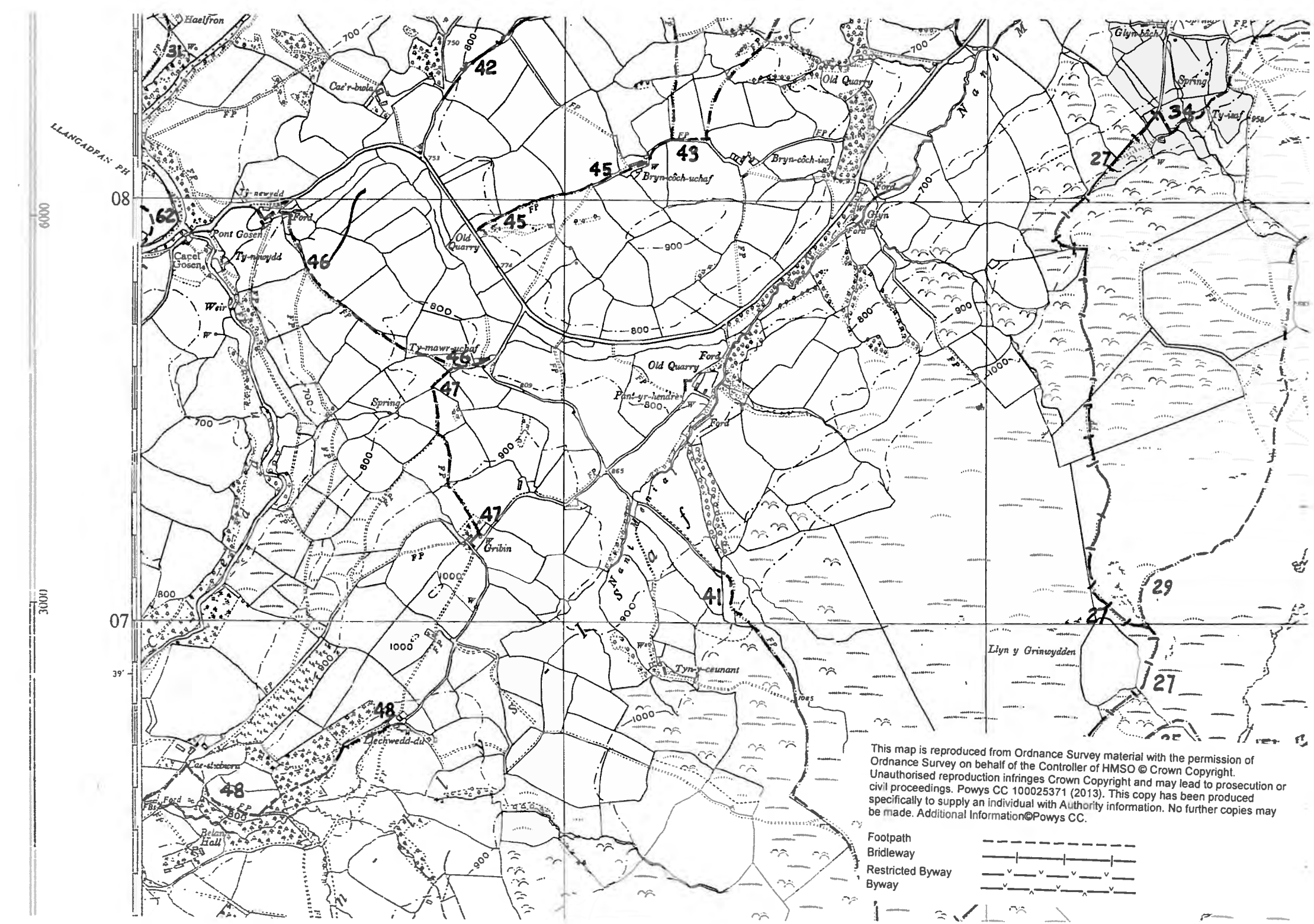
Route	The total length of the route from Welshpool Station Road roundabout to the furthest accessible point along the A458 in SSA B is 36km This section of the route is single carriageway trunk road maintained by the North and Mid Wales Trunk Road Agency on behalf of the Welsh Government, with the exception of 500m along the B4381 Severn Street which is maintained by Powys County Council
Traffic management	Eight passing places are proposed for use by the convoys if required • Two are off carriageway and suitable for longer term storage • Five are off, partially off or on carriageway, where the police escort would be required at all times due to potential impact on other traffic movements • One is on carriageway, where other traffic will be diverted to avoid rather than pass the convoy The existing one way system in Welshpool would be temporarily extended and the layby at Dol-y-maen amended to permit use by convoys without closing to public access
Delivery times	The journey duration from the passing place at Rhalt Lane/The Moors at Welshpool to SSA B (north) is forecast to be 1 hour 13 minutes for convoys departing the Mile End layover area at approximately 9.30am on a weekday The total journey duration from the Mile End layover area at Oswestry to SSA B (north) is forecast to be 1 hour 50 minutes The longest queue of opposing traffic is anticipated to be an average of 16 vehicles at the Middle Sylfaen, Einion and Foel passing places
Highway improvements	Swept path analysis has been undertaken at six constraints. Minor highway improvements have been proposed at two constraints to facilitate the movement of the convoys. Manual rear wheel steering will be required to negotiate three of these constraints There are no vertical alignment issues along this section of the route
Structures	The Sychcoed and Neuadd bridges and side slopes east of Glascoed and west of Llanfair Caereinion will be assessed for loading capacity, and will be strengthened if found to be inadequate. There are no highway structures along the route with restricted headroom

Appendix A: Figures

APPENDIX 10.1 - E: PUBLIC RIGHTS OF WAY (PROW) MAPPING

Footpath
Bridleway
Restricted Byway
Byway




LLANGADFAN PH
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Haelfron
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Glyn
Glyn-bâch
Ty-newydd
Pont Gosen
Capel Gosen
Weir
Old Quarry
Ty-mawr-uchaf
Pant-yr-hendre
Ford
Spring
Gribin
Tyn-y-ceunant
Llyn y Grinwydden
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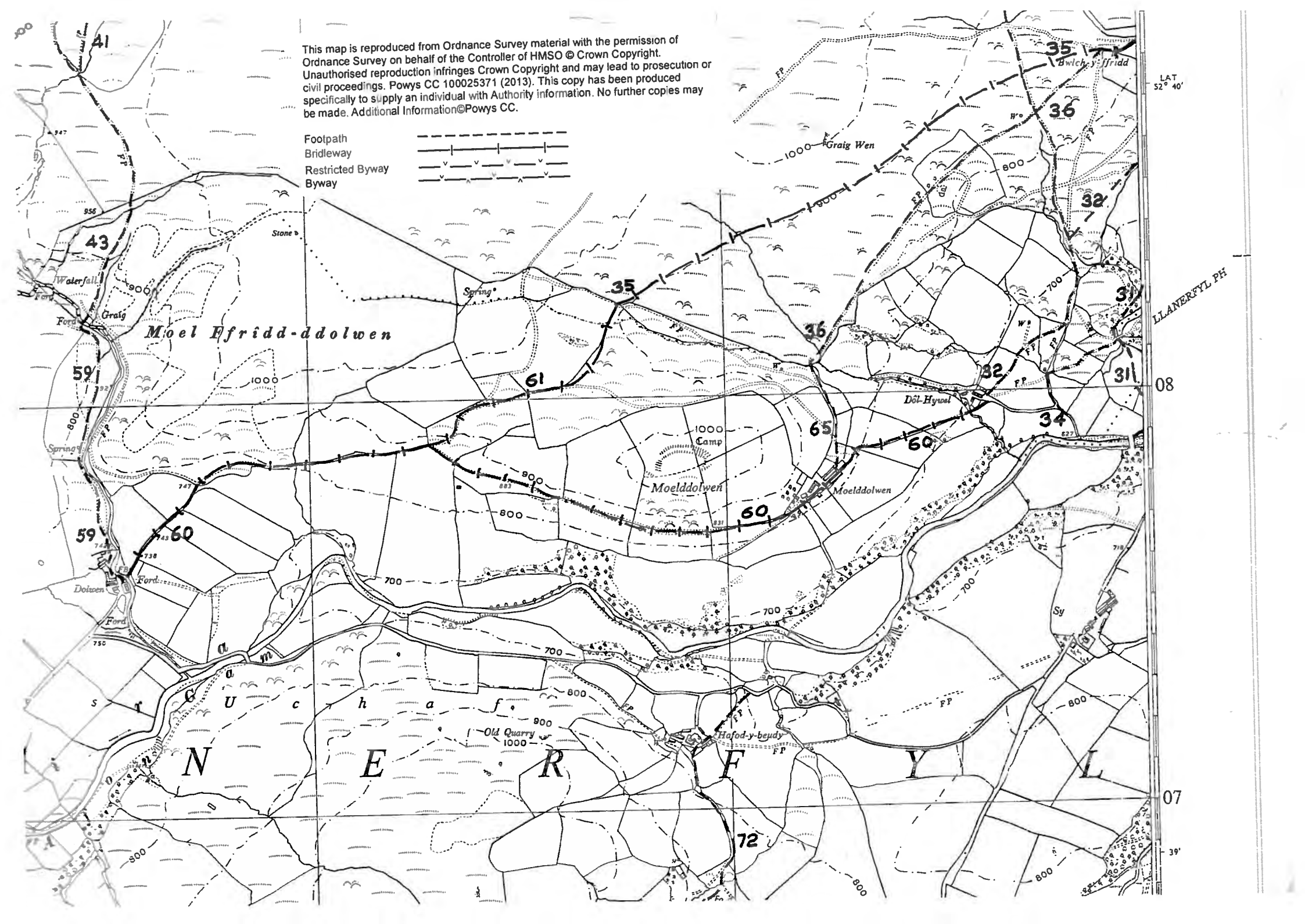
Footpath
Bridleway
Restricted Byway
Byway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Footpath
Bridleway
Restricted Byway
Byway
Moel Ffridd-ddolwen
Graig Wen
Bwlch-y-ffridd
Waterfall
Graig
Spring
Dôl-Hywel
Moelddolwen
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Footpat
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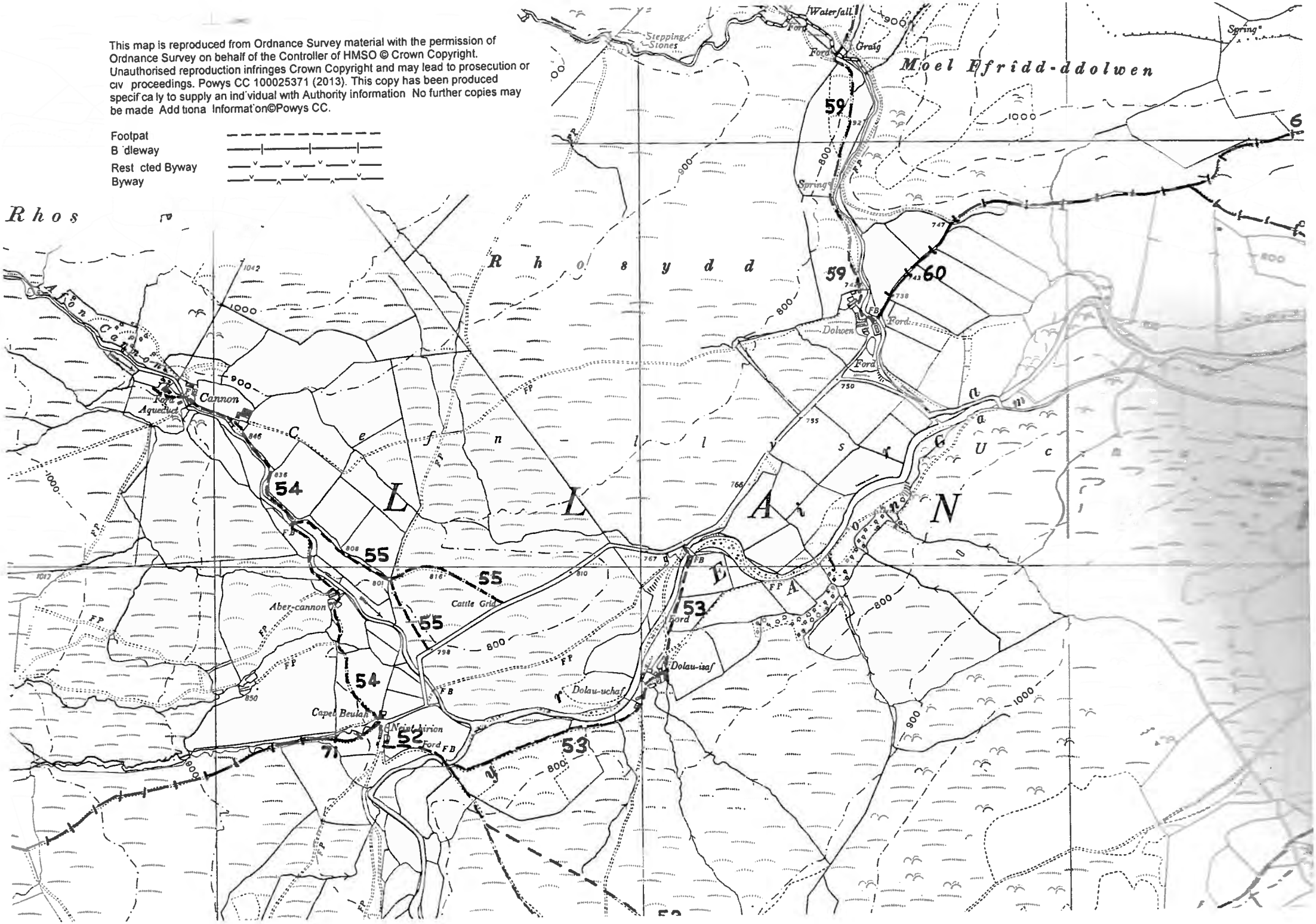
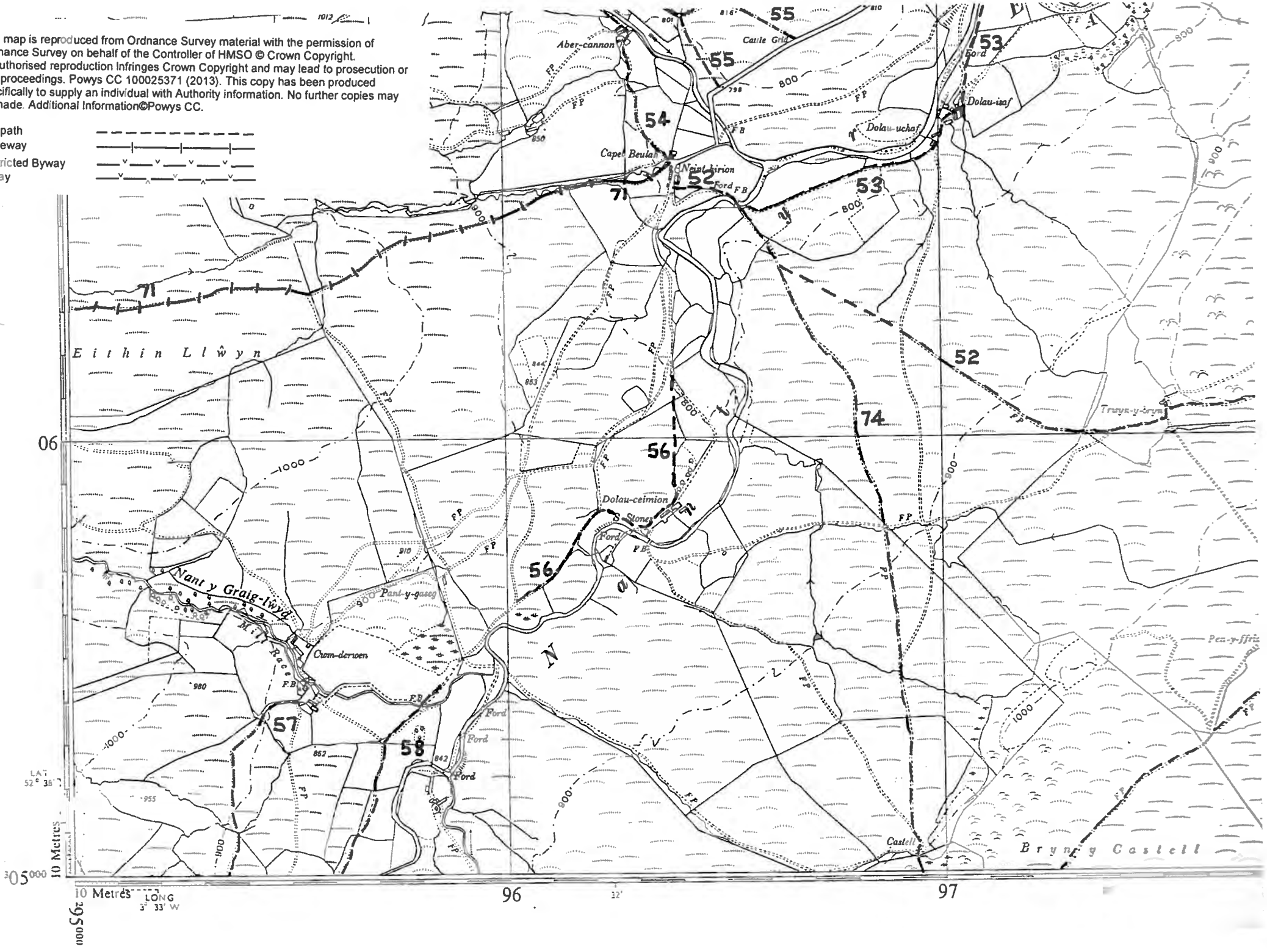
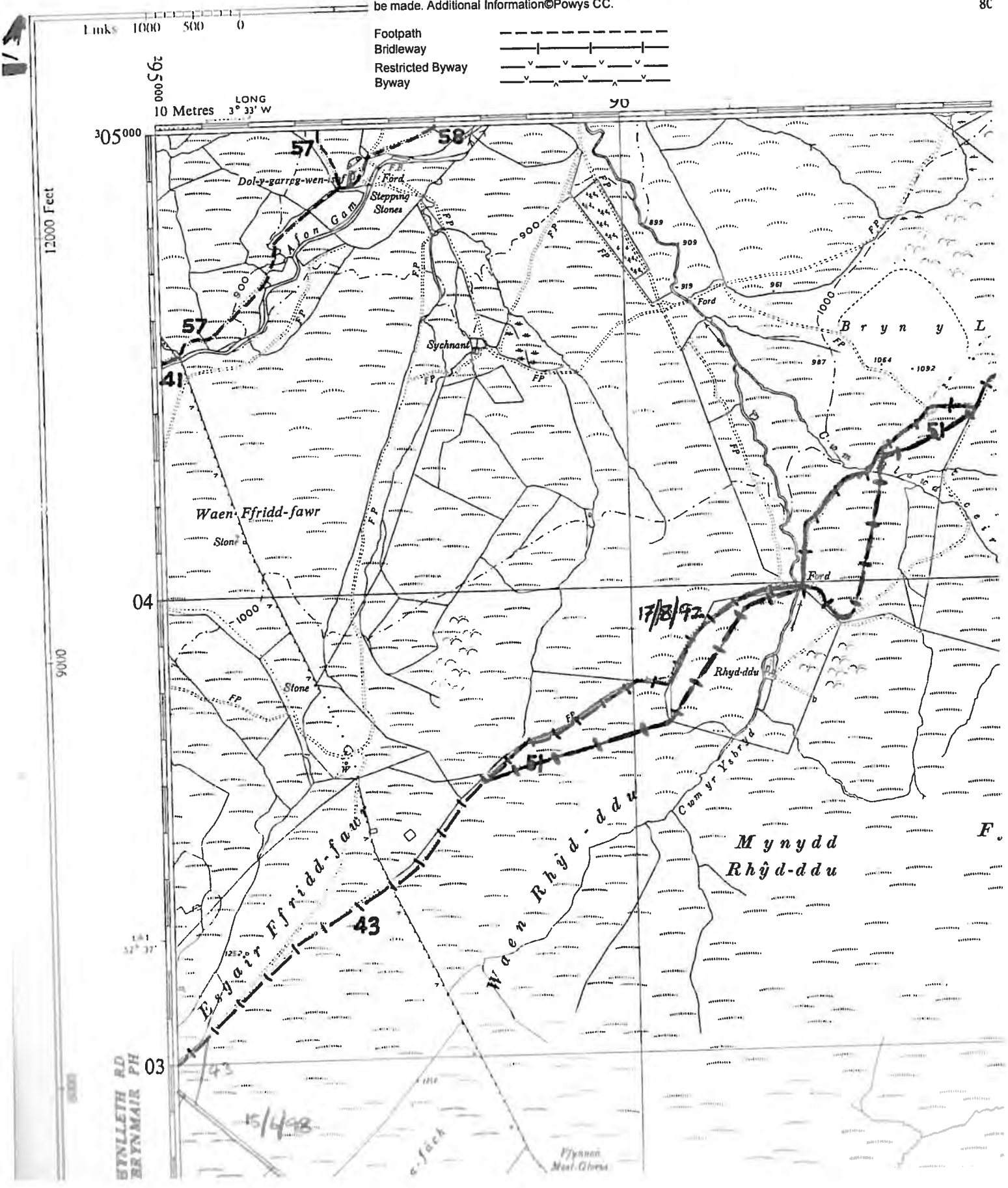
Rest cted Byway
Byway



Footpath
Bridleway
Restricted Byway
Byway



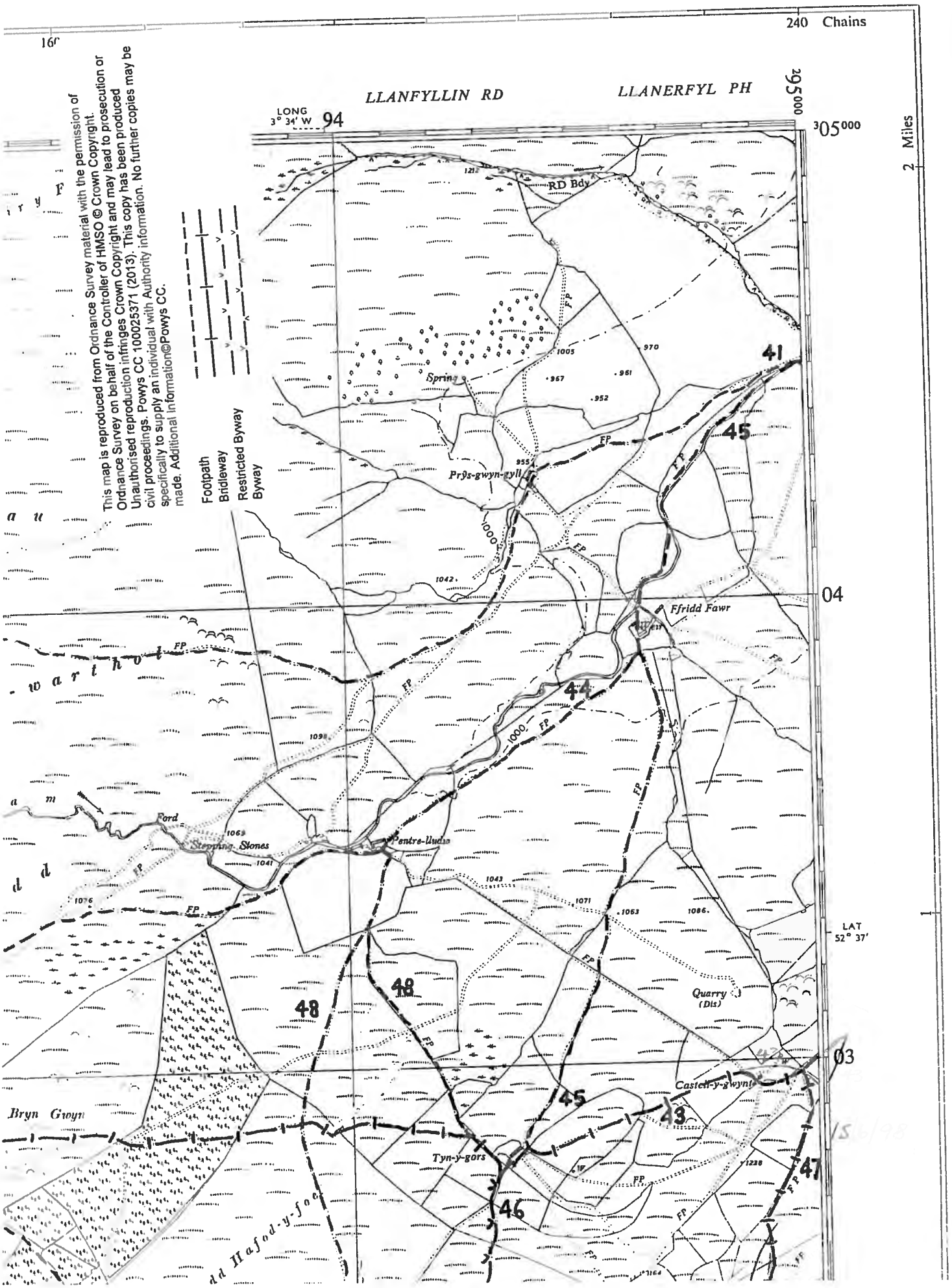
SHEET SH 90 SE

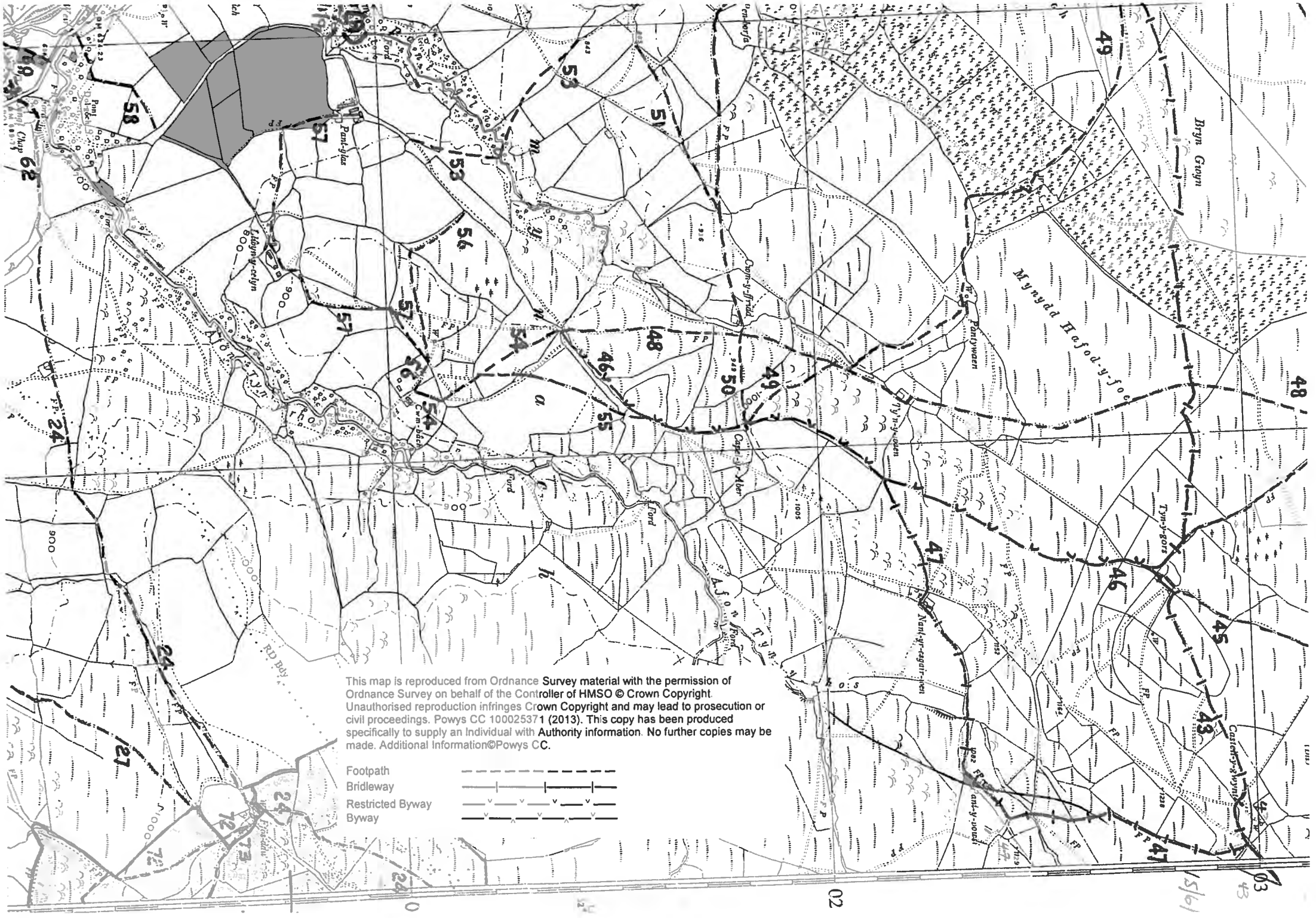


* Otters

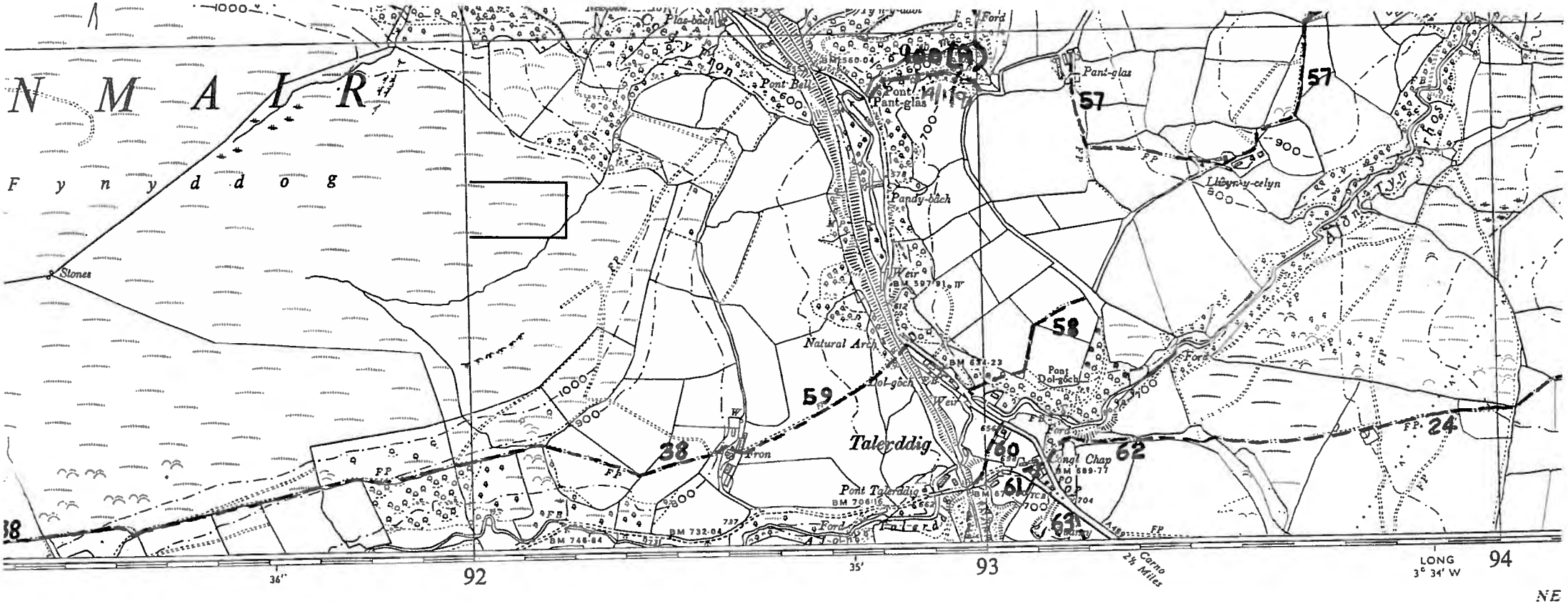
Provisional Edition

SHEET SH 90 SW





Footpath
Bridleway
Restricted Byway
Byway



NE

0 1000 2000 3000

INDEX TO ADJOINING SHEETS

SH 80 NE	SH 90 NW	SH 90 NE
SH 80 SE	SH 90 SW	SH 90 SE
SN 89 NE	SN 99 NW	SN 99 NE

THE NATIONAL GRID

TO GIVE A GRID RE

EXAMPLE

The Grid Lett

EAST

Take west edge of kilometre square in which point lies and read the large figures printed opposite this line on north or south margins.

Estimate tenths Eastwards

Full 100 Metr

The above Full Reference is unique. giving a reference, H 927018 which letters are omitted, the resulting reference 927018 recurs at intervals of 100 Kilometres. When the area concerned is sufficiently restricted, as will usually be the case with maps on scales of one inch to the mile and larger, both the grid letters are normally omitted.

Footpath
Bridleway
Restricted Byway
Byway

AGRAM

Revised before 1930.....
Revised 1930-1945.....
Revised for major changes only 1960.
Boundaries revised to 1-7-62
Major roads revised

Made and published by the Dire

Antiquity (Site of)
Spot Height
Boundaries, County
" County or Borough
" Constituency
" Rural District
" Parish

Bridge
Aqueduct
Lock
Tramway
Path
Dam

1 square inch on this map represents 17·778 acres on the ground.
The representation on this Map of a Road, Track, or Footpath, is no evidence of the existence of a right of way.

At the Eastern edge of this sheet True North is 1° 14' East of Grid North and at the Western edge 1° 17' East of Grid North

Magnetic North was about 8½° West of Grid North in 1963 decreasing by about ½° in six years.

Heights are in feet above Mean Sea Level at Newlyn.

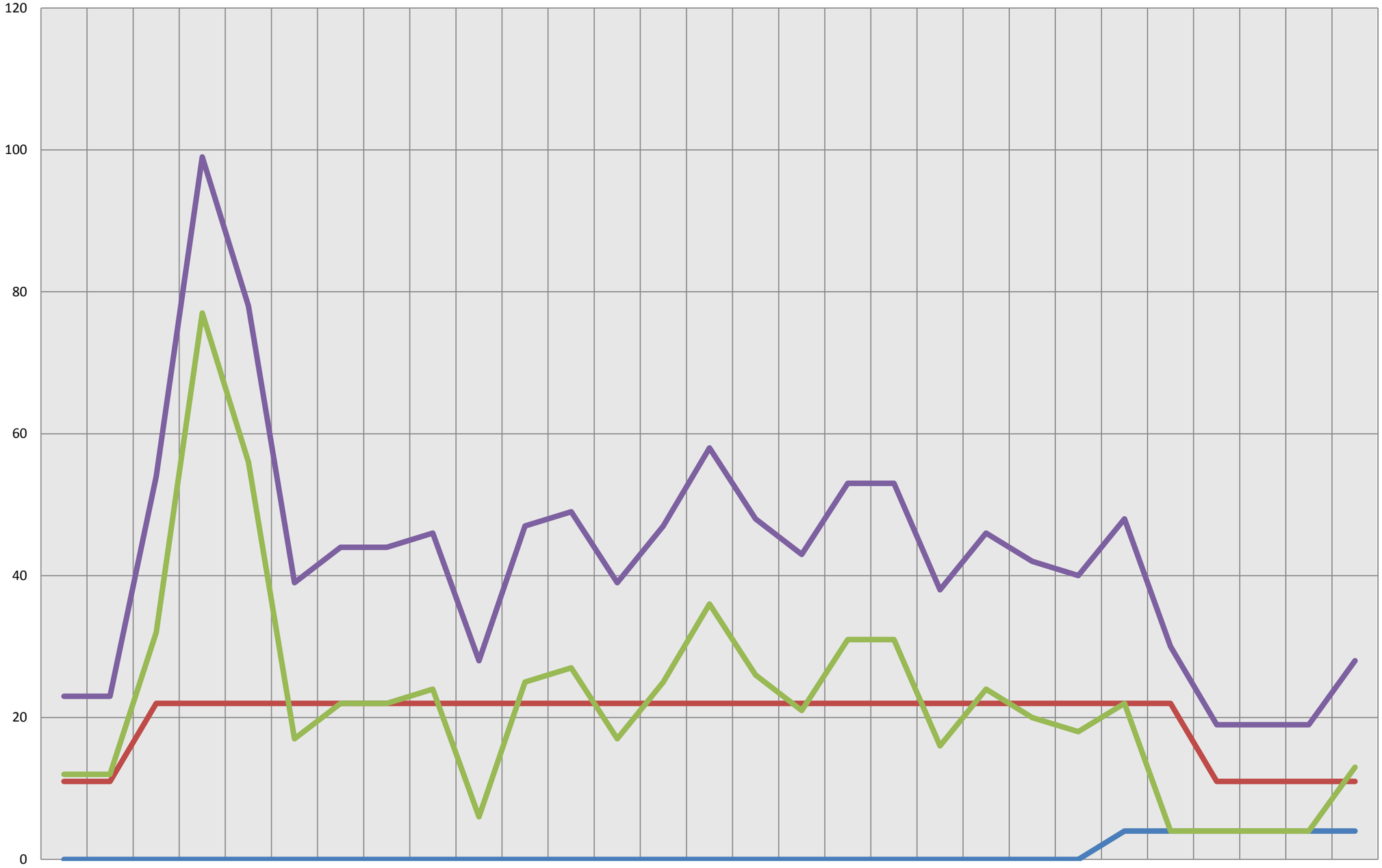
Bench Marks and their values are shown thus:— BM 165.32

Bench Mark lists

APPENDIX 10.1 - F: TRIP GENERATION

LLANBRYNMAIR - 6% IMPORT, 94% BORROW, W BATCH, BEST CASE		DAYS/MO	25	10/05/2013		DAILY HGV TRIPS GENERATED BY DEVELOPMENT, BY MONTH - TWO WAY TRIPS																											
	ACTIVITY	PROG MONTHS	PROG DAYS	TRIPS	TRIPS / DAY	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18
AIL	Turbines - Delivery of Turbines - South Access (4)	2	50	177	3.5																							4	4				
AIL	Turbines - Delivery of Turbines - Centre Access (2)	1.5	37.5	129	3.4																									4	4		
AIL	Turbines - Delivery of Turbines - North Access (1)	2	50	177	3.5																											4	4
AIL Total				**484**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**4**	**4**	**4**	**4**
ALL	Site Servicing	22	550	1664	3.0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ALL Total				**1664**		**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
EXT	External Works and Statutory Undertakers', Preliminaries	3	75	290	3.9	4	4	4																									
EXT	External Works - Section 3 - Talerddig to South Entrance (Access 4)	2	50	200	4.0	4	4																										
EXT	External Works - Section 2A - South Access 4 to Central Access 2	2	50	1020	20.4			21	21																								
EXT	External Works - Section 2B - Central Access 2 to North Entrance 1, including Neinthirion	2	50	1794	35.9				36	36																							
EXT	External Works - Section 1A - North Access to Gosen Bridge	6	150	1882	12.5				13	13	13	13	13	13																			
EXT	External Works - Section 1B - Gosen Bridge to Llanerfyl A458	3	75	370	4.9							5	5	5																			
EXT Total				**5556**		**8**	**8**	**25**	**70**	**49**	**13**	**18**	**18**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PH1	Mobilisation, Site Compound and Access Junction	1	25	60	2.4			3																									
PH1	New Tracks	5	125	235	1.9									2	2	2	2	2															
PH1	Forestry Clearance	2	50	500	10.0											10	10																
PH1	Hardstanding Areas	4	100	141	1.4												2	2	2	2													
PH1	Turbine Foundations	5	125	1044	8.4											9	9	9	9	9													
PH1	Cable Infrastructure	3	75	388	5.2														6	6	6												
PH1	Reinstatement	3	75	0	0.0																0	0	0										
PH1	Demobilisation	1	25	67	2.7																												3
PH1	Turbines - Mobilisation and Delivery of Kit - South Access (4)	1	25	37	1.5																	2											
PH1 Total				**2472**		**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**21**	**23**	**13**	**17**	**17**	**6**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
PH2	Mobilisation, Site Compound and Access Junction	1	25	60	2.4				3																								
PH2	New Tracks	5	125	249	2.0														2	2	2	2	2										
PH2	Forestry Clearance	2	50	188	3.8															4	4												
PH2	Hardstanding Areas	5	125	120	1.0																1	1	1	1	1								
PH2	Substation	5	125	204	1.6														2	2	2	2	2										
PH2	Turbine Foundations	5	125	759	6.1															7	7	7	7	7									
PH2	Cable Infrastructure	3	75	282	3.8																		4	4	4								
PH2	Reinstatement	3	75	0	0.0																		0	0	0								
PH2	Demobilisation	1	25	67	2.7																												3
PH2	Turbines - Mobilisation and Delivery of Kit - Centre Access (2)	1	25	37	1.5																			2									
PH2 Total				**1967**		**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**15**	**16**	**12**	**12**	**12**	**7**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
PH3	Mobilisation, Site Compound and Access Junction	1	25	60	2.4					3																							
PH3	New Tracks	4	100	208	2.1																	3	3	3	3								
PH3	Forestry Clearance	2	50	562	11.2																		12	12									
PH3	Hardstanding Areas	3	75	141	1.9																				2	2	2						
PH3	Turbine Foundations	3	75	1044	13.9																					14	14	14					
PH3	Cable Infrastructure	1	25	388	15.5																								16				
PH3	Reinstatement	3	75	0	0.0																							0	0	0			
PH3	Demobilisation	1	25	67	2.7																												3
PH3	Turbines - Mobilisation and Delivery of Kit - North Access (1)	1	25	37	1.5																								2				
PH3 Total				**2507**		**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**15**	**15**	**5**	**16**	**16**	**14**	**18**	**0**	**0**	**0**	**0**	**3**
VAN	Substation Commissioning	3	75	0	0.0																												
VAN	Turbine - M&E and Commissioning	5	125	0	0.0																												
VAN	Site Personnel (Including personnel working external of the site assuming 2.25 people per vehicle)		608	12970.66667	21.3	11	11	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	11	11	11
VAN Total		**MAX**	**AVG**	**12970.66667**		**11**	**11**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**11**	**11**	**11**	**11**
Grand Total - VANS/CARS ONLY		**22**	**20**	**12971**		**11**	**11**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**11**	**11**	**11**	**11**
Grand Total - AILS ONLY		**4**	**1**	**484**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**4**	**4**	**4**	**4**
Grand Total - HGVS ONLY		**56**	**21**	**14166**		**12**	**12**	**32**	**77**	**56**	**17**	**22**	**22**	**24**	**6**	**25**	**27**	**17**	**25**	**36**	**26**	**21**	**31**	**31**	**16**	**24**	**20**	**18**	**22**	**4**	**4**	**4**	**4**	**13**
Grand Total - ALL VEHICLES		**99**	**42**	**27621**		**23**	**23**	**54**	**99**	**78**	**39**	**44**	**44**	**46**	**28**	**47**	**49**	**39**	**47**	**58**	**48**	**43**	**53**	**53**	**38**	**46**	**42**	**40**	**48**	**30**	**19**	**19**	**19**	**28**

LLANBRYNMAIR - CONSTRUCTION TRAFFIC - DRAFT 3 - 10/05/13 - BEST CASE - 6% Import, 94% Borrow



	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18
Grand Total - VANS/CARS ONLY	11	11	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	11	11	11
Grand Total - AILS ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4
Grand Total - HGVS ONLY	12	12	32	77	56	17	22	22	24	6	25	27	17	25	36	26	21	31	31	16	24	20	18	22	4	4	4	4	13
Grand Total - ALL VEHICLES	23	23	54	99	78	39	44	44	46	28	47	49	39	47	58	48	43	53	53	38	46	42	40	48	30	19	19	19	28

NOTE - HGVS ONLY!!!	TOTAL 2 WAY TRIPS	SOUTH ACCESS (4) TRIPS	CENTRE ACCESS (2) TRIPS	NORTH ACCESS (1) TRIPS	COMMENTS ON INTRA SITE TRIPS
EXTERNAL WORKS					
External Works and Statutory Undertakers', Preliminaries	**290**	290			
External Works - Section 3 - Talerddig to South Entrance (Access 4)	**200**	200			
External Works - Section 2A - South Access 4 to Central Access 2	**1020**	1020			
External Works - Section 2B - Central Access 2 to North Entrance 1, including Neinthirion	**1794**	1794			
External Works - Section 1A - North Access to Gosen Bridge	**1882**			1882	
External Works - Section 1B - Gosen Bridge to Llanerfyl A458	**370**			370	
TOTAL EXTERNAL WORK TRIPS	**5556**	**3304**	**0**	**2252**	
INTERNAL WORKS					
Mobilisation, Site Compound and Access Junction	**177**	60	60	60	
New Tracks	**691**	235	249	208	34% AC4, 36% AC2, 30% AC1, by total trk length
Forestry Clearance	**1248**	500	188	562	40% AC4, 15% AC2, 45% AC1, by length
Hardstanding Areas	**402**	141	120	141	13 hs AC4, 11 hs AC2, 13hs AC1
Substation	**204**		204		96 TRIPS BETWEEN ACC 4 AND ACC 2 FOR SUBSTATION FOR CONCRETE DELIVERY.
Turbine Foundations AND Met Mast	**2848**	1044	759	1044	Max 30 trips per day for Turbine Foundations
Cable Infrastructure	**1057**	388	282	388	Distributed by numbers of Turbines
Reinstatement	**0**	0	0	0	Distributed by numbers of Turbines
Demobilisation	**200**	67	67	67	
Turbines - Mobilisation and Delivery of Kit	**112**	37	37	37	EQUIPMENT MOVED FROM ACC4 - 2 - 1 THEN DEMOBILISED
Turbines - Delivery of Turbines	**484**	177	129	177	
Substation Commissioning	**0**				Assume trips, LGV
Turbine - M&E and Commissioning	**0**				Assume trips, LGV
Site Personnel	**12970.66667**	4324	4324	4324	Assume trips, LGV
Site Servicing	**1664**	3	3	3	Consistent as weekly trips
TOTAL TRIPS	**22058**	**6976**	**6422**	**7011**	
TOTAL HGV TRIPS	**8603**	**2475**	**1969**	**2510**	
TOTAL VAN/LGV TRIPS	**12971**	**4324**	**4324**	**4324**	
TOTAL AIL TRIPS	**484**	**177**	**129**	**177**	

LLANBRYNMAIR - ASSUMPTIONS FOR EXTERNAL WORKS - S REID 08/05/13 - DRAFT 2

ASSUMPTION AREA	ASSUMPTION	TRIPS
Material Source	All materials have been assumed to be sourced externally of Llanbrynmair WF Site and trips are from the A470	
Personnel	It is assumed that each area of work will have either one or two gangs undertaking the works. (2 for Section 1, 2 for Section 2, 1 for Section 1). Each gang consists of 6 people and car occupancy is assumed to be between 2 and 3 people per car (2.25 people per car).	12
Origin of personnel.	All personnel will enter the site from the A470. For Section 2, personnel will come from Access 4. For Section 1, personnel will come from Access 1. It is assumed that intra-site trips throughout the works between Access 4 and 2, and Access 4 and 1 will be 10 vehicles/day.	
Welfare and Inspections	Trip movements associated with welfare have not been included within this model.	
Sensitivity	This is a coarse model only and is based on the works as of 29/04/13.	
Earthworks	Earthworks will be managed locally. Won cut or fill material will be balanced between different landowners. Fill material has been estimated with all fill material being imported. No use of cut material.	
Scope	This assessment considers the LTMP (Talerddig to Llanerfyl Road) only.	
Non-inclusives	No specific inclusion has been provided for structural works, culverting etc. It has been assumed that these trips have been included within the estimate.	
Prelims - Stats	It has been assumed that stats diversions are required on Section 1 only.	
HGV TRIPS - DEFINITIONS	TRIPS ARE CALCULATED AS SINGLE O-D-O TRIPS TO SITE. SECOND COLUMN, TWO-WAY TRIPS, ARE CALCULATED AS ONE O-D TRIP, AND ONE D-O TRIP. IE, EACH HGV HAVING TWO IMPACTS ON THE HIGHWAY NETWORK.	
	ASSUMPTION	FACTOR
AREA OF OVER-RUN	ASSUME THAT 1M2 OF OVER-RUN CONSTRUCTED FROM 0.4m3 OF TYPE 1 SUB-BASE, 2 LAYERS OF GEOGRID, 1M2 OF GRASS REINFORCEMENT	1.012
AREA OF ASPHALT	ASSUME THAT 1M2 OF ASPHALT CONSTRUCTION CONSISTS OF, 0.2M3 OF ASPHALT, 0.30M3 OF TYPE 1, 0.15M3 OF CAPPING, 2 LAYERS OF GEOGRID	1.5
AREA OF TRACK	ASSUME THAT 1M2 OF TRACK CONSTRUCTED FROM 0.4M3 OF TYPE 1 SUB-BASE, 2 LAYERS OF GEOGRID.	0.902
EARTHWORKS - FILL	FACTOR APPLIED IF EARTHWORKS GREATER THAN 1M DEPTH AS ADDITIONAL IMPORTED FILL WILL BE REQUIRED. FACTOR ASSUMES THAT WITHIN AREAS OF FILL, EACH 1M2 OF CONSTRUCTION REQUIRES 1M3 OF FILL. THEREFORE, THE AREA IS DOUBLED	1
TONNAGE CAPACITY OF HGVS	ASSUME THAT 1 CONSTRUCTION TIPPER CAN CARRY 20T	0.05
MULTIPLIER FOR ESTIMATE LEVEL OF DETAIL	Additional on top of total to allow of unaccounted trips, and to allow for the outline nature of the quantification of works.	1
MULTIPLIER FOR WORKS ON GOOD GROUND	Reduce volume of material by 50% for areas of good CBR	0.5

LOCATION / SECTION	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)	O-R TONNAGE	ASP TONNAGE	TRACK TONNAGE	FILL TONNAGE	HGV TRIPS - RAW	HGV TRIPS - FACTORED	TWO-WAY HGV TRIPS
PRELIMINARY													
STATS DIVERSIONS - Section 1	Assumed that overhead lines diverted and moved to new locations. Approx 40 Poles Impacted. 1 Trips per pole.		0	0	no		0	0	0	0	0	40	80
STATS DIVERSIONS - Section 2	Minimal Stats Impact	0	0	0	NO		0	0	0	0	0	0	0
STATS DIVERSIONS - Section 3	Minimal Stats Impact	0	0	0	NO		0	0	0	0	0	0	0
CH 0 - A458 LLANERFYL JUNCTION	CONSTRUCTION OF NEW ACCESS FOR WORKS	217	0	252	YES		219.604	0	227.304	844.2	65	65	130
Ch 17500 - A470 Talerddig	WIDENING OF EXISTING ACCESS JUNCTION FOR ABNORMALS	0	220	24	YES		0	330	21.648	439.2	40	40	80
PRELIM TOTALS							219.604	330	248.952	1283.4	104.0978	145	290
SECTION 3	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 17450 - 3.23	NEW ASPHALT PASSING PLACE AND OVERRUN	90	41	0	no		91.08	61.5	0	0	8	8	16
CH 17290 - 3.22C	NEW ASHPALT WIDENING AND PASSING BAY	0	58	0	NO		0	87	0	0	4	5	10
CH 17200 - 3.22B	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	31	26	0	NO	YES	31.372	39	0	0	2	2	4
CH 17080 - 3.22A	WIDEN EXISTING BAY WITH OVERRUN	88	0	0	NO	YES	89.056	0	0	0	2	3	6
CH 16855 - 3.21	WIDEN EXISTING BAY WITH OVERRUN	47	0	0	NO	YES	47.564	0	0	0	1	2	4
CH 16715 - 3.20	WIDEN EXISTING BAY WITH OVERRUN	59	0	0	NO	YES	59.708	0	0	0	1	2	4
CH 16550 - 3.19	WIDENING TO BOTH SIDES OF ROAD WITH OVERRUN	104	0	0	NO		105.248	0	0	0	5	6	12
CH 16480 - 3.18	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 16370 - 3.17B	NEW OVERRUN PASSING PLACE	45	0	0	NO		45.54	0	0	0	2	3	6
CH 16275 - 3.17A	NEW PASSING PLACE AND OVERRUN	69	37	0	NO		69.828	55.5	0	0	6	7	14
CH 15950 - 3.16	WIDEN EXISTING BAY WITH OVERRUN	47	0	0	NO		47.564	0	0	0	2	3	6
CH 15780 - 3.15	WIDEN EXISTING BAY WITH OVERRUN	138	0	0	NO		139.656	0	0	0	7	7	14
CH 15570 - 3.14	NEW ASPHALT PASSING PLACE AND OVERRUN	63	31	0	NO		63.756	46.5	0	0	6	6	12
CH 15350 - 3.13	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 15150 - 3.12	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 15000 - 3.11	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14850 - 3.10	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14695 - 3.9 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14620 - 3.8B	NEW ASHPALT WIDENING AND PASSING BAY	0	29	0	NO		0	43.5	0	0	2	3	6
CH 14520 - 3.8A	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	46	22	0	NO	YES	46.552	33	0	0	2	2	4
CH 14300 - 3.7 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14250 - 3.6 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14075 - 3.5 -	WIDEN EXISTING BAYS ON BOTH SIDES OF ROAD WITH OVERRUN	49	0	0	YES	YES	49.588	0	0	88.2	3	4	8
CH 13950 - 3.4A	NEW ASPHALT PASSING PLACE	0	99	0	YES		0	148.5	0	178.2	16	17	34
CH 13840 - 3.4 -	WIDEN EXISTING BAY WITH OVERRUN	29	0	0	NO	YES	29.348	0	0	0	1	1	2
CH 13700 - 3.3 -	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	53	10	0	YES	YES	53.636	15	0	113.4	5	5	10
CH 13550 - 3.2B	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 13460 - 3.2A	WIDEN EXISTING BAY WITH OVERRUN	33	0	0	YES	YES	33.396	0	0	59.4	2	3	6
CH 13330 - 3.1D	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 13160 - 3.1C	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	49	21	0	YES	YES	49.588	31.5	0	126	5	6	12
CH 12950 - 3.1B	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	43	21	0	YES	YES	43.516	31.5	0	115.2	5	5	10
CH 12700 - 3.1A	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
SECTION 3 TOTALS							1095.996	592.5	0	680.4	89	100	200
SECTION 2	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 12390 - SITE ACCESS 4	WIDENING TO EXISTING ACCESS JUNCTION	350	192	218	NO		354.2	288	196.636	0	42	42	84
CH 12000 - 12390 - 2.17	OVERRUN WIDENING	586	0	0	NO		593.032	0	0	0	30	30	60
CH 11700 - 12000 - 2.16D	OVERRUN WIDENING AND WIDEN EXISTING BAY WITH ASPHALT	693	38	0	YES	YES	701.316	57	0	1315.8	52	52	104
CH 11640 - 11700 - 2.16C	OVERRUN WIDENING AND NEW ASPHALT PASSING BAY	192	77	0	YES		194.304	115.5	0	484.2	40	40	80
CH 11430 - 11640 - 2.16B	OVERRUN WIDENING	725	0	0	YES	YES	733.7	0	0	1305	51	51	102
CH 11390 - 11430 - 2.16A	NEW ASPHALT AND OVERRUN PASSING BAY	56	99	0	YES		56.672	148.5	0	279	24	25	50
CH 11100 - 11390 - 2.15	NEW ASPHALT AND OVERRUN PASSING BAY	888	90	0	YES		898.656	135	0	1760.4	140	140	280
CH 10920 - 11120 - 2.14	OVERRUN WIDENING	350	0	0	NO		354.2	0	0	0	18	18	36
CH 10750 - 10800 - 2.13	OVERRUN WIDENING AND NEW ASPHALT PASSING BAY	432	32	0	NO		437.184	48	0	0	24	25	50
CH 10675 - 10950 - 2.12	CULVERT WIDENING AND EXISTING BAY TO BE RETAINED	37	0	0	NO		37.444	0	0	0	2	2	4
CH 10620 - 10730 - 2.11	OVERRUN WIDENING	140	0	0	NO		141.68	0	0	0	7	8	16
CH 10530 - 10610 - 2.10	OVERRUN WIDENING	277	0	0	YES		280.324	0	0	498.6	39	39	78
CH 10480 - 10530 - 2.9	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN WIDENING	0	0	0	YES		0	0	0	0	0	0	0
CH 10410 - 10500 - 2.8	ASPHALT WIDENING AND OVERRUN WIDENING	412	220	0	NO		416.944	330	0	0	37	38	76
SECTION 2A TOTALS							5199.656	1122	196.636	5643	505.2442	510	1020
CH 10140 - SITE ACCESS 2	WIDENING TO EXISTING ACCESS JUNCTION	419	290	291	NO		424.028	435	262.482	0	56	57	114
CH 10100 - 10440 - 2.7B	NEW ASPHALT PASSING PLACE AND OVERRUN WIDENING	1565	98	0	YES		1583.78	147	0	2993.4	236	237	474
CH 09980 - 10100 - 2.7A	NEW ASPHALT PASSING PLACE AND OVERRUN WIDENING	439	129	0	NO		444.268	193.5	0	0	32	32	64
CH 09770 - 9980 - 2.6	OVERRUN WIDENING	630	0	0	YES		637.56	0	0	1134	89	89	178
CH 09680 - 9840 - 2.5	OVERRUN AND TRACK WIDENING	768	0	0	YES		777.216	0	0	1382.4	108	108	216
CH 09550 - 9680 - 2.4	OVERRUN WIDENING	393	267	0	NO		397.716	400.5	0	0	40	40	80
CH 09000 - 900m OF NEW ROAD - NEINTHIRION BYPASS	NEW TRACK CONSTRUCTION WITH OVERRUN WIDENING	607	0	4845	NO		614.284	0	4370.19	0	249	250	500
CH 08850 - 8950 - 2.3B	OVERRUN WIDENING	207	266	0	NO	YES	209.484	399	0	0	15	16	32
CH 08500 - 8850 - 2.3A	OVERRUN WIDENING	325	0	0	NO	YES	328.9	0	0	0	8	9	18
CH 08330 - 8580 - 2.2	OVERRUN AND ASPHALT WIDENING	686	96	0	YES	YES	694.232	144	0	1407.6	56	57	114
CH 08280 - 8320 - 2.1	OVERRUN WIDENING	54	0	0	NO	YES	54.648	0	0	0	1	2	4
SECTION 2B TOTALS							6166.116	1719	4632.672	6917.4	890.8128	897	1794
SECTION 2 TOTALS							11365.772	2841	4829.308	12560.4	1396.057	1407	2814
SECTION 1	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 460 - 590 - 1.1	OVERRUN WIDENING AND BRIDGE PARAPET WORKS	133	0	0	NO		134.596	0	0	0	7	7	14
CH 720 - 740 - 1.2	ASPHALT WIDENING	0	11	0	NO		0	16.5	0	0	1	1	2
CH 875 - 950 - 1.3	OVERRUN WIDENING	522	15	0	NO		528.264	22.5	0	0	28	28	56
CH 970 - 990 - 1.4	ASPHALT WIDENING, additional trips for retaining wall	0	0	0	yes		0	0	0	0	0	0	6
CH 1045 - 1080 - 1.5	OVERRUN WIDENING	29	0	0	no		29.348	0	0	0	1	2	4
CH 1130 - 1175 - 1.6	OVERRUN WIDENING	19	0	0	NO		19.228	0	0	0	1	1	2
CH 1175 - 1210 - 1.7	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 1380 - 1450 - 1.8	OVERRUN WIDENING WITH ISLAND ASPHALT WIDENING	62	12	0	NO		62.744	18	0	0	4	5	10
CH 1950 - 2000 - 1.9	ASPHALT WIDENING	0	26	0	YES		0	39	0	46.8	4	5	10
CH 2055 - 2090 - 1.10	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2300 - 2340 - 1.11	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2400 - 2575 - 1.12	OVERRUN WIDENING	169	0	0	NO		171.028	0	0	0	9	9	18
CH 2580 - 2630 - 1.13	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2970 - 3050 - 1.14	OVERRUN WIDENING	150	0	0	YES		151.8	0	0	270	21	22	44
CH 3340 - 3450 - 1.15	OVERRUN WIDENING AND EXISTING PASSING BAY	316	0	0	NO		319.792	0	0	0	16	16	32
CH 3870 - 3930 - 1.16	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 3875 - 4090 - 1.17	OVERRUN WIDENING	303	0	0	YES		306.636	0	0	545.4	43	43	86
CH 4120 - 4200 - 1.18	ASPHALT AND OVERRUN WIDENING	188	58	0	YES		190.256	87	0	442.8	36	37	74

CH 4235 - 4315 - 1.19	OVERRUN WIDENING	115	0	0	NO		116.38	0	0	0	6	6	12
SECTION 1B TOTALS							2030.072	183	0	1305	175.9036	182	370
CH 4335 - 4430 - 1.20	OVERRUN WIDENING	397	0	40	NO		401.764	0	36.08	0	22	22	44
CH 4390 - 4450 - 1.21	OVERRUN WIDENING	381	0	0	YES		385.572	0	0	685.8	54	54	108
CH 4440 - 4540 - 1.22	ROAD WIDENING, RETENTION AND BRIDGE WORKS, additional trips added for enabling and temporary works, which are extensive	0	367	0	YES		0	550.5	0	660.6	61	61	222
CH 4540 - 4560 - 1.23	ROAD WIDENING WITH RETENTION	0	35	0	YES		0	52.5	0	63	6	6	12
CH 4550 - 4640 - 1.24	ROAD WIDENING	0	128	0	YES		0	192	0	230.4	21	22	44
CH 4620 TO 4970 - GOSEN TO SYCHTYN OFF-ROAD TRACK	NEW TRACK CONSTRUCTION	1251	577.5		NO		1266.012	866.25	0	0	107	107	214
CH 4970 - 5040 - 1.25	ROAD WIDENING	0	105	0	NO		0	157.5	0	0	8	8	16
CH 5050 - 5110 - 1.26	ROAD WIDENING	0	116	0	YES		0	174	0	208.8	19	20	40
CH 5130 - 5180 - 1.27	OVERRUN WIDENING	111	0	0	NO		112.332	0	0	0	6	6	12
CH 5175 - 5315 - 1.28	OVERRUN WIDENING	171	0	0	NO		173.052	0	0	0	9	9	18
CH 5330 - 5430 - 1.29	OVERRUN WIDENING	138	0	0	NO		139.656	0	0	0	7	7	14
CH 5430 - 5700 - 1.30	WIDEN EXISTING BAY WITH ASHPALT AND OVERRUN WIDENING	387	29	0	NO		391.644	43.5	0	0	22	22	44
CH 5770 - 5880 - 1.31	OVERRUN WIDENING	250	0	0	NO		253	0	0	0	13	13	26
CH 6060 - 6115 - 1.32	WIDEN EXISTING BAY WITH OVERRUN	64	0	0	NO		64.768	0	0	0	3	4	8
CH 6090 - 6325 - 1.33	OVERRUN WIDENING	576	0	0	NO		582.912	0	0	0	29	30	60
CH 6350 - 6480 - 1.34	OVERRUN WIDENING	121	0	0	NO		122.452	0	0	0	6	7	14
CH 6450 - 6575 - 1.35	WIDEN EXISTING BAY WITH OVERRUN	228	0	0	YES		230.736	0	0	410.4	32	33	66
CH 6530 - 6770 - 1.36	WIDEN EXISTING BAY WITH OVERRUN	51	0	0	NO		51.612	0	0	0	3	3	6
CH 6730 - 6950 - 1.37	OVERRUN WIDENING	260	0	0	YES		263.12	0	0	468	37	37	74
CH 6950 - 7130 - 1.38	NEW ASPHALT PASSING BAY AND OVERRUN WIDENING	375	89	0	NO		379.5	133.5	0	0	26	26	52
CH 7100 - 7170 - 1.39	OVERRUN WIDENING	0	0	0	NO		0	0	0	0	0	0	0
CH 7170 - 7290 - 1.40	OVERRUN WIDENING	0	0	0	YES		0	0	0	0	0	0	0
CH 7270 - 7530 - DOLWEN ISAF - OPTION 1	OVERRUN WITH BRIDGE WIDENING (INCLUDED IN OVERRUN CALCS), REMOVED AS USING OPTION 2 WITH BRIDGE WORKS - ZERO QUANTITIES BECAUSE OPTION 2 USED.	0	0	0	NO		0	0	0	0	0	0	0
CH 7220 - 7530 - DOLWEN ISAF - OPTION 2	NEW TRACK CONSTRUCTION WITH OVERRUN WIDENING, WITH BRIDGE WIDENING INCLUDED IN CALCS, ADDITIONAL 20 TRIPS ADDED FOR TEMP WORKS	2520	21	0	NO		2550.24	31.5	0	0	129	130	300
CH 7500 - 7670 - 1.41	OVERRUN WIDENING	1088	0	0	YES		1101.056	0	0	1958.4	153	153	306
CH 7660 - 7720 - 1.42	OVERRUN WIDENING	91	0	0	NO		92.092	0	0	0	5	5	10
CH 7700 - 7780 - 1.43	OVERRUN WIDENING	229	0	0	NO		231.748	0	0	0	12	12	24
CH 7950 - 8040 - 1.44	OVERRUN WIDENING	184	0	0	YES		186.208	0	0	331.2	26	26	52
CH 8150 - 8240 - 1.45	OVERRUN WIDENING	136	0	0	NO		137.632	0	0	0	7	7	14
CH 8250 - SITE ACCESS 1	WIDENING TO EXISTING ACCESS JUNCTION	384	169	193	NO		388.608	253.5	174.086	0	41	41	82
SECTION 1A TOTALS							9505.716	2454.75	210.166	5016.6	859.3616	871	1882
SECTION 1 TOTALS	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)	11535.788	2637.75	210.166	6321.6	1035.2652	1053	2252
GRAND TOTALS							24217.16	6401.25	5288.426	20845.8	2624.2267	2705	5556

Llanbrynmair South Wind Farm Deliveries Table - CENTRAL CASE 60% WON - RES 22/04/13, AECOM 07/05/13

Phase	Purpose	Vehicle	Approximate No of Journeys	Max journeys possible in 1 day (not all journeys will occur in one day)	CHK
Site Set-Up	Portacabin delivery	Low loader	10	10	
	Skip delivery	Low loader	10	10	
	Generator delivery	Low loader	4	4	
	Water and fuel tank delivery	Low loader	2	1	
	Excavator delivery	Low loader	4	1	
	Roller-compactor	Low loader	2	1	
	Crushing/Grading equip	Low loader	4	4	
	Batching Equipment	Low loader	8	8	
	Backhoe	Low loader	2	2	
	Forestry Felling	Low loader	24	2	
	Forestry Felling-Timber removal	Flat bed	600	16	
Road & hard standings	Stone for site tracks	Tipper trucks	321	40	
	Stone for control building and substation compounds	Tipper trucks	7	7	
	Stone for construction compound and gatehouse	Tipper trucks	40	40	
	Stone for met mast	Tipper trucks	2	2	
	Stone for turning heads	Tipper trucks	14	14	
	Stone for pathways	Tipper trucks	10	10	
	Stone for crane hardstanding	Tipper trucks	199	40	
Foundation construction	Excavator delivery	Low loader	2	2	
	Misc works	Low loader	8	2	
	Concrete for turbine foundations, piles & transformer plinths	Mixer trucks	1314	22	
	Concrete for Comms & Met mast	Mixer trucks	11	11	
	Steel delivery	Flat bed	60	30	
	Foundation bolts or steel insert	Flat bed	30	30	
	Place foundation bolt cage or steel insert	30t to 50t crane	1	1	
Turbine erection	Tool container delivery	Low Loader	15	15	X
	Tower section delivery	Extendible trailer	120	8	
	Blade delivery	Extendible trailer	90	6	
	Nacelle	Low loader	30	2	
	Met Mast	Low loader	1	1	X
	Hub and rotor	Low loader	30	2	X
	Turbine erection	1000t to 1200t	1	1	
	Crane Associated equipment	Low loader	10	10	X
	Turbine erection	150t to 200t	1	1	
Cable Installation	Cable delivery	Flat bed or Hiab	9	2	
	Excavator delivery	Low loader	2	1	
	Cable laying	Telescopic	2	1	
	Sand Bedding	Tipper trucks	515	40	
Sub Station & Control Building	Concrete delivery	Mixer trucks	70	35	
	Brick delivery	Flat bed	13	3	
	Roofing & Cladding	Flat bed	4	3	
	Switchgear	Flat bed	4	2	
	Misc electrical equipment	Flat bed	4	3	
Reinstatement	Removal of temporary compound & gate house stone	Tipper trucks	0	0	
	Removal of temporary met mast hardstanding	Tipper trucks	0	0	
	Removal of temporary turning head stone	Tipper trucks	0	0	
	Removal of temporary hardstanding stone	Tipper trucks	0	0	
Misc	4 GANGS OF 6 PPL, 608 DAYS	Vans, cars	6485	5	
		Telescopic	1	1	
		Skip lorry	208	2	
		Small tanker	208	2	
		Light goods van	416	4	
Site De-mobilisation	Portacabin removal	Low loader	10	10	
	Skip removal	Low loader	10	10	
	Generator removal	Low loader	4	4	
	Water and fuel tank removal	Low loader	2	2	
	Excavator removal	Low loader	6	1	
	Roller-compactor	Low loader	2	2	
	Backhoe	Low loader	2	2	
	Crushing/Grading equip	Low loader	4	4	
	Batching Equipment	Low loader	8	8	
	Forestry Felling	Low loader	24	24	
	Turbine Tools & Crane removal	Low loader	25	2	
	Telescopic Removal	Low loader	3	2	
			4301		

Llanbrynmair South Wind Farm Deliveries Table - PRODUCED BY RES, REVISED BY AECOM 08/05/13

INPUTS		Comments
No. of turbines (TOTAL)	30	
No of piled foundations	0	Assumed none at this stage
No of gravity foundations	30	
Estimated number of piles per foundation		N/A
Estimated pile depth (m)		N/A
Estimated pile diameter (m)		N/a
No. of permanent met masts	1	Input total number of permanent met masts
Is the met mast piled? Yes/no	no	
No of tower sections	4	80m Hub Height
Is the drive train delivered separately? Yes/no	no	
No of control building and sub-station compounds	1	Additional Stone/concrete allowed for 2 welfare buildings below.
No. of turbine component laydown areas	0	
No. of construction compounds	5	Assumes no recovery of stone between phases.
Gate-house compound	0	Assumes Construction Compounds will act as gate houses.
Length of new tracks (m)	**18300**	Sum of all new track
Length of FORESTRY TRACKS (m)	**3642**	sum of forestry tracks
Length of upgrade tracks (m)	**3830**	Upgrade of existing site track only; not including off site works, Delivery Route etc.
Average new track construction depth anticipated (m)	0.40	No SI available, assumes 400mm average across site for new tracks.
Average upgrade track construction depth anticipated (m)	0.30	No SI available, assumes 300mm average across site for upgraded existing track.
Average depth of construction above upgraded track	**0.10**	Assumed on 0.1m above existing track, with geogrids to span into new track.
Average forestry track construction depth anticipated (m)	**0.20**	200mm depth using timber as a component in the road foundation.
Assumed Width of Existing Tracks to be Upgraded (TBC, pending Topo)	**2.50**	2.5m standard wheel width.
Track width on straight lengths	**5.5**	5.5M STANDARD TRACK WIDTH, NO PASSING BAYS OR CURVE WIDENING
Factor to accommodate widening at bends	**1.0**	REDUCED TO 1.0
Percentage of stone won on site	94%	Assumes productive borrow pits
Percentage of crane hardstanding covered with truckpave (or equivalent)	0%	Assume all compacted stone surface
Number of turning heads	14	
External transformer at turbines? yes/no	yes	Assume external transformers for now
Grid Connection (kV)	132	132kV
Is offsite exportation of any waste material and/or excess spoil required during construction? yes/no	no	Assumes all spoil disposed of/stored on site.
Is onsite concrete batching proposed? yes/no	yes	Assumes all concrete can be batched on site.
Are crane hardstandings rectangular? yes/no	yes	Refer to drawing 01592D2306-09
Number of communication masts required (with lattice masts)	1	Assume 1 at 132kv substation.
Forestry felling required? yes/no	Yes	Forresty Vehicles shown in final table

CALCULATIONS		
Total area of site tracks (m2)	141746	Both new, forestry and upgraded
Total area of sub-station and control building compound (m2)	3844	62mX62m based on 01592D2304-04
Total Area of Welfare Buildings	96	Based on 01592d2312-01
Total area of construction compounds (m2)	15000	60m x 50m based on 01592d2221-02
Total area of batching compounds (m2)	6400	80m x 80m based on typical plant
Total area of met mast temporary hardstanding (m2)	400	Assumes 20m x 20m area
Total area of turning heads (m2)	5460	65m x 6m Based on fully extended trailer.
Total area of lay down area (m2)	0	

Total area of pathways at turbines (m2)	9960	Based on 5m path around plinth and back to the hardstanding from the turbine. Assumes 2m thick stone depth from ground level to top of co
Total permanent crane hard standing area (m2)	26880	Based on triangle configuration (896m2/turbine, Ref 01657D2312-09)
Total temporary crane hard standing area (m2)	33600	Based on triangle configuration (1120m2/turbine, Ref 01657D2312-09)
Total permanent crane hard standing area (m2)	**50325**	Based on rectangular configuration (1200m2/turbine, Ref 001592D2221-02)
Total temporary crane hard standing area (m2)		Based on rectangular configuration (562m2/turbine, Ref 001592D2221-02)
Total area of crane hard standings (m2)	50325	

	Imported	Site Won	TOTAL	
Total stone volume for site tracks (m3)	2920	45750	48671	Both New, Forestry and Upgrade - (Length*width*depth*Factor)
Total stone volume for sub-station and control building compounds (m3)	65	1012	1076	Assumes only 70% of track stone depth required.
Total stone volume for Welfare Buildings (m3)	2	25	27	Assumes only 70% of track stone depth required.
Total stone volume for construction compounds (m3)	252	3948	4200	Assumes only 70% of track stone depth required.
Total stone volume for batching compound (m3)	108	1684	1792	Assumes only 70% of track stone depth required.
Total stone volume for met mast temporary hardstandings (m3)	14	226	240	Assumes that hardstandings require 0.6m depth
Total stone volume for turning heads	131	2053	2184	Same as track stone depth
Total stone volume for lay-down area	0	0	0	
Total stone volume for pathways (m3)	90	1404	1494	Based on depth of 0.15m
Total permanent crane hardstanding volume			21504	triangular configuration
Total temporary crane hardstanding volume			26880	triangular configuration
Total permanent crane hardstanding volume			40260	rectangular configuration
Total temporary crane hardstanding volume			0	rectangular configuration
Total stone volume for crane hardstandings (m3)	1812	28383	30195	Assumes that hardstandings require 0.6m depth
Total stone volume for piling rig hardstandings (m3)	0	0	0	No Piling Required
Total imported stone volume (m3)	**5393**	84486	89879	Please note that only the **imported** stone quantities are shown in the delivery table. As a result be conservative when estimating % of stone won on site as the results should represent a worst case when being used in a TIA

Total concrete volume for turbine bases (m3)	10500	Based on foundation volume of 350m3 (16m Dia.)
Total concrete volume for piles (m3)	0	No piles required
Total concrete volume for pile caps (m3)	0	No piles required
Total concrete volume for transformer base (m3)	300	Based on transformer plinth volume of 10m3
Total concrete volume for control building (m3)	239	Based on 13.9m x 43m footprint and average slab depth of 0.4m.
Total concrete volume for welfare building (m3)	20	Based on 5m x 5m footprint and average slab depth of 0.4m.
Total concrete volume for sub-station (excluding control building slab) (m3)	339	Based on 13.9m x 43m footprint and average slab depth of 0.4m. Plus approximately 100m3 for plinths and bunds for transformers)
Total concrete volume for met mast base (m3)	55	base on foundation volume of 55m3
Total concrete volume for met mast piles (m3)	0	Based on 4 No piles of similar size at turbine foundations

Total concrete volume for communication mast (m3)	12.5	Based on foundation dimensions of 2.5m x 2.5m x 2.0m
Total concrete volume (m3)	**11465**	
	1910.88	
MV Cable Layouts - Based on Drawing 01592d4303-02 & 01592d4302-02		
Total Cable Length based on 5 runs (m)	42943	- Based on Drawing 01592d4303-02
Bedding Depth (m)	0.3	- Based on Drawing 01592d4302-02
Bedding Width (m)	0.4	- Based on Drawing 01592d4302-02
Total sand bedding required (m3)	**5153**	

References / Methodology / Notes

Stone deliveries = total stone volume required, multiplied by 2.2 to convert m3 into Tonnes. Number divided by 18 to reflect the number of tonnes each truck can carry.

Concrete deliveries = total volume of concrete required, divided by 6 to derive number of concrete wagons

Cable deliveries = track length * 6 / 8 reels / 1500m

Does not include for vehicle movements during decommissioning

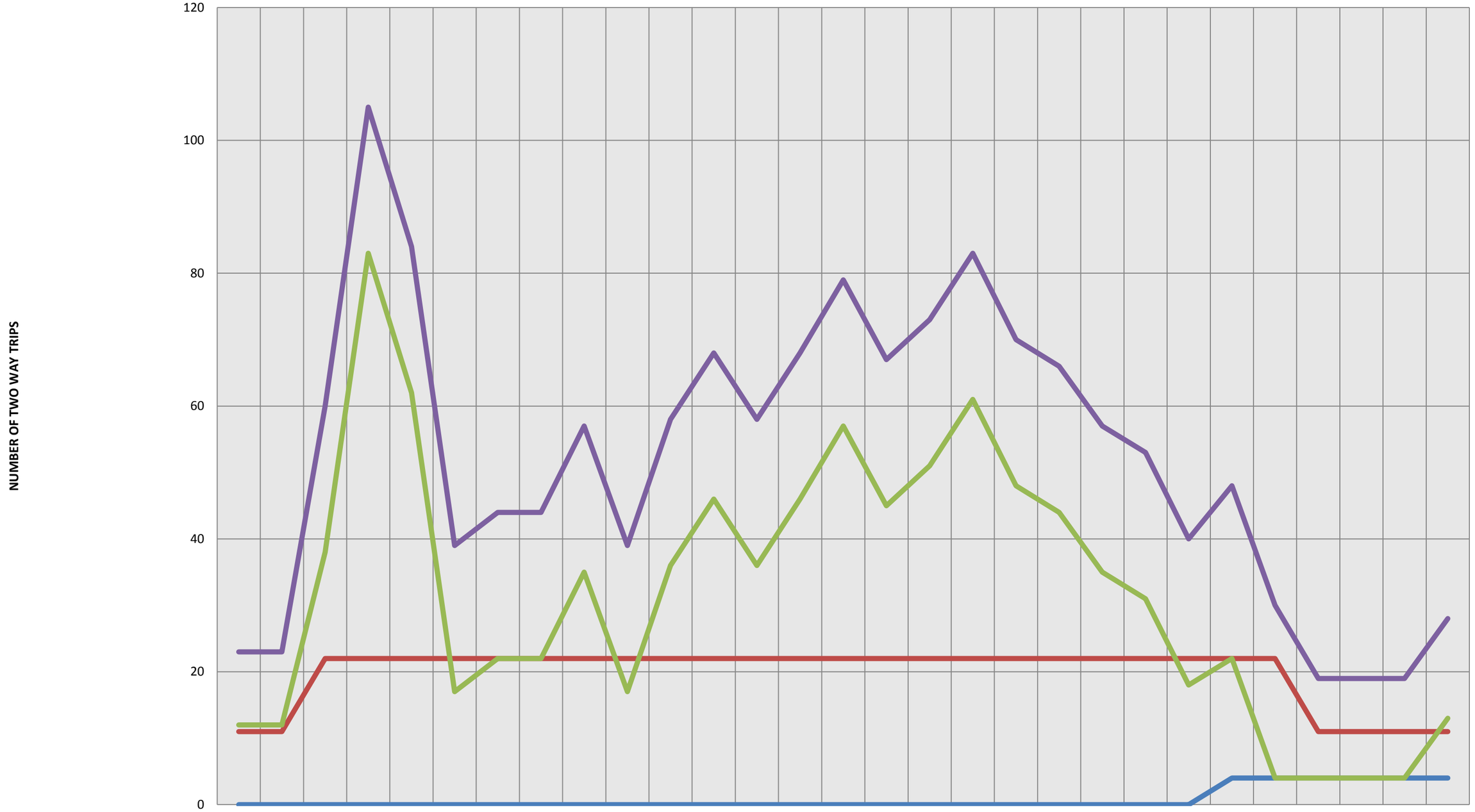
Assumes concrete is batched off site

Assumes large scale turbines (80-90m rotor diameter)

TONNAGE FOR CONSTRUCTION TIPPER	**20.00**	TONS/VEHICLE
DENSITY OF CRUSHED STONE	**2.20**	TONS/M3
DENSITY OF SAND	**2.00**	TONS/M3
DENSITY OF CONCRETE	**2.60**	TONS/M3
TONNAGE FOR CONCRETE WAGON	**15.60**	TONS/VEHICLE
DENSITY OF ASPHALT CONCRETE	**2.30**	TONS/M3

LLANBRYNMAIR - 40% IMPORT, 60% BORROW, W BATCH, CENTRAL CASE		DAYS/MO	25	12/07/2013		DAILY HGV TRIPS GENERATED BY DEVELOPMENT, BY MONTH - TWO WAY TRIPS																											
	ACTIVITY	PROG MONTHS	PROG DAYS	TRIPS	TRIPS / DAY	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18
AIL	Turbines - Delivery of Turbines - South Access (4)	2	50	177	3.5																							4	4				
AIL	Turbines - Delivery of Turbines - Centre Access (2)	1.5	37.5	129	3.4																									4	4		
AIL	Turbines - Delivery of Turbines - North Access (1)	2	50	177	3.5																											4	4
AIL Total				**484**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**4**	**4**	**4**	**4**
ALL	Site Servicing	22	550	1664	3.0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ALL Total				**1664**		**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
EXT	External Works and Statutory Undertakers', Preliminaries	3	75	290	3.9	4	4	4																									
EXT	External Works - Section 3 - Talerddig to South Entrance (Access 4)	2	50	200	4.0	4	4																										
EXT	External Works - Section 2A - South Access 4 to Central Access 2	2	50	1020	20.4			21	21																								
EXT	External Works - Section 2B - Central Access 2 to North Entrance 1, including Neinthirion	2	50	1794	35.9				36	36																							
EXT	External Works - Section 1A - North Access to Gosen Bridge	6	150	1882	12.5				13	13	13	13	13	13																			
EXT	External Works - Section 1B - Gosen Bridge to Llanerfyl A458	3	75	370	4.9							5	5	5																			
EXT Total				**5556**		**8**	**8**	**25**	**70**	**49**	**13**	**18**	**18**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PH1	Mobilisation, Site Compound and Access Junction	1	25	209	8.4			9																									
PH1	New Tracks	5	125	1568	12.5									13	13	13	13	13															
PH1	Forestry Clearance	2	50	500	10.0											10	10																
PH1	Hardstanding Areas	4	100	939	9.4												10	10	10	10													
PH1	Turbine Foundations	5	125	1044	8.4											9	9	9	9	9													
PH1	Cable Infrastructure	3	75	388	5.2														6	6	6												
PH1	Reinstatement	3	75	0	0.0																0	0	0										
PH1	Demobilisation	1	25	67	2.7																												3
PH1	Turbines - Mobilisation and Delivery of Kit - South Access (4)	1	25	37	1.5																	2											
PH1 Total				**4752**		**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**13**	**13**	**32**	**42**	**32**	**25**	**25**	**6**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
PH2	Mobilisation, Site Compound and Access Junction	1	25	209	8.4				9																								
PH2	New Tracks	5	125	1661	13.3														14	14	14	14	14										
PH2	Forestry Clearance	2	50	188	3.8															4	4												
PH2	Hardstanding Areas	5	125	803	6.4																7	7	7	7	7								
PH2	Substation	5	125	285	2.3														3	3	3	3	3										
PH2	Turbine Foundations	5	125	759	6.1															7	7	7	7	7									
PH2	Cable Infrastructure	3	75	282	3.8																		4	4	4								
PH2	Reinstatement	3	75	0	0.0																		0	0	0								
PH2	Demobilisation	1	25	67	2.7																												3
PH2	Turbines - Mobilisation and Delivery of Kit - Centre Access (2)	1	25	37	1.5																			2									
PH2 Total				**4292**		**0**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**28**	**35**	**31**	**31**	**18**	**13**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
PH3	Mobilisation, Site Compound and Access Junction	1	25	209	8.4					9																							
PH3	New Tracks	4	100	1384	13.8																	14	14	14	14								
PH3	Forestry Clearance	2	50	562	11.2																		12	12									
PH3	Hardstanding Areas	3	75	939	12.5																				13	13	13						
PH3	Turbine Foundations	3	75	1044	13.9																					14	14	14					
PH3	Cable Infrastructure	1	25	388	15.5																								16				
PH3	Reinstatement	3	75	0	0.0																							0	0	0			
PH3	Demobilisation	1	25	67	2.7																												3
PH3	Turbines - Mobilisation and Delivery of Kit - North Access (1)	1	25	37	1.5																								2				
PH3 Total				**4630**		**0**	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**26**	**26**	**27**	**27**	**27**	**14**	**18**	**0**	**0**	**0**	**0**	**3**
VAN	Substation Commissioning	3	75	0	0.0																												
VAN	Turbine - M&E and Commissioning	5	125	0	0.0																												
VAN	Site Personnel (Including personnel working external of the site assuming 2.25 people per vehicle)		608	12970.66667	21.3	11	11	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	11	11	11
VAN Total		**MAX**	**AVG**	**12970.66667**		**11**	**11**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**11**	**11**	**11**	**11**
Grand Total - VANS/CARS ONLY		**22**	**20**	**12971**		**11**	**11**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**11**	**11**	**11**	**11**
Grand Total - AILS ONLY		**4**	**1**	**484**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**4**	**4**	**4**	**4**
Grand Total - HGVS ONLY		**62**	**31**	**20894**		**12**	**12**	**38**	**83**	**62**	**17**	**22**	**22**	**35**	**17**	**36**	**46**	**36**	**46**	**57**	**45**	**51**	**61**	**48**	**44**	**35**	**31**	**18**	**22**	**4**	**4**	**4**	**4**	**13**
Grand Total - ALL VEHICLES		**105**	**52**	**34349**		**23**	**23**	**60**	**105**	**84**	**39**	**44**	**44**	**57**	**39**	**58**	**68**	**58**	**68**	**79**	**67**	**73**	**83**	**70**	**66**	**57**	**53**	**40**	**48**	**30**	**19**	**19**	**19**	**28**

LLANBRYNMAIR - CONSTRUCTION TRAFFIC - DRAFT 3 - 10/05/13 - CENTRAL CASE - 40% Import, 60% Borrow



	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18
Grand Total - VANS/CARS ONLY	11	11	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	11	11	11
Grand Total - AILS ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4
Grand Total - HGVS ONLY	12	12	38	83	62	17	22	22	35	17	36	46	36	46	57	45	51	61	48	44	35	31	18	22	4	4	4	4	13
Grand Total - ALL VEHICLES	23	23	60	105	84	39	44	44	57	39	58	68	58	68	79	67	73	83	70	66	57	53	40	48	30	19	19	19	28

NOTE - HGVS ONLY!!!	TOTAL 2 WAY TRIPS	SOUTH ACCESS (4) TRIPS	CENTRE ACCESS (2) TRIPS	NORTH ACCESS (1) TRIPS	COMMENTS ON INTRA SITE TRIPS
EXTERNAL WORKS					
External Works and Statutory Undertakers', Preliminaries	**290**	290			
External Works - Section 3 - Talerddig to South Entrance (Access 4)	**200**	200			
External Works - Section 2A - South Access 4 to Central Access 2	**1020**	1020			
External Works - Section 2B - Central Access 2 to North Entrance 1, including Neinthirion	**1794**	1794			
External Works - Section 1A - North Access to Gosen Bridge	**1882**			1882	
External Works - Section 1B - Gosen Bridge to Llanerfyl A458	**370**			370	
TOTAL EXTERNAL WORK TRIPS	**5556**	**3304**	**0**	**2252**	
INTERNAL WORKS					
Mobilisation, Site Compound and Access Junction	**626**	209	209	209	
New Tracks	**4612**	1568	1661	1384	34% AC4, 36% AC2, 30% AC1, by total trk length
Forestry Clearance	**1248**	500	188	562	40% AC4, 15% AC2, 45% AC1, by length
Hardstanding Areas	**2681**	939	803	939	13 hs AC4, 11 hs AC2, 13hs AC1
Substation	**285**		285		96 TRIPS BETWEEN ACC 4 AND ACC 2 FOR SUBSTATION FOR CONCRETE DELIVERY.
Turbine Foundations AND Met Mast	**2848**	1044	759	1044	Max 30 trips per day for Turbine Foundations
Cable Infrastructure	**1057**	388	282	388	Distributed by numbers of Turbines
Reinstatement	**0**	0	0	0	Distributed by numbers of Turbines
Demobilisation	**200**	67	67	67	
Turbines - Mobilisation and Delivery of Kit	**112**	37	37	37	EQUIPMENT MOVED FROM ACC4 - 2 - 1 THEN DEMOBILISED
Turbines - Delivery of Turbines	**484**	177	129	177	
Substation Commissioning	**0**				Assume trips, LGV
Turbine - M&E and Commissioning	**0**				Assume trips, LGV
Site Personnel	**12970.66667**	4324	4324	4324	Assume trips, LGV
Site Servicing	**1664**	3	3	3	Consistent as weekly trips
TOTAL TRIPS	**28787**	**9256**	**8747**	**9134**	
TOTAL HGV TRIPS	**15332**	**4755**	**4294**	**4633**	
TOTAL VAN/LGV TRIPS	**12971**	**4324**	**4324**	**4324**	
TOTAL AIL TRIPS	**484**	**177**	**129**	**177**	

LLANBRYNMAIR - ASSUMPTIONS FOR EXTERNAL WORKS - S REID 08/05/13 - DRAFT 2

ASSUMPTION AREA	ASSUMPTION	TRIPS
Material Source	All materials have been assumed to be sourced externally of Llanbrynmair WF Site and trips are from the A470	
Personnel	It is assumed that each area of work will have either one or two gangs undertaking the works. (2 for Section 1, 2 for Section 2, 1 for Section 1). Each gang consists of 6 people and car occupancy is assumed to be between 2 and 3 people per car (2.25 people per car).	12
Origin of personnel.	All personnel will enter the site from the A470. For Section 2, personnel will come from Access 4. For Section 1, personnel will come from Access 1. It is assumed that intra-site trips throughout the works between Access 4 and 2, and Access 4 and 1 will be 10 vehicles/day.	
Welfare and Inspections	Trip movements associated with welfare have not been included within this model.	
Sensitivity	This is a coarse model only and is based on the works as of 29/04/13.	
Earthworks	Earthworks will be managed locally. Won cut or fill material will be balanced between different landowners. Fill material has been estimated with all fill material being imported. No use of cut material.	
Scope	This assessment considers the LTMP (Talerddig to Llanerfyl Road) only.	
Non-inclusives	No specific inclusion has been provided for structural works, culverting etc. It has been assumed that these trips have been included within the estimate.	
Prelims - Stats	It has been assumed that stats diversions are required on Section 1 only.	
HGV TRIPS - DEFINITIONS	TRIPS ARE CALCULATED AS SINGLE O-D-O TRIPS TO SITE. SECOND COLUMN, TWO-WAY TRIPS, ARE CALCULATED AS ONE O-D TRIP, AND ONE D-O TRIP. IE, EACH HGV HAVING TWO IMPACTS ON THE HIGHWAY NETWORK.	
	ASSUMPTION	FACTOR
AREA OF OVER-RUN	ASSUME THAT 1M2 OF OVER-RUN CONSTRUCTED FROM 0.4m3 OF TYPE 1 SUB-BASE, 2 LAYERS OF GEOGRID, 1M2 OF GRASS REINFORCEMENT	1.012
AREA OF ASPHALT	ASSUME THAT 1M2 OF ASPHALT CONSTRUCTION CONSISTS OF, 0.2M3 OF ASPHALT, 0.30M3 OF TYPE 1, 0.15M3 OF CAPPING, 2 LAYERS OF GEOGRID	1.5
AREA OF TRACK	ASSUME THAT 1M2 OF TRACK CONSTRUCTED FROM 0.4M3 OF TYPE 1 SUB-BASE, 2 LAYERS OF GEOGRID.	0.902
EARTHWORKS - FILL	FACTOR APPLIED IF EARTHWORKS GREATER THAN 1M DEPTH AS ADDITIONAL IMPORTED FILL WILL BE REQUIRED. FACTOR ASSUMES THAT WITHIN AREAS OF FILL, EACH 1M2 OF CONSTRUCTION REQUIRES 1M3 OF FILL. THEREFORE, THE AREA IS DOUBLED	1
TONNAGE CAPACITY OF HGVS	ASSUME THAT 1 CONSTRUCTION TIPPER CAN CARRY 20T	0.05
MULTIPLIER FOR ESTIMATE LEVEL OF DETAIL	Additional on top of total to allow of unaccounted trips, and to allow for the outline nature of the quantification of works.	1
MULTIPLIER FOR WORKS ON GOOD GROUND	Reduce volume of material by 50% for areas of good CBR	0.5

LOCATION / SECTION	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)	O-R TONNAGE	ASP TONNAGE	TRACK TONNAGE	FILL TONNAGE	HGV TRIPS - RAW	HGV TRIPS - FACTORED	TWO-WAY HGV TRIPS
PRELIMINARY													
STATS DIVERSIONS - Section 1	Assumed that overhead lines diverted and moved to new locations. Approx 40 Poles Impacted. 1 Trips per pole.		0	0	no		0	0	0	0	0	40	80
STATS DIVERSIONS - Section 2	Minimal Stats Impact	0	0	0	NO		0	0	0	0	0	0	0
STATS DIVERSIONS - Section 3	Minimal Stats Impact	0	0	0	NO		0	0	0	0	0	0	0
CH 0 - A458 LLANERFYL JUNCTION	CONSTRUCTION OF NEW ACCESS FOR WORKS	217	0	252	YES		219.604	0	227.304	844.2	65	65	130
Ch 17500 - A470 Talerddig	WIDENING OF EXISTING ACCESS JUNCTION FOR ABNORMALS	0	220	24	YES		0	330	21.648	439.2	40	40	80
PRELIM TOTALS							219.604	330	248.952	1283.4	104.0978	145	290
SECTION 3	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 17450 - 3.23	NEW ASPHALT PASSING PLACE AND OVERRUN	90	41	0	no		91.08	61.5	0	0	8	8	16
CH 17290 - 3.22C	NEW ASHPALT WIDENING AND PASSING BAY	0	58	0	NO		0	87	0	0	4	5	10
CH 17200 - 3.22B	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	31	26	0	NO	YES	31.372	39	0	0	2	2	4
CH 17080 - 3.22A	WIDEN EXISTING BAY WITH OVERRUN	88	0	0	NO	YES	89.056	0	0	0	2	3	6
CH 16855 - 3.21	WIDEN EXISTING BAY WITH OVERRUN	47	0	0	NO	YES	47.564	0	0	0	1	2	4
CH 16715 - 3.20	WIDEN EXISTING BAY WITH OVERRUN	59	0	0	NO	YES	59.708	0	0	0	1	2	4
CH 16550 - 3.19	WIDENING TO BOTH SIDES OF ROAD WITH OVERRUN	104	0	0	NO		105.248	0	0	0	5	6	12
CH 16480 - 3.18	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 16370 - 3.17B	NEW OVERRUN PASSING PLACE	45	0	0	NO		45.54	0	0	0	2	3	6
CH 16275 - 3.17A	NEW PASSING PLACE AND OVERRUN	69	37	0	NO		69.828	55.5	0	0	6	7	14
CH 15950 - 3.16	WIDEN EXISTING BAY WITH OVERRUN	47	0	0	NO		47.564	0	0	0	2	3	6
CH 15780 - 3.15	WIDEN EXISTING BAY WITH OVERRUN	138	0	0	NO		139.656	0	0	0	7	7	14
CH 15570 - 3.14	NEW ASPHALT PASSING PLACE AND OVERRUN	63	31	0	NO		63.756	46.5	0	0	6	6	12
CH 15350 - 3.13	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 15150 - 3.12	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 15000 - 3.11	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14850 - 3.10	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14695 - 3.9 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14620 - 3.8B	NEW ASHPALT WIDENING AND PASSING BAY	0	29	0	NO		0	43.5	0	0	2	3	6
CH 14520 - 3.8A	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	46	22	0	NO	YES	46.552	33	0	0	2	2	4
CH 14300 - 3.7 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14250 - 3.6 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14075 - 3.5 -	WIDEN EXISTING BAYS ON BOTH SIDES OF ROAD WITH OVERRUN	49	0	0	YES	YES	49.588	0	0	88.2	3	4	8
CH 13950 - 3.4A	NEW ASPHALT PASSING PLACE	0	99	0	YES		0	148.5	0	178.2	16	17	34
CH 13840 - 3.4 -	WIDEN EXISTING BAY WITH OVERRUN	29	0	0	NO	YES	29.348	0	0	0	1	1	2
CH 13700 - 3.3 -	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	53	10	0	YES	YES	53.636	15	0	113.4	5	5	10
CH 13550 - 3.2B	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 13460 - 3.2A	WIDEN EXISTING BAY WITH OVERRUN	33	0	0	YES	YES	33.396	0	0	59.4	2	3	6
CH 13330 - 3.1D	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 13160 - 3.1C	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	49	21	0	YES	YES	49.588	31.5	0	126	5	6	12
CH 12950 - 3.1B	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	43	21	0	YES	YES	43.516	31.5	0	115.2	5	5	10
CH 12700 - 3.1A	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
SECTION 3 TOTALS							1095.996	592.5	0	680.4	89	100	200
SECTION 2	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 12390 - SITE ACCESS 4	WIDENING TO EXISTING ACCESS JUNCTION	350	192	218	NO		354.2	288	196.636	0	42	42	84
CH 12000 - 12390 - 2.17	OVERRUN WIDENING	586	0	0	NO		593.032	0	0	0	30	30	60
CH 11700 - 12000 - 2.16D	OVERRUN WIDENING AND WIDEN EXISTING BAY WITH ASPHALT	693	38	0	YES	YES	701.316	57	0	1315.8	52	52	104
CH 11640 - 11700 - 2.16C	OVERRUN WIDENING AND NEW ASPHALT PASSING BAY	192	77	0	YES		194.304	115.5	0	484.2	40	40	80
CH 11430 - 11640 - 2.16B	OVERRUN WIDENING	725	0	0	YES	YES	733.7	0	0	1305	51	51	102
CH 11390 - 11430 - 2.16A	NEW ASPHALT AND OVERRUN PASSING BAY	56	99	0	YES		56.672	148.5	0	279	24	25	50
CH 11100 - 11390 - 2.15	NEW ASPHALT AND OVERRUN PASSING BAY	888	90	0	YES		898.656	135	0	1760.4	140	140	280
CH 10920 - 11120 - 2.14	OVERRUN WIDENING	350	0	0	NO		354.2	0	0	0	18	18	36
CH 10750 - 10800 - 2.13	OVERRUN WIDENING AND NEW ASPHALT PASSING BAY	432	32	0	NO		437.184	48	0	0	24	25	50
CH 10675 - 10950 - 2.12	CULVERT WIDENING AND EXISTING BAY TO BE RETAINED	37	0	0	NO		37.444	0	0	0	2	2	4
CH 10620 - 10730 - 2.11	OVERRUN WIDENING	140	0	0	NO		141.68	0	0	0	7	8	16
CH 10530 - 10610 - 2.10	OVERRUN WIDENING	277	0	0	YES		280.324	0	0	498.6	39	39	78
CH 10480 - 10530 - 2.9	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN WIDENING	0	0	0	YES		0	0	0	0	0	0	0
CH 10410 - 10500 - 2.8	ASPHALT WIDENING AND OVERRUN WIDENING	412	220	0	NO		416.944	330	0	0	37	38	76
SECTION 2A TOTALS							5199.656	1122	196.636	5643	505.2442	510	1020
CH 10140 - SITE ACCESS 2	WIDENING TO EXISTING ACCESS JUNCTION	419	290	291	NO		424.028	435	262.482	0	56	57	114
CH 10100 - 10440 - 2.7B	NEW ASPHALT PASSING PLACE AND OVERRUN WIDENING	1565	98	0	YES		1583.78	147	0	2993.4	236	237	474
CH 09980 - 10100 - 2.7A	NEW ASPHALT PASSING PLACE AND OVERRUN WIDENING	439	129	0	NO		444.268	193.5	0	0	32	32	64
CH 09770 - 9980 - 2.6	OVERRUN WIDENING	630	0	0	YES		637.56	0	0	1134	89	89	178
CH 09680 - 9840 - 2.5	OVERRUN AND TRACK WIDENING	768	0	0	YES		777.216	0	0	1382.4	108	108	216
CH 09550 - 9680 - 2.4	OVERRUN WIDENING	393	267	0	NO		397.716	400.5	0	0	40	40	80
CH 09000 - 900m OF NEW ROAD - NEINTHIRION BYPASS	NEW TRACK CONSTRUCTION WITH OVERRUN WIDENING	607	0	4845	NO		614.284	0	4370.19	0	249	250	500
CH 08850 - 8950 - 2.3B	OVERRUN WIDENING	207	266	0	NO	YES	209.484	399	0	0	15	16	32
CH 08500 - 8850 - 2.3A	OVERRUN WIDENING	325	0	0	NO	YES	328.9	0	0	0	8	9	18
CH 08330 - 8580 - 2.2	OVERRUN AND ASPHALT WIDENING	686	96	0	YES	YES	694.232	144	0	1407.6	56	57	114
CH 08280 - 8320 - 2.1	OVERRUN WIDENING	54	0	0	NO	YES	54.648	0	0	0	1	2	4
SECTION 2B TOTALS							6166.116	1719	4632.672	6917.4	890.8128	897	1794
SECTION 2 TOTALS							11365.772	2841	4829.308	12560.4	1396.057	1407	2814
SECTION 1	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 460 - 590 - 1.1	OVERRUN WIDENING AND BRIDGE PARAPET WORKS	133	0	0	NO		134.596	0	0	0	7	7	14
CH 720 - 740 - 1.2	ASPHALT WIDENING	0	11	0	NO		0	16.5	0	0	1	1	2
CH 875 - 950 - 1.3	OVERRUN WIDENING	522	15	0	NO		528.264	22.5	0	0	28	28	56
CH 970 - 990 - 1.4	ASPHALT WIDENING, additional trips for retaining wall	0	0	0	yes		0	0	0	0	0	0	6
CH 1045 - 1080 - 1.5	OVERRUN WIDENING	29	0	0	no		29.348	0	0	0	1	2	4
CH 1130 - 1175 - 1.6	OVERRUN WIDENING	19	0	0	NO		19.228	0	0	0	1	1	2
CH 1175 - 1210 - 1.7	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 1380 - 1450 - 1.8	OVERRUN WIDENING WITH ISLAND ASPHALT WIDENING	62	12	0	NO		62.744	18	0	0	4	5	10
CH 1950 - 2000 - 1.9	ASPHALT WIDENING	0	26	0	YES		0	39	0	46.8	4	5	10
CH 2055 - 2090 - 1.10	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2300 - 2340 - 1.11	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2400 - 2575 - 1.12	OVERRUN WIDENING	169	0	0	NO		171.028	0	0	0	9	9	18
CH 2580 - 2630 - 1.13	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2970 - 3050 - 1.14	OVERRUN WIDENING	150	0	0	YES		151.8	0	0	270	21	22	44
CH 3340 - 3450 - 1.15	OVERRUN WIDENING AND EXISTING PASSING BAY	316	0	0	NO		319.792	0	0	0	16	16	32
CH 3870 - 3930 - 1.16	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 3875 - 4090 - 1.17	OVERRUN WIDENING	303	0	0	YES		306.636	0	0	545.4	43	43	86
CH 4120 - 4200 - 1.18	ASPHALT AND OVERRUN WIDENING	188	58	0	YES		190.256	87	0	442.8	36	37	74

CH 4235 - 4315 - 1.19	OVERRUN WIDENING	115	0	0	NO		116.38	0	0	0	6	6	12
SECTION 1B TOTALS							2030.072	183	0	1305	175.9036	182	370
CH 4335 - 4430 - 1.20	OVERRUN WIDENING	397	0	40	NO		401.764	0	36.08	0	22	22	44
CH 4390 - 4450 - 1.21	OVERRUN WIDENING	381	0	0	YES		385.572	0	0	685.8	54	54	108
CH 4440 - 4540 - 1.22	ROAD WIDENING, RETENTION AND BRIDGE WORKS, additional trips added for enabling and temporary works, which are extensive	0	367	0	YES		0	550.5	0	660.6	61	61	222
CH 4540 - 4560 - 1.23	ROAD WIDENING WITH RETENTION	0	35	0	YES		0	52.5	0	63	6	6	12
CH 4550 - 4640 - 1.24	ROAD WIDENING	0	128	0	YES		0	192	0	230.4	21	22	44
CH 4620 TO 4970 - GOSEN TO SYCHTYN OFF-ROAD TRACK	NEW TRACK CONSTRUCTION	1251	577.5		NO		1266.012	866.25	0	0	107	107	214
CH 4970 - 5040 - 1.25	ROAD WIDENING	0	105	0	NO		0	157.5	0	0	8	8	16
CH 5050 - 5110 - 1.26	ROAD WIDENING	0	116	0	YES		0	174	0	208.8	19	20	40
CH 5130 - 5180 - 1.27	OVERRUN WIDENING	111	0	0	NO		112.332	0	0	0	6	6	12
CH 5175 - 5315 - 1.28	OVERRUN WIDENING	171	0	0	NO		173.052	0	0	0	9	9	18
CH 5330 - 5430 - 1.29	OVERRUN WIDENING	138	0	0	NO		139.656	0	0	0	7	7	14
CH 5430 - 5700 - 1.30	WIDEN EXISTING BAY WITH ASHPALT AND OVERRUN WIDENING	387	29	0	NO		391.644	43.5	0	0	22	22	44
CH 5770 - 5880 - 1.31	OVERRUN WIDENING	250	0	0	NO		253	0	0	0	13	13	26
CH 6060 - 6115 - 1.32	WIDEN EXISTING BAY WITH OVERRUN	64	0	0	NO		64.768	0	0	0	3	4	8
CH 6090 - 6325 - 1.33	OVERRUN WIDENING	576	0	0	NO		582.912	0	0	0	29	30	60
CH 6350 - 6480 - 1.34	OVERRUN WIDENING	121	0	0	NO		122.452	0	0	0	6	7	14
CH 6450 - 6575 - 1.35	WIDEN EXISTING BAY WITH OVERRUN	228	0	0	YES		230.736	0	0	410.4	32	33	66
CH 6530 - 6770 - 1.36	WIDEN EXISTING BAY WITH OVERRUN	51	0	0	NO		51.612	0	0	0	3	3	6
CH 6730 - 6950 - 1.37	OVERRUN WIDENING	260	0	0	YES		263.12	0	0	468	37	37	74
CH 6950 - 7130 - 1.38	NEW ASPHALT PASSING BAY AND OVERRUN WIDENING	375	89	0	NO		379.5	133.5	0	0	26	26	52
CH 7100 - 7170 - 1.39	OVERRUN WIDENING	0	0	0	NO		0	0	0	0	0	0	0
CH 7170 - 7290 - 1.40	OVERRUN WIDENING	0	0	0	YES		0	0	0	0	0	0	0
CH 7270 - 7530 - DOLWEN ISAF - OPTION 1	OVERRUN WITH BRIDGE WIDENING (INCLUDED IN OVERRUN CALCS), REMOVED AS USING OPTION 2 WITH BRIDGE WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 7220 - 7530 - DOLWEN ISAF - OPTION 2	NEW TRACK CONSTRUCTION WITH OVERRUN WIDENING, WITH BRIDGE WIDENING INCLUDED IN CALCS, ADDITIONAL 20 TRIPS ADDED FOR TEMP WORKS	2520	21	0	NO		2550.24	31.5	0	0	129	130	300
CH 7500 - 7670 - 1.41	OVERRUN WIDENING	1088	0	0	YES		1101.056	0	0	1958.4	153	153	306
CH 7660 - 7720 - 1.42	OVERRUN WIDENING	91	0	0	NO		92.092	0	0	0	5	5	10
CH 7700 - 7780 - 1.43	OVERRUN WIDENING	229	0	0	NO		231.748	0	0	0	12	12	24
CH 7950 - 8040 - 1.44	OVERRUN WIDENING	184	0	0	YES		186.208	0	0	331.2	26	26	52
CH 8150 - 8240 - 1.45	OVERRUN WIDENING	136	0	0	NO		137.632	0	0	0	7	7	14
CH 8250 - SITE ACCESS 1	WIDENING TO EXISTING ACCESS JUNCTION	384	169	193	NO		388.608	253.5	174.086	0	41	41	82
SECTION 1A TOTALS							9505.716	2454.75	210.166	5016.6	859.3616	871	1882
SECTION 1 TOTALS	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)	11535.788	2637.75	210.166	6321.6	1035.2652	1053	2252
GRAND TOTALS							24217.16	6401.25	5288.426	20845.8	2624.2267	2705	5556

Llanbrynmair South Wind Farm Deliveries Table - CENTRAL CASE 60% WON - RES 22/04/13, AECOM 07/05/13

Phase	Purpose	Vehicle	Approximate No of Journeys	Max journeys possible in 1 day (not all journeys will occur in one day)	CHK
Site Set-Up	Portacabin delivery	Low loader	10	10	
	Skip delivery	Low loader	10	10	
	Generator delivery	Low loader	4	4	
	Water and fuel tank delivery	Low loader	2	1	
	Excavator delivery	Low loader	4	1	
	Roller-compactor	Low loader	2	1	
	Crushing/Grading equip	Low loader	4	4	
	Batching Equipment	Low loader	8	8	
	Backhoe	Low loader	2	2	
	Forestry Felling	Low loader	24	2	
	Forestry Felling-Timber removal	Flat bed	600	16	
Road & hard standings	Stone for site tracks	Tipper trucks	2144	40	
	Stone for control building and substation compounds	Tipper trucks	47	40	
	Stone for construction compound and gatehouse	Tipper trucks	264	40	
	Stone for met mast	Tipper trucks	11	11	
	Stone for turning heads	Tipper trucks	96	40	
	Stone for pathways	Tipper trucks	66	40	
	Stone for crane hardstanding	Tipper trucks	1330	40	
Foundation construction	Excavator delivery	Low loader	2	2	
	Misc works	Low loader	8	2	
	Concrete for turbine foundations, piles & transformer plinths	Mixer trucks	1314	22	
	Concrete for Comms & Met mast	Mixer trucks	11	11	
	Steel delivery	Flat bed	60	30	
	Foundation bolts or steel insert	Flat bed	30	30	
	Place foundation bolt cage or steel insert	30t to 50t crane	1	1	
Turbine erection	Tool container delivery	Low Loader	15	15	X
	Tower section delivery	Extendible trailer	120	8	
	Blade delivery	Extendible trailer	90	6	
	Nacelle	Low loader	30	2	
	Met Mast	Low loader	1	1	X
	Hub and rotor	Low loader	30	2	X
	Turbine erection	1000t to 1200t	1	1	
	Crane Associated equipment	Low loader	10	10	X
	Turbine erection	150t to 200t	1	1	
Cable Installation	Cable delivery	Flat bed or Hiab	9	2	
	Excavator delivery	Low loader	2	1	
	Cable laying	Telescopic	2	1	
	Sand Bedding	Tipper trucks	515	40	
Sub Station & Control Building	Concrete delivery	Mixer trucks	70	35	
	Brick delivery	Flat bed	13	3	
	Roofing & Cladding	Flat bed	4	3	
	Switchgear	Flat bed	4	2	
	Misc electrical equipment	Flat bed	4	3	
Reinstatement	Removal of temporary compound & gate house stone	Tipper trucks	0	0	
	Removal of temporary met mast hardstanding	Tipper trucks	0	0	
	Removal of temporary turning head stone	Tipper trucks	0	0	
	Removal of temporary hardstanding stone	Tipper trucks	0	0	
Misc	4 GANGS OF 6 PPL, 608 DAYS	Vans, cars	6485	5	
		Telescopic	1	1	
		Skip lorry	208	2	
		Small tanker	208	2	
		Light goods van	416	4	
Site De-mobilisation	Portacabin removal	Low loader	10	10	
	Skip removal	Low loader	10	10	
	Generator removal	Low loader	4	4	
	Water and fuel tank removal	Low loader	2	2	
	Excavator removal	Low loader	6	1	
	Roller-compactor	Low loader	2	2	
	Backhoe	Low loader	2	2	
	Crushing/Grading equip	Low loader	4	4	
	Batching Equipment	Low loader	8	8	
	Forestry Felling	Low loader	24	24	
	Turbine Tools & Crane removal	Low loader	25	2	
	Telescopic Removal	Low loader	3	2	
			7666		

Llanbrynmair South Wind Farm Deliveries Table - PRODUCED BY RES, REVISED BY AECOM 08/05/13

INPUTS		Comments
No. of turbines (TOTAL)	30	
No of piled foundations	0	Assumed none at this stage
No of gravity foundations	30	
Estimated number of piles per foundation		N/A
Estimated pile depth (m)		N/A
Estimated pile diameter (m)		N/a
No. of permanent met masts	1	Input total number of permanent met masts
Is the met mast piled? Yes/no	no	
No of tower sections	4	80m Hub Height
Is the drive train delivered separately? Yes/no	no	
No of control building and sub-station compounds	1	Additional Stone/concrete allowed for 2 welfare buildings below.
No. of turbine component laydown areas	0	
No. of construction compounds	5	Assumes no recovery of stone between phases.
Gate-house compound	0	Assumes Construction Compounds will act as gate houses.
Length of new tracks (m)	**18300**	Sum of all new track
Length of FORESTRY TRACKS (m)	**3642**	sum of forestry tracks
Length of upgrade tracks (m)	**3830**	Upgrade of existing site track only; not including off site works, Delivery Route etc.
Average new track construction depth anticipated (m)	0.40	No SI available, assumes 400mm average across site for new tracks.
Average upgrade track construction depth anticipated (m)	0.30	No SI available, assumes 300mm average across site for upgraded existing track.
Average depth of construction above upgraded track	**0.10**	Assumed on 0.1m above existing track, with geogrids to span into new track.
Average forestry track construction depth anticipated (m)	**0.20**	200mm depth using timber as a component in the road foundation.
Assumed Width of Existing Tracks to be Upgraded (TBC, pending Topo)	**2.50**	2.5m standard wheel width.
Track width on straight lengths	**5.5**	5.5M STANDARD TRACK WIDTH, NO PASSING BAYS OR CURVE WIDENING
Factor to accommodate widening at bends	**1.0**	REDUCED TO 1.0
Percentage of stone won on site	60%	Assumes productive borrow pits
Percentage of crane hardstanding covered with truckpave (or equivalent)	0%	Assume all compacted stone surface
Number of turning heads	14	
External transformer at turbines? yes/no	yes	Assume external transformers for now
Grid Connection (kV)	132	132kV
Is offsite exportation of any waste material and/or excess spoil required during construction? yes/no	no	Assumes all spoil disposed of/stored on site.
Is onsite concrete batching proposed? yes/no	yes	Assumes all concrete can be batched on site.
Are crane hardstandings rectangular? yes/no	yes	Refer to drawing 01592D2306-09
Number of communication masts required (with lattice masts)	1	Assume 1 at 132kv substation.
Forestry felling required? yes/no	Yes	Forresty Vehicles shown in final table

CALCULATIONS		
Total area of site tracks (m2)	141746	Both new, forestry and upgraded
Total area of sub-station and control building compound (m2)	3844	62mX62m based on 01592D2304-04
Total Area of Welfare Buildings	96	Based on 01592d2312-01
Total area of construction compounds (m2)	15000	60m x 50m based on 01592d2221-02
Total area of batching compounds (m2)	6400	80m x 80m based on typical plant
Total area of met mast temporary hardstanding (m2)	400	Assumes 20m x 20m area
Total area of turning heads (m2)	5460	65m x 6m Based on fully extended trailer.
Total area of lay down area (m2)	0	

Total area of pathways at turbines (m2)	9960			Based on 5m path around plinth and back to the hardstanding from the turbine. Assumes 2m thick stone depth from ground level to top of co
Total permanent crane hard standing area (m2)	26880			Based on triangle configuration (896m2/turbine, Ref 01657D2312-09)
Total temporary crane hard standing area (m2)	33600			Based on triangle configuration (1120m2/turbine, Ref 01657D2312-09)
Total permanent crane hard standing area (m2)	**50325**			Based on rectangular configuration (1200m2/turbine, Ref 001592D2221-02)
Total temporary crane hard standing area (m2)				Based on rectangular configuration (562m2/turbine, Ref 001592D2221-02)
Total area of crane hard standings (m2)	50325			

	Imported	Site Won	TOTAL	
Total stone volume for site tracks (m3)	19489	29182	48671	Both New, Forestry and Upgrade - (Length*width*depth*Factor)
Total stone volume for sub-station and control building compounds (m3)	431	645	1076	Assumes only 70% of track stone depth required.
Total stone volume for Welfare Buildings (m3)	11	16	27	Assumes only 70% of track stone depth required.
Total stone volume for construction compounds (m3)	1682	2518	4200	Assumes only 70% of track stone depth required.
Total stone volume for batching compound (m3)	718	1074	1792	Assumes only 70% of track stone depth required.
Total stone volume for met mast temporary hardstandings (m3)	96	144	240	Assumes that hardstandings require 0.6m depth
Total stone volume for turning heads	875	1309	2184	Same as track stone depth
Total stone volume for lay-down area	0	0	0	
Total stone volume for pathways (m3)	598	896	1494	Based on depth of 0.15m
Total permanent crane hardstanding volume			21504	triangular configuration
Total temporary crane hardstanding volume			26880	triangular configuration
Total permanent crane hardstanding volume			40260	rectangular configuration
Total temporary crane hardstanding volume			0	rectangular configuration
Total stone volume for crane hardstandings (m3)	12091	18104	30195	Assumes that hardstandings require 0.6m depth
Total stone volume for piling rig hardstandings (m3)	0	0	0	No Piling Required
Total imported stone volume (m3)	**35989**	53889	89879	Please note that only the **imported** stone quantities are shown in the delivery table. As a result be conservative when estimating % of stone won on site as the results should represent a worst case when being used in a TIA

Total concrete volume for turbine bases (m3)	10500	Based on foundation volume of 350m3 (16m Dia.)
Total concrete volume for piles (m3)	0	No piles required
Total concrete volume for pile caps (m3)	0	No piles required
Total concrete volume for transformer base (m3)	300	Based on transformer plinth volume of 10m3
Total concrete volume for control building (m3)	239	Based on 13.9m x 43m footprint and average slab depth of 0.4m.
Total concrete volume for welfare building (m3)	20	Based on 5m x 5m footprint and average slab depth of 0.4m.
Total concrete volume for sub-station (excluding control building slab) (m3)	339	Based on 13.9m x 43m footprint and average slab depth of 0.4m. Plus approximately 100m3 for plinths and bunds for transformers)
Total concrete volume for met mast base (m3)	55	base on foundation volume of 55m3
Total concrete volume for met mast piles (m3)	0	Based on 4 No piles of similar size at turbine foundations

Total concrete volume for communication mast (m3)	12.5	Based on foundation dimensions of 2.5m x 2.5m x 2.0m
Total concrete volume (m3)	**11465**	
	1910.88	
MV Cable Layouts - Based on Drawing 01592d4303-02 & 01592d4302-02		
Total Cable Length based on 5 runs (m)	42943	- Based on Drawing 01592d4303-02
Bedding Depth (m)	0.3	- Based on Drawing 01592d4302-02
Bedding Width (m)	0.4	- Based on Drawing 01592d4302-02
Total sand bedding required (m3)	**5153**	

References / Methodology / Notes

Stone deliveries = total stone volume required, multiplied by 2.2 to convert m3 into Tonnes. Number divided by 18 to reflect the number of tonnes each truck can carry.

Concrete deliveries = total volume of concrete required, divided by 6 to derive number of concrete wagons

Cable deliveries = track length * 6 / 8 reels / 1500m

Does not include for vehicle movements during decommissioning

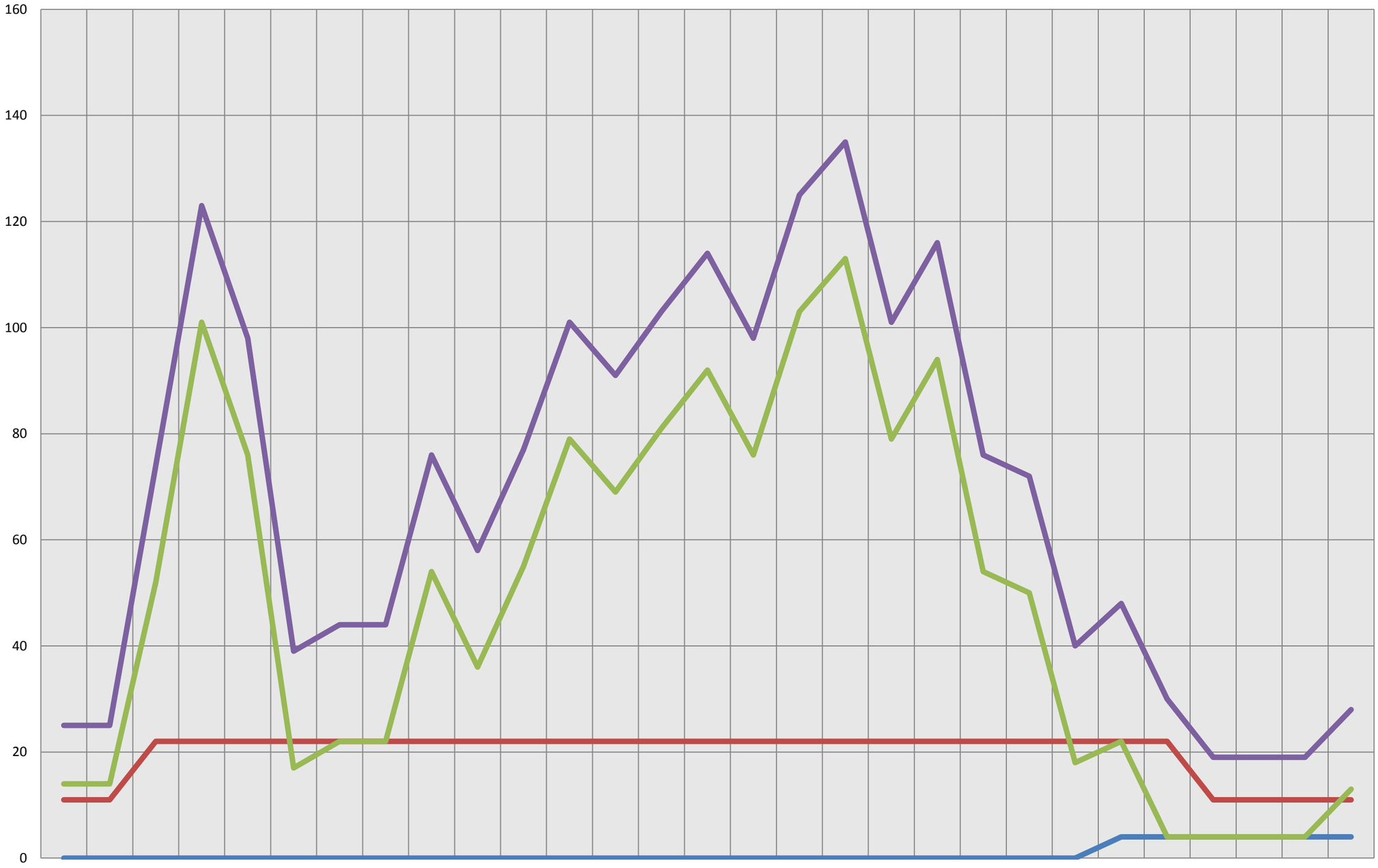
Assumes concrete is batched off site

Assumes large scale turbines (80-90m rotor diameter)

TONNAGE FOR CONSTRUCTION TIPPER	**20.00**	TONS/VEHICLE
DENSITY OF CRUSHED STONE	**2.20**	TONS/M3
DENSITY OF SAND	**2.00**	TONS/M3
DENSITY OF CONCRETE	**2.60**	TONS/M3
TONNAGE FOR CONCRETE WAGON	**15.60**	TONS/VEHICLE
DENSITY OF ASPHALT CONCRETE	**2.30**	TONS/M3

LLANBRYNMAIR - 100% IMPORT, 0% BORROW, W BATCH, WORST CASE		DAYS/MO	25	12/07/2013	DAILY HGV TRIPS GENERATED BY DEVELOPMENT, BY MONTH - TWO WAY TRIPS																											
	ACTIVITY	PROG MONTHS	PROG DAYS	TRIPS	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18
AIL	Turbines - Delivery of Turbines - South Access (4)	2	50	177																							4	4				
AIL	Turbines - Delivery of Turbines - Centre Access (2)	1.5	37.5	129																									4	4		
AIL	Turbines - Delivery of Turbines - North Access (1)	2	50	177																											4	4
AIL Total				**484**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**4**	**4**	**4**	**4**
ALL	Site Servicing	22	550	1664	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ALL Total				**1664**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
EXT	External Works and Statutory Undertakers', Preliminaries	3	75	290	4	4	4																										
EXT	External Works - Section 3 - Talerddig to South Entrance (Access 4)	2	50	258	6	6																											
EXT	External Works - Section 2A - South Access 4 to Central Access 2	2	50	1226			25	25																									
EXT	External Works - Section 2B - Central Access 2 to North Entrance 1, including Neinthirion	2	50	1954				40	40																								
EXT	External Works - Section 1A - North Access to Gosen Bridge	6	150	1882				13	13	13	13	13	13																				
EXT	External Works - Section 1B - Gosen Bridge to Llanerfyl A458	3	75	370							5	5	5																				
EXT Total				**5980**	**10**	**10**	**29**	**78**	**53**	**13**	**18**	**18**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PH1	Mobilisation, Site Compound and Access Junction	1	25	470			19																										
PH1	New Tracks	5	125	3916									32	32	32	32	32																
PH1	Forestry Clearance	2	50	500											10	10																	
PH1	Hardstanding Areas	4	100	2344												24	24	24	24														
PH1	Turbine Foundations	5	125	1044											9	9	9	9	9														
PH1	Cable Infrastructure	3	75	388														6	6	6													
PH1	Reinstatement	3	75	0																0	0	0											
PH1	Demobilisation	1	25	64																													3
PH1	Turbines - Mobilisation and Delivery of Kit - South Access (4)	1	25	37																	2												
PH1 Total				**8763**	**0**	**0**	**19**	**0**	**0**	**0**	**0**	**0**	**32**	**32**	**51**	**75**	**65**	**39**	**39**	**6**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
PH2	Mobilisation, Site Compound and Access Junction	1	25	470				19																									
PH2	New Tracks	5	125	4147														34	34	34	34	34											
PH2	Forestry Clearance	2	50	188															4	4													
PH2	Hardstanding Areas	5	125	2008																17	17	17	17	17									
PH2	Substation	5	125	427														4	4	4	4	4											
PH2	Turbine Foundations	5	125	759															7	7	7	7	7										
PH2	Cable Infrastructure	3	75	282																			4	4	4								
PH2	Reinstatement	3	75	0																			0	0	0								
PH2	Demobilisation	1	25	64																													3
PH2	Turbines - Mobilisation and Delivery of Kit - Centre Access (2)	1	25	37																				2									
PH2 Total				**8382**	**0**	**0**	**0**	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**38**	**49**	**66**	**62**	**62**	**28**	**23**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
PH3	Mobilisation, Site Compound and Access Junction	1	25	470					19																								
PH3	New Tracks	4	100	3456																	35	35	35	35									
PH3	Forestry Clearance	2	50	562																		12	12										
PH3	Hardstanding Areas	3	75	2344																				32	32	32							
PH3	Turbine Foundations	3	75	1044																					14	14	14						
PH3	Cable Infrastructure	1	25	388																							16						
PH3	Reinstatement	3	75	0																							0	0	0				
PH3	Demobilisation	1	25	64																													3
PH3	Turbines - Mobilisation and Delivery of Kit - North Access (1)	1	25	37																							2						
PH3 Total				**8365**	**0**	**0**	**0**	**0**	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**35**	**47**	**47**	**67**	**46**	**46**	**14**	**18**	**0**	**0**	**0**	**0**	**3**
VAN	Substation Commissioning	3	75	0																													
VAN	Turbine - M&E and Commissioning	4	100	0																													
VAN	Site Personnel (Including personnel working external of the site assuming 2.25 people per vehicle)		608	12970.66667	11	11	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	11	11	11
VAN Total		**MAX**	**AVG**	**12970.66667**	**11**	**11**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**11**	**11**	**11**	**11**
Grand Total - VANS/CARS ONLY		**22**	**20**	**12971**	**11**	**11**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**11**	**11**	**11**	**11**
Grand Total - AILS ONLY		**4**	**1**	**484**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**4**	**4**	**4**	**4**
Grand Total - HGVS ONLY		**113**	**50**	**33154**	**14**	**14**	**52**	**101**	**76**	**17**	**22**	**22**	**54**	**36**	**55**	**79**	**69**	**81**	**92**	**76**	**103**	**113**	**79**	**94**	**54**	**50**	**18**	**22**	**4**	**4**	**4**	**4**	**13**
Grand Total - ALL VEHICLES		**135**	**71**	**46609**	**25**	**25**	**74**	**123**	**98**	**39**	**44**	**44**	**76**	**58**	**77**	**101**	**91**	**103**	**114**	**98**	**125**	**135**	**101**	**116**	**76**	**72**	**40**	**48**	**30**	**19**	**19**	**19**	**28**

LLANBRYNMAIR - CONSTRUCTION TRAFFIC - DRAFT 3 - 10/05/13 - WORST CASE - 100% Import, 0% Borrow



	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18
Grand Total - VANS/CARS ONLY	11	11	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	11	11	11	11
Grand Total - AILS ONLY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4
Grand Total - HGVS ONLY	14	14	52	101	76	17	22	22	54	36	55	79	69	81	92	76	103	113	79	94	54	50	18	22	4	4	4	4	13
Grand Total - ALL VEHICLES	25	25	74	123	98	39	44	44	76	58	77	101	91	103	114	98	125	135	101	116	76	72	40	48	30	19	19	19	28

NOTE - HGVS ONLY!!!	TOTAL 2 WAY TRIPS	SOUTH ACCESS (4) TRIPS	CENTRE ACCESS (2) TRIPS	NORTH ACCESS (1) TRIPS	COMMENTS ON INTRA SITE TRIPS
EXTERNAL WORKS					
External Works and Statutory Undertakers', Preliminaries	**290**	290			
External Works - Section 3 - Talerddig to South Entrance (Access 4)	**258**	258			
External Works - Section 2A - South Access 4 to Central Access 2	**1226**	1226			
External Works - Section 2B - Central Access 2 to North Entrance 1, including Neinthirion	**1954**	1954			
External Works - Section 1A - North Access to Gosen Bridge	**1882**			1882	
External Works - Section 1B - Gosen Bridge to Llanerfyl A458	**370**			370	
TOTAL EXTERNAL WORK TRIPS	**5980**	**3728**	**0**	**2252**	
INTERNAL WORKS					
Mobilisation, Site Compound and Access Junction	**1408**	470	470	470	
New Tracks	**11517**	3916	4147	3456	34% AC4, 36% AC2, 30% AC1, by total trk length
Forestry Clearance	**1248**	500	188	562	40% AC4, 15% AC2, 45% AC1, by length
Hardstanding Areas	**6696**	2344	2008	2344	13 hs AC4, 11 hs AC2, 13hs AC1
Substation	**427**		427		96 TRIPS BETWEEN ACC 4 AND ACC 2 FOR SUBSTATION FOR CONCRETE DELIVERY.
Turbine Foundations AND Met Mast	**2848**	1044	759	1044	Max 30 trips per day for Turbine Foundations
Cable Infrastructure	**1057**	388	282	388	Distributed by numbers of Turbines
Reinstatement	**0**	0	0	0	Distributed by numbers of Turbines
Demobilisation	**192**	64	64	64	
Turbines - Mobilisation and Delivery of Kit	**112**	37	37	37	EQUIPMENT MOVED FROM ACC4 - 2 - 1 THEN DEMOBILISED
Turbines - Delivery of Turbines	**484**	177	129	177	
Substation Commissioning	**0**				Assume trips, LGV
Turbine - M&E and Commissioning	**0**				Assume trips, LGV
Site Personnel	**12971**	4324	4324	4324	Assume trips, LGV
Site Servicing	**1664**	3	3	3	Consistent as weekly trips
TOTAL TRIPS	**40623**	**13267**	**12837**	**12869**	
TOTAL HGV TRIPS	**27168**	**8766**	**8385**	**8368**	
TOTAL VAN/LGV TRIPS	**12971**	**4324**	**4324**	**4324**	
TOTAL AIL TRIPS	**484**	**177**	**129**	**177**	

LLANBRYNMAIR - ASSUMPTIONS FOR EXTERNAL WORKS - S REID 08/05/13 - DRAFT 2

ASSUMPTION AREA	ASSUMPTION	TRIPS
Material Source	All materials have been assumed to be sourced externally of Llanbrynmair WF Site and trips are from the A470	
Personnel	It is assumed that each area of work will have either one or two gangs undertaking the works. (2 for Section 1, 2 for Section 2, 1 for Section 1). Each gang consists of 6 people and car occupancy is assumed to be between 2 and 3 people per car (2.25 people per car).	12
Origin of personnel.	All personnel will enter the site from the A470. For Section 2, personnel will come from Access 4. For Section 1, personnel will come from Access 1. It is assumed that intra-site trips throughout the works between Access 4 and 2, and Access 4 and 1 will be 10 vehicles/day.	
Welfare and Inspections	Trip movements associated with welfare have not been included within this model.	
Sensitivity	This is a coarse model only and is based on the works as of 29/04/13.	
Earthworks	Earthworks will be managed locally. Won cut or fill material will be balanced between different landowners. Fill material has been estimated with all fill material being imported. No use of cut material.	
Scope	This assessment considers the LTMP (Talerddig to Llanerfyl Road) only.	
Non-inclusives	No specific inclusion has been provided for structural works, culverting etc. It has been assumed that these trips have been included within the estimate.	
Prelims - Stats	It has been assumed that stats diversions are required on Section 1 only.	
HGV TRIPS - DEFINITIONS	TRIPS ARE CALCULATED AS SINGLE O-D-O TRIPS TO SITE. SECOND COLUMN, TWO-WAY TRIPS, ARE CALCULATED AS ONE O-D TRIP, AND ONE D-O TRIP. IE, EACH HGV HAVING TWO IMPACTS ON THE HIGHWAY NETWORK.	
	ASSUMPTION	FACTOR
AREA OF OVER-RUN	ASSUME THAT 1M2 OF OVER-RUN CONSTRUCTED FROM 0.4m3 OF TYPE 1 SUB-BASE, 2 LAYERS OF GEOGRID, 1M2 OF GRASS REINFORCEMENT	1.012
AREA OF ASPHALT	ASSUME THAT 1M2 OF ASPHALT CONSTRUCTION CONSISTS OF, 0.2M3 OF ASPHALT, 0.30M3 OF TYPE 1, 0.15M3 OF CAPPING, 2 LAYERS OF GEOGRID	1.5
AREA OF TRACK	ASSUME THAT 1M2 OF TRACK CONSTRUCTED FROM 0.4M3 OF TYPE 1 SUB-BASE, 2 LAYERS OF GEOGRID.	0.902
EARTHWORKS - FILL	FACTOR APPLIED IF EARTHWORKS GREATER THAN 1M DEPTH AS ADDITIONAL IMPORTED FILL WILL BE REQUIRED. FACTOR ASSUMES THAT WITHIN AREAS OF FILL, EACH 1M2 OF CONSTRUCTION REQUIRES 1M3 OF FILL. THEREFORE, THE AREA IS DOUBLED	1
TONNAGE CAPACITY OF HGVS	ASSUME THAT 1 CONSTRUCTION TIPPER CAN CARRY 20T	0.05
MULTIPLIER FOR ESTIMATE LEVEL OF DETAIL	Additional on top of total to allow of unaccounted trips, and to allow for the outline nature of the quantification of works.	1
MULTIPLIER FOR WORKS ON GOOD GROUND	Reduce volume of material by 50% for areas of good CBR	0.5

LOCATION / SECTION	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)	O-R TONNAGE	ASP TONNAGE	TRACK TONNAGE	FILL TONNAGE	HGV TRIPS - RAW	HGV TRIPS - FACTORED	TWO-WAY HGV TRIPS
PRELIMINARY													
STATS DIVERSIONS - Section 1	Assumed that overhead lines diverted and moved to new locations. Approx 40 Poles Impacted. 1 Trips per pole.		0	0	no		0	0	0	0	0	40	80
STATS DIVERSIONS - Section 2	Minimal Stats Impact	0	0	0	NO		0	0	0	0	0	0	0
STATS DIVERSIONS - Section 3	Minimal Stats Impact	0	0	0	NO		0	0	0	0	0	0	0
CH 0 - A458 LLANERFYL JUNCTION	CONSTRUCTION OF NEW ACCESS FOR WORKS	217	0	252	YES		219.604	0	227.304	844.2	65	65	130
Ch 17500 - A470 Talerddig	WIDENING OF EXISTING ACCESS JUNCTION FOR ABNORMALS	0	220	24	YES		0	330	21.648	439.2	40	40	80
PRELIM TOTALS							219.604	330	248.952	1283.4	104.0978	145	290
SECTION 3	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 17450 - 3.23	NEW ASPHALT PASSING PLACE AND OVERRUN	90	41	0	no		91.08	61.5	0	0	8	8	16
CH 17290 - 3.22C	NEW ASHPALT WIDENING AND PASSING BAY	0	58	0	NO		0	87	0	0	4	5	10
CH 17200 - 3.22B	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	31	26	0	NO		31.372	39	0	0	4	4	8
CH 17080 - 3.22A	WIDEN EXISTING BAY WITH OVERRUN	88	0	0	NO		89.056	0	0	0	4	5	10
CH 16855 - 3.21	WIDEN EXISTING BAY WITH OVERRUN	47	0	0	NO		47.564	0	0	0	2	3	6
CH 16715 - 3.20	WIDEN EXISTING BAY WITH OVERRUN	59	0	0	NO		59.708	0	0	0	3	3	6
CH 16550 - 3.19	WIDENING TO BOTH SIDES OF ROAD WITH OVERRUN	104	0	0	NO		105.248	0	0	0	5	6	12
CH 16480 - 3.18	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 16370 - 3.17B	NEW OVERRUN PASSING PLACE	45	0	0	NO		45.54	0	0	0	2	3	6
CH 16275 - 3.17A	NEW PASSING PLACE AND OVERRUN	69	37	0	NO		69.828	55.5	0	0	6	7	14
CH 15950 - 3.16	WIDEN EXISTING BAY WITH OVERRUN	47	0	0	NO		47.564	0	0	0	2	3	6
CH 15780 - 3.15	WIDEN EXISTING BAY WITH OVERRUN	138	0	0	NO		139.656	0	0	0	7	7	14
CH 15570 - 3.14	NEW ASPHALT PASSING PLACE AND OVERRUN	63	31	0	NO		63.756	46.5	0	0	6	6	12
CH 15350 - 3.13	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 15150 - 3.12	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 15000 - 3.11	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14850 - 3.10	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14695 - 3.9 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14620 - 3.8B	NEW ASHPALT WIDENING AND PASSING BAY	0	29	0	NO		0	43.5	0	0	2	3	6
CH 14520 - 3.8A	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	46	22	0	NO		46.552	33	0	0	4	4	8
CH 14300 - 3.7 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14250 - 3.6 -	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 14075 - 3.5 -	WIDEN EXISTING BAYS ON BOTH SIDES OF ROAD WITH OVERRUN	49	0	0	YES		49.588	0	0	88.2	7	7	14
CH 13950 - 3.4A	NEW ASPHALT PASSING PLACE	0	99	0	YES		0	148.5	0	178.2	16	17	34
CH 13840 - 3.4 -	WIDEN EXISTING BAY WITH OVERRUN	29	0	0	NO		29.348	0	0	0	1	2	4
CH 13700 - 3.3 -	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	53	10	0	YES		53.636	15	0	113.4	9	10	20
CH 13550 - 3.2B	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 13460 - 3.2A	WIDEN EXISTING BAY WITH OVERRUN	33	0	0	YES		33.396	0	0	59.4	5	5	10
CH 13330 - 3.1D	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 13160 - 3.1C	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	49	21	0	YES		49.588	31.5	0	126	10	11	22
CH 12950 - 3.1B	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN	43	21	0	YES		43.516	31.5	0	115.2	10	10	20
CH 12700 - 3.1A	EXISTING PASSING BAY TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
SECTION 3 TOTALS							1095.996	592.5	0	680.4	118	129	258
SECTION 2	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 12390 - SITE ACCESS 4	WIDENING TO EXISTING ACCESS JUNCTION	350	192	218	NO		354.2	288	196.636	0	42	42	84
CH 12000 - 12390 - 2.17	OVERRUN WIDENING	586	0	0	NO		593.032	0	0	0	30	30	60
CH 11700 - 12000 - 2.16D	OVERRUN WIDENING AND WIDEN EXISTING BAY WITH ASPHALT	693	38	0	YES		701.316	57	0	1315.8	104	104	208
CH 11640 - 11700 - 2.16C	OVERRUN WIDENING AND NEW ASPHALT PASSING BAY	192	77	0	YES		194.304	115.5	0	484.2	40	40	80
CH 11430 - 11640 - 2.16B	OVERRUN WIDENING	725	0	0	YES		733.7	0	0	1305	102	102	204
CH 11390 - 11430 - 2.16A	NEW ASPHALT AND OVERRUN PASSING BAY	56	99	0	YES		56.672	148.5	0	279	24	25	50
CH 11100 - 11390 - 2.15	NEW ASPHALT AND OVERRUN PASSING BAY	888	90	0	YES		898.656	135	0	1760.4	140	140	280
CH 10920 - 11120 - 2.14	OVERRUN WIDENING	350	0	0	NO		354.2	0	0	0	18	18	36
CH 10750 - 10800 - 2.13	OVERRUN WIDENING AND NEW ASPHALT PASSING BAY	432	32	0	NO		437.184	48	0	0	24	25	50
CH 10675 - 10950 - 2.12	CULVERT WIDENING AND EXISTING BAY TO BE RETAINED	37	0	0	NO		37.444	0	0	0	2	2	4
CH 10620 - 10730 - 2.11	OVERRUN WIDENING	140	0	0	NO		141.68	0	0	0	7	8	16
CH 10530 - 10610 - 2.10	OVERRUN WIDENING	277	0	0	YES		280.324	0	0	498.6	39	39	78
CH 10480 - 10530 - 2.9	WIDEN EXISTING BAY WITH ASPHALT AND OVERRUN WIDENING	0	0	0	YES		0	0	0	0	0	0	0
CH 10410 - 10500 - 2.8	ASPHALT WIDENING AND OVERRUN WIDENING	412	220	0	NO		416.944	330	0	0	37	38	76
SECTION 2A TOTALS							5199.656	1122	196.636	5643	608.0646	613	1226
CH 10140 - SITE ACCESS 2	WIDENING TO EXISTING ACCESS JUNCTION	419	290	291	NO		424.028	435	262.482	0	56	57	114
CH 10100 - 10440 - 2.7B	NEW ASPHALT PASSING PLACE AND OVERRUN WIDENING	1565	98	0	YES		1583.78	147	0	2993.4	236	237	474
CH 09980 - 10100 - 2.7A	NEW ASPHALT PASSING PLACE AND OVERRUN WIDENING	439	129	0	NO		444.268	193.5	0	0	32	32	64
CH 09770 - 9980 - 2.6	OVERRUN WIDENING	630	0	0	YES		637.56	0	0	1134	89	89	178
CH 09680 - 9840 - 2.5	OVERRUN AND TRACK WIDENING	768	0	0	YES		777.216	0	0	1382.4	108	108	216
CH 09550 - 9680 - 2.4	OVERRUN WIDENING	393	267	0	NO		397.716	400.5	0	0	40	40	80
CH 09000 - 900m OF NEW ROAD - NEINTHIRION BYPASS	NEW TRACK CONSTRUCTION WITH OVERRUN WIDENING	607	0	4845	NO		614.284	0	4370.19	0	249	250	500
CH 08850 - 8950 - 2.3B	OVERRUN WIDENING	207	266	0	NO		209.484	399	0	0	30	31	62
CH 08500 - 8850 - 2.3A	OVERRUN WIDENING	325	0	0	NO		328.9	0	0	0	16	17	34
CH 08330 - 8580 - 2.2	OVERRUN AND ASPHALT WIDENING	686	96	0	YES		694.232	144	0	1407.6	112	113	226
CH 08280 - 8320 - 2.1	OVERRUN WIDENING	54	0	0	NO		54.648	0	0	0	3	3	6
SECTION 2B TOTALS							6166.116	1719	4632.672	6917.4	971.7594	977	1954
SECTION 2 TOTALS							11365.772	2841	4829.308	12560.4	1579.824	1590	3180
SECTION 1	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)							
CH 460 - 590 - 1.1	OVERRUN WIDENING AND BRIDGE PARAPET WORKS	133	0	0	NO		134.596	0	0	0	7	7	14
CH 720 - 740 - 1.2	ASPHALT WIDENING	0	11	0	NO		0	16.5	0	0	1	1	2
CH 875 - 950 - 1.3	OVERRUN WIDENING	522	15	0	NO		528.264	22.5	0	0	28	28	56
CH 970 - 990 - 1.4	ASPHALT WIDENING, additional trips for retaining wall	0	0	0	yes		0	0	0	0	0	0	6
CH 1045 - 1080 - 1.5	OVERRUN WIDENING	29	0	0	no		29.348	0	0	0	1	2	4
CH 1130 - 1175 - 1.6	OVERRUN WIDENING	19	0	0	NO		19.228	0	0	0	1	1	2
CH 1175 - 1210 - 1.7	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 1380 - 1450 - 1.8	OVERRUN WIDENING WITH ISLAND ASPHALT WIDENING	62	12	0	NO		62.744	18	0	0	4	5	10
CH 1950 - 2000 - 1.9	ASPHALT WIDENING	0	26	0	YES		0	39	0	46.8	4	5	10
CH 2055 - 2090 - 1.10	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2300 - 2340 - 1.11	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2400 - 2575 - 1.12	OVERRUN WIDENING	169	0	0	NO		171.028	0	0	0	9	9	18
CH 2580 - 2630 - 1.13	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 2970 - 3050 - 1.14	OVERRUN WIDENING	150	0	0	YES		151.8	0	0	270	21	22	44
CH 3340 - 3450 - 1.15	OVERRUN WIDENING AND EXISTING PASSING BAY	316	0	0	NO		319.792	0	0	0	16	16	32
CH 3870 - 3930 - 1.16	EXISTING JUNCTION TO BE RETAINED - NO FURTHER WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 3875 - 4090 - 1.17	OVERRUN WIDENING	303	0	0	YES		306.636	0	0	545.4	43	43	86
CH 4120 - 4200 - 1.18	ASPHALT AND OVERRUN WIDENING	188	58	0	YES		190.256	87	0	442.8	36	37	74

CH 4235 - 4315 - 1.19	OVERRUN WIDENING	115	0	0	NO		116.38	0	0	0	6	6	12
SECTION 1B TOTALS							2030.072	183	0	1305	175.9036	182	370
CH 4335 - 4430 - 1.20	OVERRUN WIDENING	397	0	40	NO		401.764	0	36.08	0	22	22	44
CH 4390 - 4450 - 1.21	OVERRUN WIDENING	381	0	0	YES		385.572	0	0	685.8	54	54	108
CH 4440 - 4540 - 1.22	ROAD WIDENING, RETENTION AND BRIDGE WORKS, additional trips added for enabling and temporary works, which are extensive	0	367	0	YES		0	550.5	0	660.6	61	61	222
CH 4540 - 4560 - 1.23	ROAD WIDENING WITH RETENTION	0	35	0	YES		0	52.5	0	63	6	6	12
CH 4550 - 4640 - 1.24	ROAD WIDENING	0	128	0	YES		0	192	0	230.4	21	22	44
CH 4620 TO 4970 - GOSEN TO SYCHTYN OFF-ROAD TRACK	NEW TRACK CONSTRUCTION	1251	577.5		NO		1266.012	866.25	0	0	107	107	214
CH 4970 - 5040 - 1.25	ROAD WIDENING	0	105	0	NO		0	157.5	0	0	8	8	16
CH 5050 - 5110 - 1.26	ROAD WIDENING	0	116	0	YES		0	174	0	208.8	19	20	40
CH 5130 - 5180 - 1.27	OVERRUN WIDENING	111	0	0	NO		112.332	0	0	0	6	6	12
CH 5175 - 5315 - 1.28	OVERRUN WIDENING	171	0	0	NO		173.052	0	0	0	9	9	18
CH 5330 - 5430 - 1.29	OVERRUN WIDENING	138	0	0	NO		139.656	0	0	0	7	7	14
CH 5430 - 5700 - 1.30	WIDEN EXISTING BAY WITH ASHPALT AND OVERRUN WIDENING	387	29	0	NO		391.644	43.5	0	0	22	22	44
CH 5770 - 5880 - 1.31	OVERRUN WIDENING	250	0	0	NO		253	0	0	0	13	13	26
CH 6060 - 6115 - 1.32	WIDEN EXISTING BAY WITH OVERRUN	64	0	0	NO		64.768	0	0	0	3	4	8
CH 6090 - 6325 - 1.33	OVERRUN WIDENING	576	0	0	NO		582.912	0	0	0	29	30	60
CH 6350 - 6480 - 1.34	OVERRUN WIDENING	121	0	0	NO		122.452	0	0	0	6	7	14
CH 6450 - 6575 - 1.35	WIDEN EXISTING BAY WITH OVERRUN	228	0	0	YES		230.736	0	0	410.4	32	33	66
CH 6530 - 6770 - 1.36	WIDEN EXISTING BAY WITH OVERRUN	51	0	0	NO		51.612	0	0	0	3	3	6
CH 6730 - 6950 - 1.37	OVERRUN WIDENING	260	0	0	YES		263.12	0	0	468	37	37	74
CH 6950 - 7130 - 1.38	NEW ASPHALT PASSING BAY AND OVERRUN WIDENING	375	89	0	NO		379.5	133.5	0	0	26	26	52
CH 7100 - 7170 - 1.39	OVERRUN WIDENING	0	0	0	NO		0	0	0	0	0	0	0
CH 7170 - 7290 - 1.40	OVERRUN WIDENING	0	0	0	YES		0	0	0	0	0	0	0
CH 7270 - 7530 - DOLWEN ISAF - OPTION 1	OVERRUN WITH BRIDGE WIDENING (INCLUDED IN OVERRUN CALCS), REMOVED AS USING OPTION 2 WITH BRIDGE WORKS	0	0	0	NO		0	0	0	0	0	0	0
CH 7220 - 7530 - DOLWEN ISAF - OPTION 2	NEW TRACK CONSTRUCTION WITH OVERRUN WIDENING, WITH BRIDGE WIDENING INCLUDED IN CALCS, ADDITIONAL 20 TRIPS ADDED FOR TEMP WORKS	2520	21	0	NO		2550.24	31.5	0	0	129	130	300
CH 7500 - 7670 - 1.41	OVERRUN WIDENING	1088	0	0	YES		1101.056	0	0	1958.4	153	153	306
CH 7660 - 7720 - 1.42	OVERRUN WIDENING	91	0	0	NO		92.092	0	0	0	5	5	10
CH 7700 - 7780 - 1.43	OVERRUN WIDENING	229	0	0	NO		231.748	0	0	0	12	12	24
CH 7950 - 8040 - 1.44	OVERRUN WIDENING	184	0	0	YES		186.208	0	0	331.2	26	26	52
CH 8150 - 8240 - 1.45	OVERRUN WIDENING	136	0	0	NO		137.632	0	0	0	7	7	14
CH 8250 - SITE ACCESS 1	WIDENING TO EXISTING ACCESS JUNCTION	384	169	193	NO		388.608	253.5	174.086	0	41	41	82
SECTION 1A TOTALS							9505.716	2454.75	210.166	5016.6	859.3616	871	1882
SECTION 1 TOTALS	DESCRIPTION OF WORKS	AREA OF OVER-RUN	AREA OF ASPHALT	AREA OF TRACK	AREA >1M FILL? (YES / NO)	GOOD GROUND? (YES / NO)	11535.788	2637.75	210.166	6321.6	1035.2652	1053	2252
GRAND TOTALS							24217.16	6401.25	5288.426	20845.8	2837.6318	2917	5980

Llanbrynmair South Wind Farm Deliveries Table - CENTRAL CASE 60% WON - RES 22/04/13, AECOM 07/05/13

Phase	Purpose	Vehicle	Approximate No of Journeys	Max journeys possible in 1 day (not all journeys will occur in one day)	CHK
Site Set-Up	Portacabin delivery	Low loader	10	10	
	Skip delivery	Low loader	10	10	
	Generator delivery	Low loader	4	4	
	Water and fuel tank delivery	Low loader	2	1	
	Excavator delivery	Low loader	4	1	
	Roller-compactor	Low loader	2	1	
	Crushing/Grading equip	Low loader	0	0	
	Batching Equipment	Low loader	8	8	
	Backhoe	Low loader	2	2	
	Forestry Felling	Low loader	24	2	
	Forestry Felling-Timber removal	Flat bed	600	16	
Road & hard standings	Stone for site tracks	Tipper trucks	5354	40	
	Stone for control building and substation compounds	Tipper trucks	118	40	
	Stone for construction compound and gatehouse	Tipper trucks	659	40	
	Stone for met mast	Tipper trucks	26	26	
	Stone for turning heads	Tipper trucks	240	40	
	Stone for pathways	Tipper trucks	164	40	
	Stone for crane hardstanding	Tipper trucks	3321	40	
Foundation construction	Excavator delivery	Low loader	2	2	
	Misc works	Low loader	8	2	
	Concrete for turbine foundations, piles & transformer plinths	Mixer trucks	1314	22	
	Concrete for Comms & Met mast	Mixer trucks	11	11	
	Steel delivery	Flat bed	60	30	
	Foundation bolts or steel insert	Flat bed	30	30	
	Place foundation bolt cage or steel insert	30t to 50t crane	1	1	
Turbine erection	Tool container delivery	Low Loader	15	15	X
	Tower section delivery	Extendible trailer	120	8	
	Blade delivery	Extendible trailer	90	6	
	Nacelle	Low loader	30	2	
	Met Mast	Low loader	1	1	X
	Hub and rotor	Low loader	30	2	X
	Turbine erection	1000t to 1200t	1	1	
	Crane Associated equipment	Low loader	10	10	X
	Turbine erection	150t to 200t	1	1	
Cable Installation	Cable delivery	Flat bed or Hiab	9	2	
	Excavator delivery	Low loader	2	1	
	Cable laying	Telescopic	2	1	
	Sand Bedding	Tipper trucks	515	40	
Sub Station & Control Building	Concrete delivery	Mixer trucks	70	35	
	Brick delivery	Flat bed	13	3	
	Roofing & Cladding	Flat bed	4	3	
	Switchgear	Flat bed	4	2	
	Misc electrical equipment	Flat bed	4	3	
Reinstatement	Removal of temporary compound & gate house stone	Tipper trucks	0	0	
	Removal of temporary met mast hardstanding	Tipper trucks	0	0	
	Removal of temporary turning head stone	Tipper trucks	0	0	
	Removal of temporary hardstanding stone	Tipper trucks	0	0	
Misc	4 GANGS OF 6 PPL, 608 DAYS	Vans, cars	6485	5	
		Telescopic	1	1	
		Skip lorry	208	2	
		Small tanker	208	2	
		Light goods van	416	4	
Site De-mobilisation	Portacabin removal	Low loader	10	10	
	Skip removal	Low loader	10	10	
	Generator removal	Low loader	4	4	
	Water and fuel tank removal	Low loader	2	2	
	Excavator removal	Low loader	6	1	
	Roller-compactor	Low loader	2	2	
	Backhoe	Low loader	2	2	
	Crushing/Grading equip	Low loader	0	0	
	Batching Equipment	Low loader	8	8	
	Forestry Felling	Low loader	24	24	
	Turbine Tools & Crane removal	Low loader	25	2	
	Telescopic Removal	Low loader	3	2	
			13584		

Llanbrynmair South Wind Farm Deliveries Table - PRODUCED BY RES, REVISED BY AECOM 08/05/13

INPUTS		Comments
No. of turbines (TOTAL)	30	
No of piled foundations	0	Assumed none at this stage
No of gravity foundations	30	
Estimated number of piles per foundation		N/A
Estimated pile depth (m)		N/A
Estimated pile diameter (m)		N/a
No. of permanent met masts	1	Input total number of permanent met masts
Is the met mast piled? Yes/no	no	
No of tower sections	4	80m Hub Height
Is the drive train delivered separately? Yes/no	no	
No of control building and sub-station compounds	1	Additional Stone/concrete allowed for 2 welfare buildings below.
No. of turbine component laydown areas	0	
No. of construction compounds	5	Assumes no recovery of stone between phases.
Gate-house compound	0	Assumes Construction Compounds will act as gate houses.
Length of new tracks (m)	**18300**	Sum of all new track
Length of FORESTRY TRACKS (m)	**3642**	sum of forestry tracks
Length of upgrade tracks (m)	**3830**	Upgrade of existing site track only; not including off site works, Delivery Route etc.
Average new track construction depth anticipated (m)	0.40	No SI available, assumes 400mm average across site for new tracks.
Average upgrade track construction depth anticipated (m)	0.30	No SI available, assumes 300mm average across site for upgraded existing track.
Average depth of construction above upgraded track	**0.10**	Assumed on 0.1m above existing track, with geogrids to span into new track.
Average forestry track construction depth anticipated (m)	**0.20**	200mm depth using timber as a component in the road foundation.
Assumed Width of Existing Tracks to be Upgraded (TBC, pending Topo)	**2.50**	2.5m standard wheel width.
Track width on straight lengths	**5.5**	5.5M STANDARD TRACK WIDTH, NO PASSING BAYS OR CURVE WIDENING
Factor to accommodate widening at bends	**1.0**	REDUCED TO 1.0
Percentage of stone won on site	0%	Assumes productive borrow pits
Percentage of crane hardstanding covered with truckpave (or equivalent)	0%	Assume all compacted stone surface
Number of turning heads	14	
External transformer at turbines? yes/no	yes	Assume external transformers for now
Grid Connection (kV)	132	132kV
Is offsite exportation of any waste material and/or excess spoil required during construction? yes/no	no	Assumes all spoil disposed of/stored on site.
Is onsite concrete batching proposed? yes/no	yes	Assumes all concrete can be batched on site.
Are crane hardstandings rectangular? yes/no	yes	Refer to drawing 01592D2306-09
Number of communication masts required (with lattice masts)	1	Assume 1 at 132kv substation.
Forestry felling required? yes/no	Yes	Forresty Vehicles shown in final table

CALCULATIONS		
Total area of site tracks (m2)	141746	Both new, forestry and upgraded
Total area of sub-station and control building compound (m2)	3844	62mX62m based on 01592D2304-04
Total Area of Welfare Buildings	96	Based on 01592d2312-01
Total area of construction compounds (m2)	15000	60m x 50m based on 01592d2221-02
Total area of batching compounds (m2)	6400	80m x 80m based on typical plant
Total area of met mast temporary hardstanding (m2)	400	Assumes 20m x 20m area
Total area of turning heads (m2)	5460	65m x 6m Based on fully extended trailer.
Total area of lay down area (m2)	0	

Total area of pathways at turbines (m2)	9960	Based on 5m path around plinth and back to the hardstanding from the turbine. Assumes 2m thick stone depth from ground level to top of co
Total permanent crane hard standing area (m2)	26880	Based on triangle configuration (896m2/turbine, Ref 01657D2312-09)
Total temporary crane hard standing area (m2)	33600	Based on triangle configuration (1120m2/turbine, Ref 01657D2312-09)
Total permanent crane hard standing area (m2)	**50325**	Based on rectangular configuration (1200m2/turbine, Ref 001592D2221-02)
Total temporary crane hard standing area (m2)		Based on rectangular configuration (562m2/turbine, Ref 001592D2221-02)
Total area of crane hard standings (m2)	50325	

	Imported	Site Won	TOTAL	
Total stone volume for site tracks (m3)	48671	0	48671	Both New, Forestry and Upgrade - (Length*width*depth*Factor)
Total stone volume for sub-station and control building compounds (m3)	1076	0	1076	Assumes only 70% of track stone depth required.
Total stone volume for Welfare Buildings (m3)	27	0	27	Assumes only 70% of track stone depth required.
Total stone volume for construction compounds (m3)	4200	0	4200	Assumes only 70% of track stone depth required.
Total stone volume for batching compound (m3)	1792	0	1792	Assumes only 70% of track stone depth required.
Total stone volume for met mast temporary hardstandings (m3)	240	0	240	Assumes that hardstandings require 0.6m depth
Total stone volume for turning heads	2184	0	2184	Same as track stone depth
Total stone volume for lay-down area	0	0	0	
Total stone volume for pathways (m3)	1494	0	1494	Based on depth of 0.15m
Total permanent crane hardstanding volume			21504	triangular configuration
Total temporary crane hardstanding volume			26880	triangular configuration
Total permanent crane hardstanding volume			40260	rectangular configuration
Total temporary crane hardstanding volume			0	rectangular configuration
Total stone volume for crane hardstandings (m3)	30195	0	30195	Assumes that hardstandings require 0.6m depth
Total stone volume for piling rig hardstandings (m3)	0	0	0	No Piling Required
Total imported stone volume (m3)	**89879**	0	89879	Please note that only the **imported** stone quantities are shown in the delivery table. As a result be conservative when estimating % of stone won on site as the results should represent a worst case when being used in a TIA

Total concrete volume for turbine bases (m3)	10500	Based on foundation volume of 350m3 (16m Dia.)
Total concrete volume for piles (m3)	0	No piles required
Total concrete volume for pile caps (m3)	0	No piles required
Total concrete volume for transformer base (m3)	300	Based on transformer plinth volume of 10m3
Total concrete volume for control building (m3)	239	Based on 13.9m x 43m footprint and average slab depth of 0.4m.
Total concrete volume for welfare building (m3)	20	Based on 5m x 5m footprint and average slab depth of 0.4m.
Total concrete volume for sub-station (excluding control building slab) (m3)	339	Based on 13.9m x 43m footprint and average slab depth of 0.4m. Plus approximately 100m3 for plinths and bunds for transformers)
Total concrete volume for met mast base (m3)	55	base on foundation volume of 55m3
Total concrete volume for met mast piles (m3)	0	Based on 4 No piles of similar size at turbine foundations

Total concrete volume for communication mast (m3)	12.5	Based on foundation dimensions of 2.5m x 2.5m x 2.0m
Total concrete volume (m3)	**11465**	
	1910.88	
MV Cable Layouts - Based on Drawing 01592d4303-02 & 01592d4302-02		
Total Cable Length based on 5 runs (m)	42943	- Based on Drawing 01592d4303-02
Bedding Depth (m)	0.3	- Based on Drawing 01592d4302-02
Bedding Width (m)	0.4	- Based on Drawing 01592d4302-02
Total sand bedding required (m3)	**5153**	

References / Methodology / Notes

Stone deliveries = total stone volume required, multiplied by 2.2 to convert m3 into Tonnes. Number divided by 18 to reflect the number of tonnes each truck can carry.

Concrete deliveries = total volume of concrete required, divided by 6 to derive number of concrete wagons

Cable deliveries = track length * 6 / 8 reels / 1500m

Does not include for vehicle movements during decommissioning

Assumes concrete is batched off site

Assumes large scale turbines (80-90m rotor diameter)

TONNAGE FOR CONSTRUCTION TIPPER	**20.00**	TONS/VEHICLE
DENSITY OF CRUSHED STONE	**2.20**	TONS/M3
DENSITY OF SAND	**2.00**	TONS/M3
DENSITY OF CONCRETE	**2.60**	TONS/M3
TONNAGE FOR CONCRETE WAGON	**15.60**	TONS/VEHICLE
DENSITY OF ASPHALT CONCRETE	**2.30**	TONS/M3

APPENDIX 10.1 - G: ROAD SAFETY AUDIT AND RESPONSES

safer roads for everyone

Llanbrynmair Wind Farm, Powys

A458 and A470 Junctions

Road Safety Audit Stage 1

on behalf of AECOM

TMS reference no: 10938

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Llanbrynmair Wind Farm, Powys

A458 and A470 Junctions

Road Safety Audit Stage 1

1. Introduction

1.1 This report describes a Stage 1 Road Safety Audit carried out on proposed improvements to the A458/C2031, Llanerfyl and A470/Unclassified Road, Talerddig junctions, on behalf of AECOM. The audit was carried out on 21st May 2013 in the offices of TMS Consultancy.

1.2 The audit team members were as follows:-

Darren Newbold – MSc, BSc (Hons), MCIHT, MSoRSA
Engineer, TMS Consultancy

Robert Cyples - BSc (Hons), MCIHT, MSoRSA
Senior Road Safety Consultant, TMS Consultancy

Also present at the site visit was Sebastian Reid of AECOM.

1.3 The audit comprised an examination of the drawings and other information relating to the scheme supplied by the design office, which is listed in **Appendix A**. The site was visited by the Audit Team on the 9th of May 2013. The weather was overcast and damp. Traffic flows were light. Pedestrian and cycle flows were light.

1.4 The terms of reference of the audit are as described in HD 19/03. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

1.5 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence. The locations of specific problems are referenced on the plan in **Appendix B**.

1.6 The scheme consists of proposed improvements to the A458/C2031, Llanerfyl and A470/Unclassified Road, Talerddig junctions.

- A458/C2031, Llanerfyl – A slip road constructed as an overrun area is to be constructed at the junction to allow free flowing eastbound movements from the A458 onto the C2031

- A470/Unclassified Road, Talerddig – the existing bellmouth junction is to be widened to facilitate all HGV turning manoeuvres. A short section of widening within the Unclassified Road will allow simultaneous two-way HGV movements.

2. Items resulting from this Stage 1 Audit

A458/C2031 Junction, Llanerfyl

2.1 PROBLEM

Location – A458 - Existing Pedestrian Crossing (outside Garage)

Summary: Potential hazard to pedestrians

Splay kerbs are to be provided across the proposed access / egress to the overrun area from the A458. The existing pedestrian crossing is to remain but pedestrians on the south side of the crossing will have to negotiate the splay kerbs, which may be difficult to negotiate and a trip hazard to pedestrians, particularly to those with visual and mobility impairments.

RECOMMENDATION

At detailed design stage it should be ensured that the tactile paving on the south side of the existing crossing retains its shallow gradient and 0-6mm upstand. Alternatively, the crossing should be relocated.

A470/Unclassified Road Junction, Talerddig

2.2 PROBLEM

Location – Unclassified Road

Summary: Potential hazard to occupants of errant vehicles

The widening of the Unclassified Road on the northern side may result in a steeper embankment depending on the detailed design. Serious injury may result to occupants of errant vehicles that leave the carriageway and descend the slope.

RECOMMENDATION

At detailed design stage a suitable risk assessment should be carried out to ascertain whether a suitable vehicle restraint system will be required at the top of the embankment.

2.3 PROBLEM

Location – Unclassified Road at junction with A470

Summary: Potential vehicle conflicts

The vertical alignment of the Unclassified Road on approach to the A470 is steep. Drivers of large vehicles may have difficulty pulling away from the give way line onto the A470. This may result in shunt type vehicle conflicts on the A470 or roll back collisions with following vehicles within the Unclassified Road.

RECOMMENDATION

An appropriate dwell area should be provided on the immediate approach to the give way line on the Unclassified Road, with the gradient on the remainder of the approach reduced as much as possible.

It is understood that a Relaxation to Design Standard has been approved by the Welsh Government for the vertical alignment of the Unclassified Road. This is indicated as Option 1 on Drawing No. 60283248-D-040 Rev E *with a 4% gradient for 10m from the give way line.*

3. Audit Team Statement

I certify that the terms of reference of the audit are as described in HD 19/03.

Audit Team Leader

Darren Newbold – MSc, BSc (Hons), MCIHT, MSoRSA
Engineer, TMS Consultancy

Signed .....

Date .....30th May 2013.....

Audit Team Member

Robert Cyples - BSc (Hons), MCIHT, MSoRSA
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Appendix A

List of Drawings Examined:

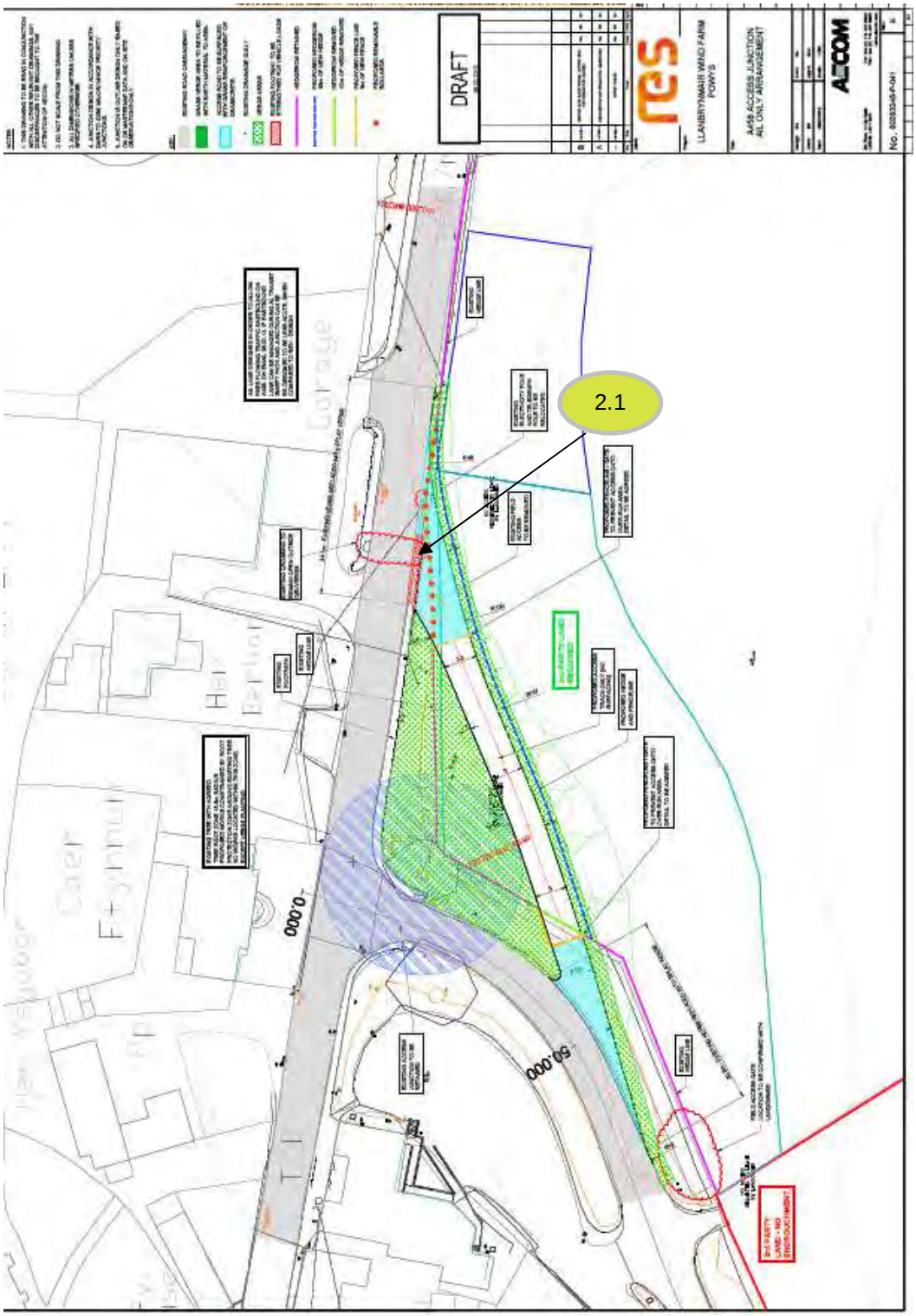
- Drawing No. 60283248-D-040 Rev E
- Drawing No. 60283248-D-041 Rev B
- Drawing No. 60283248-D-001 Rev C
- Drawing No. 60283248-P-030 Rev B

Other Information Provided:

- Traffic count Data
- Technical Note – A470/Talerddig Junction

Appendix B

Please refer to the following page for a plan illustrating the locations of the problems identified as part of this audit (location numbers refer to paragraph numbers in the report).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LLANBRYNMAIR WIND FARM
POWYS
A458 ACCESS JUNCTION
AIL ONLY ARRANGEMENT
AECOM
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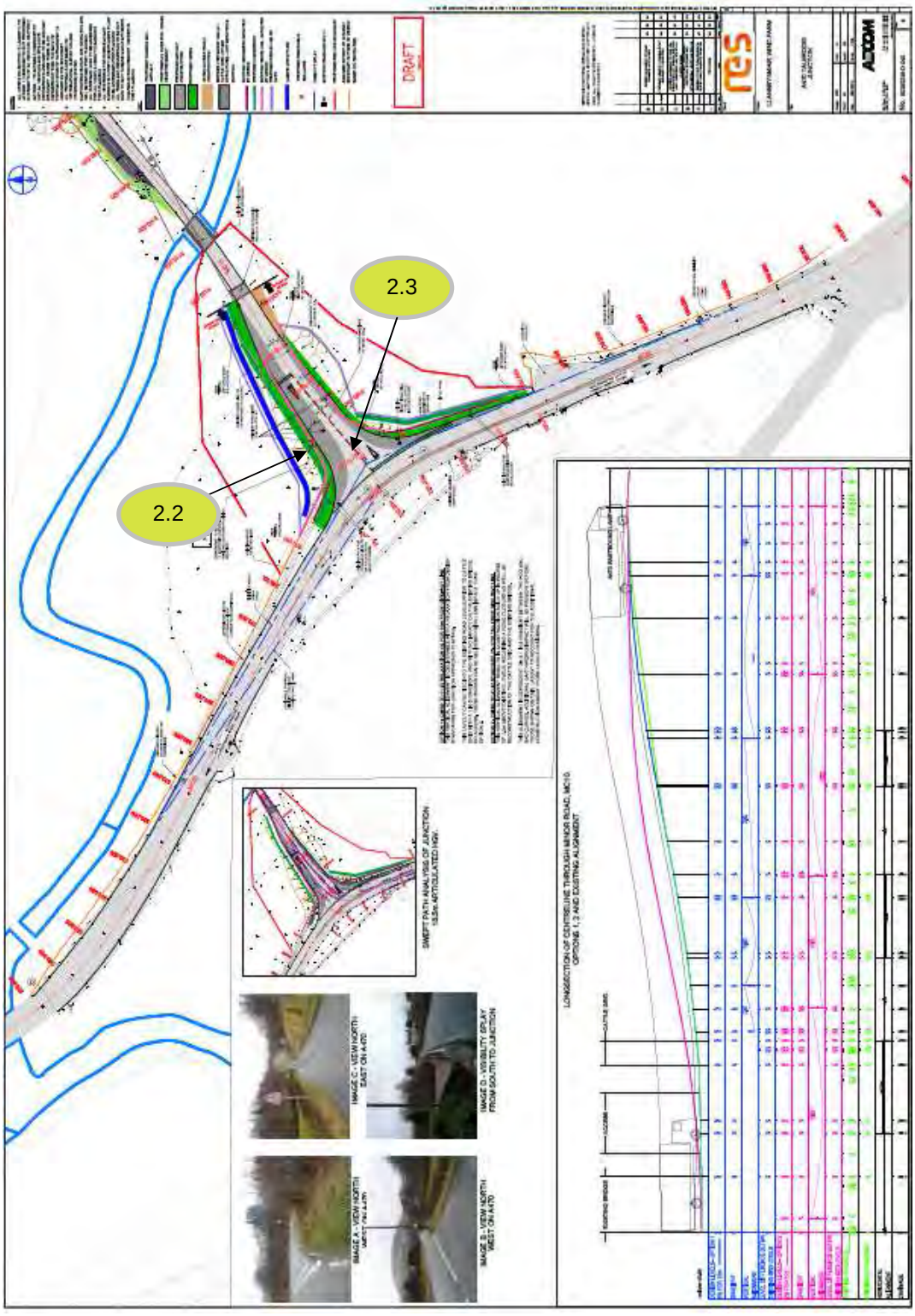
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safer roads for everyone

Llanbrynmair Wind Farm, Powys

Llanerfyl to Talerddig

Road Safety Audit Stage 1

on behalf of AECOM

TMS reference no: 10939

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Llanbrynmair Wind Farm, Powys

Llanerfyl to Talerddig

Road Safety Audit Stage 1

1. Introduction

1.1 This report describes a Stage 1 Road Safety Audit carried out on proposed highway works between Llanerfyl and Talerddig in association with the proposed Llanbrynmair Wind Farm, Powys, on behalf of AECOM. The audit was carried out on the 21st of May 2013 in the offices of TMS Consultancy.

1.2 The audit team members were as follows:-

Darren Newbold – MSc, BSc (Hons), MCIHT, MSoRSA
Engineer, TMS Consultancy

Robert Cyples - BSc (Hons), MCIHT, MSoRSA
Senior Road Safety Consultant, TMS Consultancy

Also present at the site visit was Sebastian Reid of AECOM.

1.3 The audit comprised an examination of the drawings and other information relating to the scheme supplied by the design office, which is listed in **Appendix A**. The site was visited by the Audit Team on the 9th of May 2013. The weather was overcast and damp. Traffic flows were light. Pedestrian and cycle flows were light.

1.4 The terms of reference of the audit are as described in HD 19/03. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

1.5 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence. The locations of specific problems are referenced on the plan in **Appendix B**.

1.6 The scheme consists of proposed highway works between the A458 junction at Llanefyl and the A470 junction at Talerddig (these junctions are included in a separate Road Safety Audit Report). Works are in three sections:

Section 1 – A458 Llanerfyl to Site Access; Works along the route include the provision of overrun areas, passing places and bridge works.

Section 2 – Site Access 1 to Site Access 4; Works along the route include the provision of overrun areas, passing places, a proposed bypass (900m of new road at Neinthirion), Site Access 2 and bridge works.

Section 3 – Site Access 4 to A470 Talerddig; Works along the route include the provision of passing places.

Overall Access Strategy

The Audit Team were asked to review the access strategy for the scheme in relation to road safety. AIL movements in will be from the Llanerfyl junction only with all other construction traffic being to and from the Talerddig junction. No construction or AIL movements will occur during darkness. The southern section of the route, which exhibits a number of existing passing place locations, and in general, good forward visibility compared to the northern section, will see the concentration of construction traffic movements.

The journey distance to the further access is also shorter along the route from Talerddig when compared with Llanerfyl.

The construction of the bypasses (Gosen to Sychtyn off track and Neinthirion bypass) will allow large vehicles to be taken off the existing road where the existing alignment is not suitable. These are considered to be satisfactory in terms of road safety.

The impact of construction safety and journey times has been considered along the local access road and in the view of the Audit Team is that we believe that the distances and passing place philosophy is suitable for purpose.

Traffic flows are expected to be no more than 80 per day during the construction period (160 two way) of which 30-40 being two-axle light vehicles. Spread through the day, this should be acceptable for the route.

Given these factors, the Audit Team consider that the route is suitable in road safety terms.

2. Items resulting from this Stage 1 Audit

General Issues

2.1 PROBLEM

Location – General – Route from Llanerfyl to Talerddig

Summary: Potential hazard to AILs and HGVs

Although the overrun works along the route appear to adequately cater for the tracking of AILs and HGVs, the vertical alignment along the route is very changeable with crests and dips and steep gradients. The vertical alignment may result in large low loading vehicles becoming grounded along the route.

RECOMMENDATION

At detailed design stage the vertical tracking of large vehicles should be undertaken to ensure that such vehicles will be able to negotiate the route.

2.2 PROBLEM

Location – General – Route from Llanerfyl to Talerddig

Summary: Potential hazard to high sided vehicles

There are a large amount of large overhanging trees along the proposed route from Llanerfyl to Talerdig. Low overhanging branches / tree canopies may be hazardous to high sided vehicles.

RECOMMENDATION

At detailed design stage it should be ensured that sufficient headroom clearance is provided throughout the route.

Section 1 – A458 Llanerfyl to Site Access 1 (including Gosen Bridge works and Gosen to Sychtyn Off-Road Track

No specific road safety issues have been identified in relation to Section 1 of this scheme.

Section 2 – Site Access 1 to Site Access 4 (including Neinthirion Bypass)

2.3 PROBLEM

Location – Neinthirion Bypass Access (ch.8850-8950)

Summary: Potential pull-out type vehicle conflict

Visibility to the right for drivers at the give way line of the Neinthirion Bypass Access (and forward visibility to the access for northbound unclassified road drivers) is restricted due to the vertical nature of the road and the physical land restraint around the adjacent bend. Poor visibility may lead to pull out type vehicle conflicts, particularly involving the larger vehicles.

RECOMMENDATION

At detailed design stage, appropriate warning signage should be provided on the existing road to warn of slow turning traffic ahead.

However, it is acknowledged that unclassified road vehicle speeds at this location will be low due to the horizontal and vertical alignments and therefore a reduced visibility splay is acceptable.

Section 3 – Site Access 4 to A470 Talerddig

No specific road safety issues have been identified in relation to Section 3 of this scheme.

3. Audit Team Statement

I certify that the terms of reference of the audit are as described in HD 19/03.

Audit Team Leader

Darren Newbold – MSc, BSc (Hons), MCIHT, MSoRSA
Engineer, TMS Consultancy

Signed .....

Date .....30th May 2013.....

Audit Team Member

Robert Cyples - BSc (Hons), MCIHT, MSoRSA
Senior Road Safety Consultant, TMS Consultancy

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Appendix A

List of Drawings Examined:

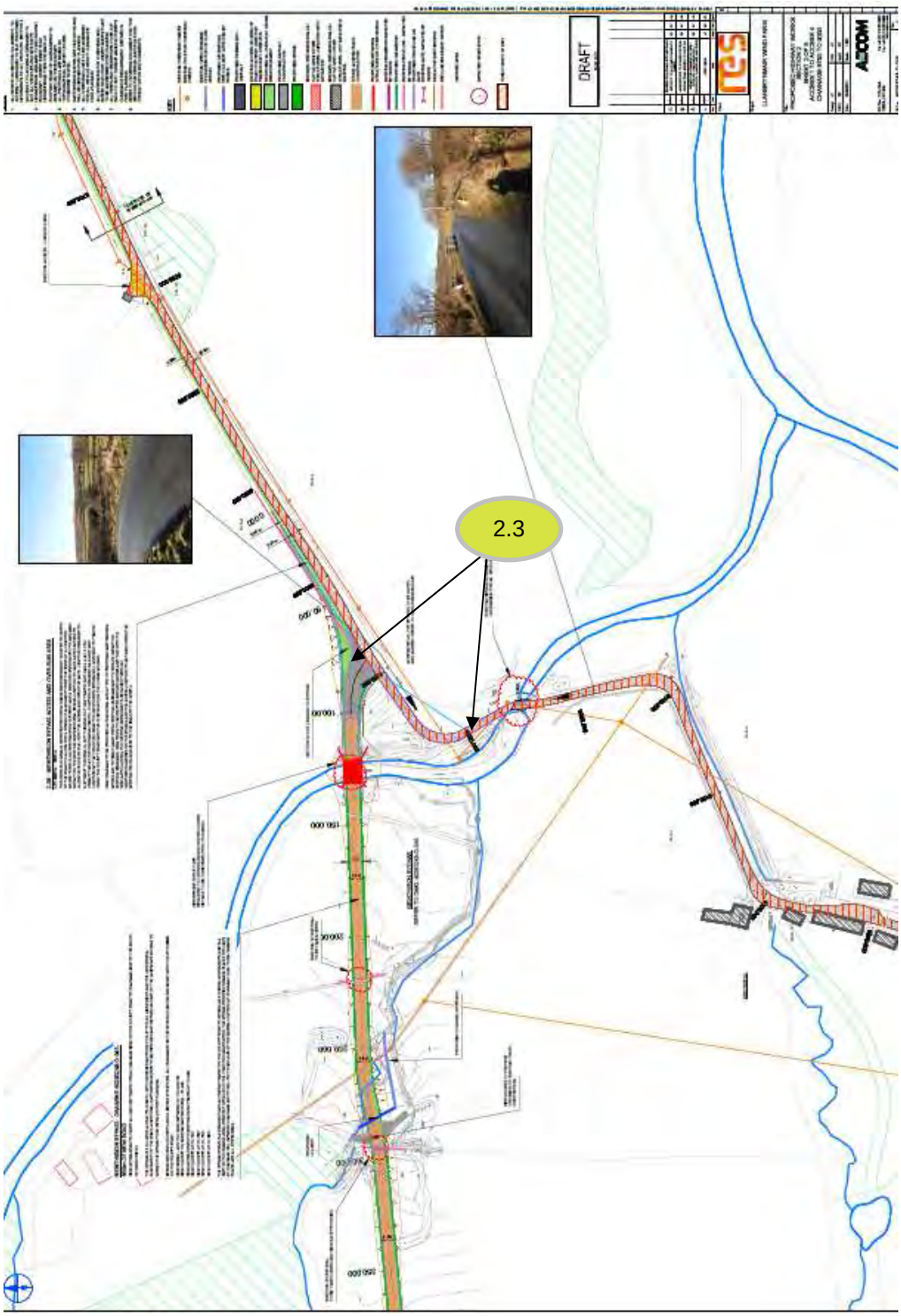
- Drawing No. 60283248-D-000
- Drawing No. 60283248-D-001 Rev C
- Drawing No. 60283248-D-002 Rev C
- Drawing No. 60283248-D-003 Rev C
- Drawing No. 60283248-D-004 Rev C
- Drawing No. 60283248-D-005 Rev C
- Drawing No. 60283248-D-006 Rev C
- Drawing No. 60283248-D-007 Rev C
- Drawing No. 60283248-D-008 Rev C
- Drawing No. 60283248-D-009 Rev C
- Drawing No. 60283248-D-010 Rev C
- Drawing No. 60283248-D-011 Rev C
- Drawing No. 60283248-D-012-1 Rev C
- Drawing No. 60283248-D-012-2 Rev C
- Drawing No. 60283248-D-013 Rev C
- Drawing No. 60283248-D-014 Rev C
- Drawing No. 60283248-D-015 Rev C
- Drawing No. 60283248-D-016 Rev C
- Drawing No. 60283248-D-017 Rev C
- Drawing No. 60283248-D-018 Rev C
- Drawing No. 60283248-D-019 Rev C
- Drawing No. 60283248-D-020 Rev C
- Drawing No. 60283248-D-021 Rev C
- Drawing No. 60283248-D-022 Rev C
- Drawing No. 60283248-D-023 Rev B
- Drawing No. 60283248-D-024 Rev B
- Drawing No. 60283248-D-025 Rev B
- Drawing No. 60283248-D-026 Rev B
- Drawing No. 60283248-D-027 Rev B
- Drawing No. 60283248-D-028 Rev B
- Drawing No. 60283248-D-029 Rev B
- Drawing No. 60283248-D-030 Rev B
- Drawing No. 60283248-P-040 Rev E
- Drawing No. 60283248-P-041-1 Rev C
- Drawing No. 60283248-P-042 Rev B
- Drawing No. 60283248-P-043 Rev B
- Drawing No. 60283248-P-044 Rev B
- Drawing No. 60283248-P-045 Rev C

Other Information Provided:

- Traffic Count Data
- Technical Note – LTMP Llanerfylt to Talerddig Highway Proposal Summary

Appendix B

Please refer to the following page for a plan illustrating the locations of the problems identified as part of this audit (location numbers refer to paragraph numbers in the report).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Technical Note

Project:	**Llanbrynmair Wind Farm**	Job No:	**60283248**
Subject:	**Designer's Responses to TMS Road Safety Audits on A458, A470 and Section 1 to 3.**		
Prepared by:	**Sebastian Reid**	Date:	**03/06/13**
Checked by:	**Kevin Martin**	Date:	**06/06/13**
Approved by:	**Steven Carmody**	Date:	**13/06/13**

This document is a designer's response to the issues raised in the documents:

- Road Safety Audit Stage 1 – A458 and A470 Junctions, TMS Ref No: 10938
- Road Safety Audit Stage 1 – Llanerfyl to Talerddig, TMS Ref No: 10939

AECOM has responded to each of the issues raised in the audits and these are shown in *Blue Italics* below.

RSA St 1 – A458 and A470 Junction

2.1 Location – A458 - Existing Pedestrian Crossing (outside Garage)

- **Summary: Potential hazard to pedestrians**
  Splay kerbs are to be provided across the proposed access / egress to the overrun area from the A470. The existing pedestrian crossing is to remain but pedestrians on the south side of the crossing will have to negotiate the splay kerbs, which may be difficult to negotiate and a trip hazard to pedestrians, particularly to those with visual and mobility impairments.
- **Recommendation**
  At detailed design stage it should be ensured that the tactile paving on the south side of the existing crossing retains its shallow gradient and 0-6mm upstand. Alternatively, the crossing should be relocated.
- **Designer's Response**
  AECOM agrees and the dropped crossing is shown to be retained in its current location. During the delivery period the crossing location will be temporarily located west, towards the C2031/A458 junction to allow pedestrians to continue safely crossing the A458. In the permanent situation, and for the majority of the construction period, however, the dropped crossing will remain as it. This will be addressed at higher detail in the detailed design stage for technical approval.

  Drawing details have been updated to clearly show this on Drawing 60283248-P-041 Rev F.

2.2 Location – U2319 on approach to A470

- **Summary: Potential hazard to occupants of errant vehicles**
  The widening of the Unclassified Road on the northern side will result in a much steeper embankment. Serious injury may result to occupants of errant vehicles that leave the carriageway and descend the slope.
- **Recommendation**
  At detailed design stage a suitable risk assessment should be carried out to ascertain whether a suitable vehicle restraint system will be required at the top of the embankment.
- **Designer's Response**
  The proposed embankment to be installed on the North West side of the junction is less steep at a 1:3 gradient than the existing earthworks which are approximately 1:1 gradient. The existing

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field to the North West, after the hedgerow and fence line, slopes downward at a 1:4 to 1:7 gradient towards the river approximately 100m away. From the publically available 1999 to 2010 accident data, no accidents of this nature have occurred. However, further accident data has been requested for this location to validate this response.

The proposal will include a new full height kerb along this channel as well as a thicker hedgeline. During the detailed design phase for this junction, a risk assessment will be undertaken by the designers to identify whether there is need for a more formal vehicle restraint solution. Any solution will need to take into account the rural setting of the junction. The traffic flow at this junction after the construction period will be similar to the existing flows, which means that the risk at this junction, in the permanent situation will not have changed.

2.3 Location – U2319 at Junction with A470

- **Summary: Potential vehicle conflicts**
  The vertical alignment of the Unclassified Road on approach to the A470 is very steep. Drivers of large vehicles may have difficulty pulling away from the give way line onto the A470. This may result in shunt type vehicle conflicts on the A470 or roll back collisions with following vehicles within the Unclassified Road.
- **Recommendation**
  An appropriate dwell area should be provided on the immediate approach to the give way line on the Unclassified Road, with the gradient on the remainder of the approach reduced as much as possible.

  It is understood that a Relaxation to Design Standard has been approved by the Welsh Government for the vertical alignment of the Unclassified Road. This is indicated as Option 1 on Drawing No. 60283245-D-040 Rev E with a 4% Gradient for 10m from the give way line.
- **Designer's Response**
  AECOM can confirm that the dwell area is as proposed above and will be detailed further as part of the detailed design and technical approval works.

RSA St 1 – Llanerfyl to Talerddig

General Issues

2.1 Location – General – Route from Llanerfyl to Talerddig

- **Summary: Potential hazard to AILs and HGVs**
  Although the overrun works along the route appear to adequately cater for the tracking of AILs and HGVs, the vertical alignment along the route is very changeable with crests and dips and steep gradients. The vertical alignment may result in large low loading vehicles becoming grounded along the route.
- **Recommendation**
  At detailed design stage the vertical tracking of large vehicles should be undertaken to ensure that such vehicles will be able to negotiate the route.
- **Designer's Response**
  An assessment of the route for AIL and HGVs has been undertaken by AECOM and our delivery partners, Collett and Sons Ltd. The route has been found to be acceptable for AILs with some works in Section 1 and 2, and acceptable for HGVs along the entire route.

  Further validation of this initial assessment will be undertaken at detailed design stage post planning after procurement of an updated 3D topographical survey of the entire road has been obtained. A further validation of the AIL impact will be undertaken pending the running of a dry-run once the works have been completed.

2.2 Location – General – Route from Llanerfyl to Talerddig

- **Summary: Potential hazard to high sided vehicles**
  There are a large amount of large overhanging trees along the proposed route from Llanerfyl to Talerdig. Low overhanging branches / tree canopies may be hazardous to high sided vehicles.
- **Recommendation**
  At detailed design stage it should be ensured that sufficient headroom clearance is provided throughout the route.
- **Designer's Response**
  AECOM agrees. As a part of any of the enabling works, a programme of tree and vegetation management including trimming, coppicing and removal of errant branches will be undertaken to ensure that a clear envelope is available for the AILs and HGVs along the entire route.

Section 1 – A458 Llanerfyl to Site Access 1

No specific road safety issues have been identified in relation to Section 1 of this scheme.

Section 2 – Site Access 1 to Site Access 4

2.3 Location – Neinthirion Bypass Access (ch.8850-8950)

- **Summary: Potential pull-out type vehicle conflict**
  Visibility to the right for drivers at the give way line of the Neinthirion Bypass Access (and forward visibility to the access for northbound drivers) is severely restricted due to the vertical nature of the road and the physical land restraint around the adjacent bend. Poor visibility may lead to pull out type vehicle conflicts, particularly involving the larger vehicles.
- **Recommendation**
  At detailed design stage, appropriate warning signage should be provided on the existing road to warn of slow turning traffic ahead.
- **Designer's Response**
  The proposed Neinthirion Bypass Access at Chainage 8850 is located at the top of an existing summit to the north of the Neinthirion Bridge. The road in this location is constrained horizontally, vertically and in the existing situation traffic is very slow at this location. This is shown on drawing 60283248-016.The existing forward visibility at this corner is approximately 30 metres, reducing to 20 metres at the existing summit on the road.

  The bypass access junction has been located to avoid the existing summit which would prevent access by AILs and conflict in this constrained area, with the result being that the visibility splay towards the bridge is reduced from the ideal 2.4m x 70m requested by PCC in their Cabinet Report of September 2012, to 2.4m x 42m.

  The 2.4m x 70m visibility splay will only be possible if the existing landform to the east of the bridge and the access junction is significantly re-profiled which is currently unacceptable from a landscape and visual opinion. AECOM believes that the solution offered is an acceptable compromise in this situation and that temporary warning signage will be used to reduce the likelihood of any vehicular conflict on approach to this access. This will be balanced by the temporary nature of the risk and the controlled use of the road as it will be within the scheme's CDM boundary.

APPENDIX 10.1 - H: GLEN MENIAL BRIDGE

Technical Note

AECOM

Project:	**Development - Llanbrynmair Wind Farm**	Job No:	**60283248**
Subject:	**Removable parapet system on Glen Menial bridge**		
Prepared by:	**Laurence Sutton**	Date:	**17/05/13**
Checked by:	**John Webb**	Date:	**20/05/13**
Approved by:	**John Webb**	Date:	**21/05/13**

1 - BRIEF

As part of the Llanbrynmair Wind Farm development, AIL (Abnormal Indivisible Load) vehicles are required to cross Glen Menial bridge in Llanerfyl, Powys. The current parapet system on the bridge does not allow adequate width for the AIL vehicles to cross the bridge. This technical note explores the possibility of removing the existing stone parapet and replacing it with a demountable parapet system which could be removed at any point in the future when AIL vehicles require access.

The suggestions made in this Technical Note are of a preliminary nature and have not been worked through in any detail. Further work would be required to develop these comments.

2 – CONSTRAINTS

- The existing bridge is a masonry arch bridge, with stone clad abutments and parapets.
- Any system in place needs to allow for a stone facia to be applied so the parapet is in keeping with the local area.
- The system needs to be able to be removed at any point in the future to allow for AIL vehicles delivering items for maintenance of the wind farm site.
- Parapet fixings in the bridge may need to be occasionally over-run by AIL vehicles.

3 – ASSUMPTIONS

- Based on the road information, the parapet must be of containment level N1.
  (TD 19/06 Requirements for Road Restraint Systems [i] – section 3.4)
- AIL vehicle wheelbase will not be greater than the width of the bridge when the parapets have been removed.
- The removal of the parapet leaves the bridge with no edge protection, it is assumed that a safety method statement will be produced detailing how to manage this risk to the public until the parapets are reinstated as well as for moving the AIL over the bridge safely.
- The bridge has the capacity to support the AIL vehicle with load.
- Removing the existing stone parapet will not affect the load capacity of the bridge due to loss of stiffness – this will require further investigation.
- The arch is topped with fill material up to the road surfacing.

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4 - POTENTIAL DESIGN

Figure 4.1 highlights the potential design which is broken down into its constituent sections below:

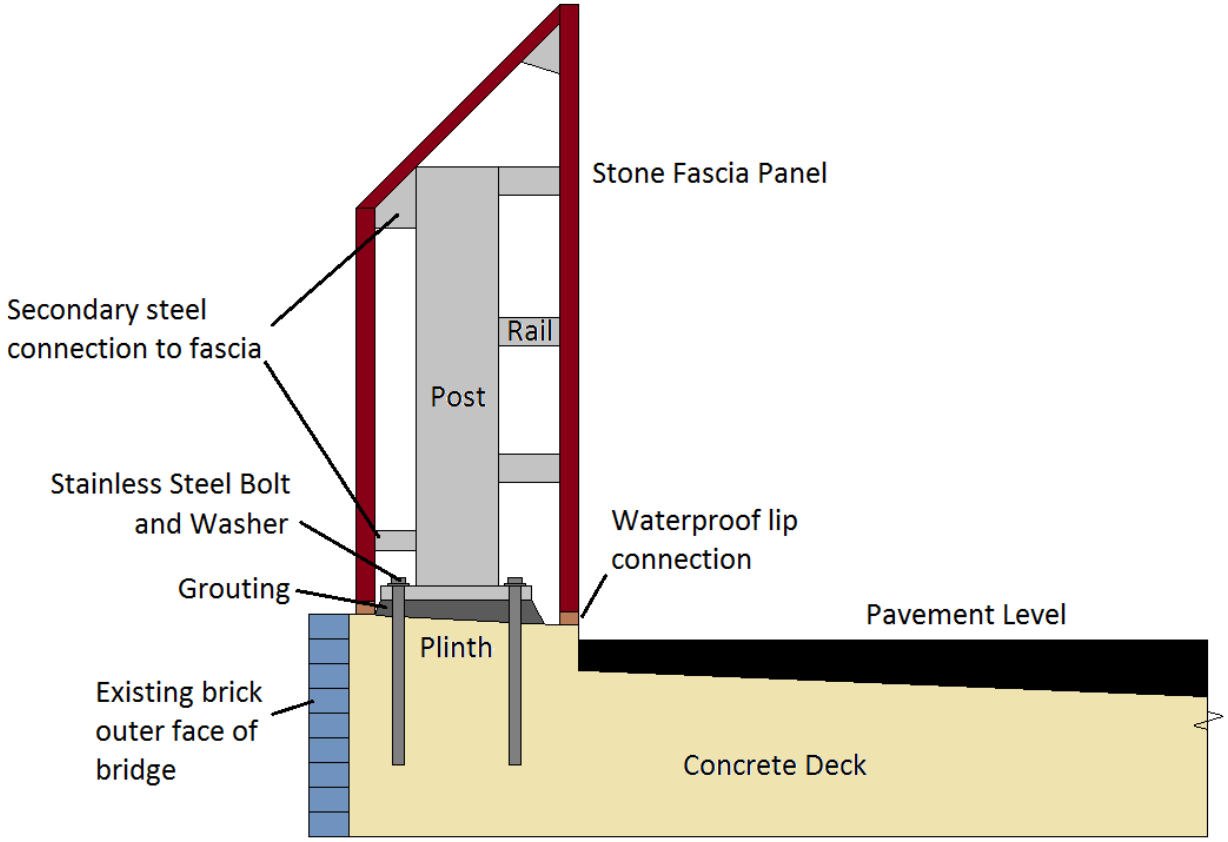

Figure 4.1 – Potential design configuration cross section through anchorage point

4.1 - Post and rails

The main requirement for this parapet system is the need for simple removal. Two main design options were considered, temporary concrete barriers and a steel post system. The installation of temporary concrete barriers (TCB's) would allow for quick and simple installation as most proprietary systems have simple connection details. TCB's would also be easy to clad in a stone fascia. However, based on the site restrictions it would be difficult for the necessary heavy plant machinery required to place and remove the TCB's to be able to access the bridge.

The suggestion is that a steel parapet system can achieve the required simple removal without the need for use of heavy plant machinery. Using the configuration shown in Figure 4.1, this system could be removed with minimal notice by two workmen with hand tools and a lightweight vehicle to lift the parapet. The post and rails will be a proprietary system based on a containment level of N1 and a ground connection as detailed in Figure 4.1. A modification, however, will be required to allow the connection of the stone fascia panels as detailed in section 4.3 below. The modification, including the suggested secondary steel, will need to be included as an extra from the fabricators.

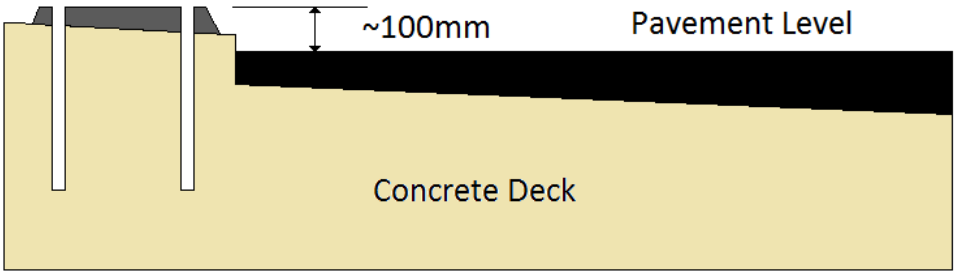

Figure 4.2 – Configuration after parapet has been demounted

4.2 - Concrete deck

With the current stone parapet, no anchorage is present in the bridge, however, a demountable system of steel posts requires anchorage. This cannot be provided by masonry, and a concrete deck has been proposed which provides the anchorage and the necessary restraint against overturning. This would involve the removal of the current road surface and a section of the fill below and replacing it with a reinforced concrete slab. A basic assessment of the current bridge condition will be required prior to the design of this slab system.

This slab would have a plinth and cast in anchorage points cast along the edge to allow a connection to the parapet posts. BS 6779-1 [ii] *(Figure B.1)* name the BS states that the concrete plinth should be at least 50mm clear of the pavement surface with the grouting being a maximum of 30mm with the fall of the plinth. Although the steel post connection leaves no steel connection of the deck once removed, the combined result of the grouting and concrete plinth leaves a raised section of approximately 100mm above the surface of the pavement. This should be acceptable for AIL's to drive over but the new concrete deck should be designed with this in mind. Figure 4.2 shows the plinth that remains after the parapet has been demounted and highlights the raised section remaining. If this causes further issues or concern it may be possible for this plinth to be removed from the detail but this departure from standards would require approval from the local authority before it could be completed.

4.3 - Stone fascia

Rather than being clad directly with stone, the parapet system will have stone fascia panels attached to it. These panels will not be resisting any load implied by vehicles so will not alter the ability of the parapets to function. These panels will be connected to the parapet via secondary steel. Bespoke fascia panels are available which can be of varying dimension and face material, for example, one such retailer is Ibstock Kevington.

A waterproofing lip connection would be required to the surface of the concrete to reduce damage by weather conditions to the boarding whilst it is in situ. This may be available from the provider but consideration must be given to the fact that the boards are designed to be removed and so this waterproofing should not be a permanent sealant.

The suggestion in Figure 4.1 includes the shaped top section to disperse water and to avoid unauthorised access.

These panels would not be designed for any sort of impact and as a result will need regular maintenance to ensure that any damaged panel be replaced. Replacing any damaged panels, however, would be a quick and simple process.

4.4 - Anchorage connection

The design of the anchorage connection should conform to BS6779-1 name the BS *(section 6.4.2)*. The bolts and washers will be required to be stainless steel fitting into cradle anchorages which are cast into the concrete. The specific details of the anchorages will be based on the type of proprietary parapet and the design of the concrete deck slab.

4.5 – Vehicle Restraint System (VRS) on lead up and lead off

The current safety fence provision on the lead up and lead off from the parapet is only present on one side of the bridge. To avoid any vehicles crashing into the end of the parapet system a safety fence will need to be in place at either end of both parapets. BS 6779-1 *(6.5.1.4)* highlights that on low containment roads, if a safety fence lead on/off cannot be accommodated due to restrictions on position and anchorage, each end of the parapet system must be designed to accept a longitudinal load equal to the load designed for in the transverse direction.

4.6 - Method of removal

Due to nature of the configuration, the whole parapet system could be dismantled by two workers fairly quickly using only hand tools.

1. Undo screw connection between fascia board and parapet post.
2. Remove fascia boards.
3. Remove anchorage bolts in base plates of posts.
4. Use lightweight plant vehicle to remove parapet post and rails.

Being a proprietary system will mean that posts and rails will not have specific locations in which they need to be returned to fit correctly. The system can be completed demounted and reconstructed after the AIL has passed through.

4.7 - Maintenance

Attention to maintenance of this parapet system will be important to ensure its ability to perform as a quickly demountable structure.

The maintenance regime for the parapet will need to be take into account requirements from the manufacturers of the proprietary system steel parapet and the stone fascia.

5 - POTENTIAL DESIGN EVALUATION

SECTION	PRO's	CON's
Steel post and rails	Lightweight in comparison to concrete so much easier to remove without heavy plant machinery. Proprietary system will not need testing once in place	More difficult to apply the required stone facia. Requires secondary steel modification to allow for connection to stone fascia board. Requires anchorage system. Additional cost of special adaption of the standard items for attachment of stone fascia (for installation and for any replacement)
Concrete deck	Allows anchorage for easily removable steel parapet system. Increases stiffness of bridge structure.	Exposed plinth above the pavement surface. Requires additional design and analysis. Requires bridge closures during installation.
Stone Fascia	Saves on weight applied to parapet system. Easily removed for inspection and demounting of parapet.	Requires a removable, waterproof connection detail to the pavement/concrete plinth to avoid water damage. Attached to the parapet via secondary steel Attention to maintenance of the attachment

Table 5.1 – Summary of Pro's and Con's of Outlined Potential System

[i] TD19/06: Design Manual for Roads and Bridges, 2.2.8, Requirements for Road Restraint Systems

ii BS6779 – 1: Highway parapets for bridges and other structures. Specification for vehicle containment parapets of metal construction

APPENDIX 10.1 - I: GOSEN BRIDGE

Technical Note

AECOM

Project:	**Llanbrynmair Wind Farm**	Job No:	**60283248**
Subject:	**Gosen Bridge**		
Prepared by:	**Yu Chen & Sebastian Reid**	Date:	**13/06/13**
Checked by:	**John Webb & Steven Carmody**	Date:	**13/06/13**
Contributors:	**Rebecca Knight and Marc Van Grieken, Land Use Consultancy**	Date:	**09/05/13**
	Mick Green, Ecology Matters		
Approved by:	**Kevin Martin**	Date:	**14/06/13**

1 Introduction

The purpose of this note is to review the widening of the road and bridge at the Gosen Bridge for the RES Llanbrynmair Wind Farm Scheme. This document demonstrates means by which the works at the Gosen Bridge can be constructed with mitigation of the impacts to landscape and ecological impact. This study has been undertaken using the best information available and with consultation with other parties involved with the scheme. The proposals within this document are preliminary only and will be defined further post planning and inquiry.

The AECOM proposals are detailed on the following drawings:

- 60283248-D-008-001: Gosen Bridge – Overall Layout
- 60283248-D-008-002: Gosen Bridge – Typical Sections
- 60283248-D-008-003: Gosen Bridge – Post Construction Arrangement

These drawings are attached with this document in Appendix A.

2 Information Available

This study is informed by the following site visits

- A site walkabout was undertaken by AECOM engineers to collect data of site features and photographs were taken during the site visit for desk study and record.
- An inspection and subsequent report of the site carried out by rope access methods by specialist contractor "Up and Under" on the 15th February 2013.
- Site visits on the 15th February 2013 and the 9th May 2013 to the bridge following discussions with PCC, NRW, Landscape and Ecology consultants on the impact of the bridge widening.

Topographical and mapping information is available for the site and this has been used, as well as site photography and records, to produce the options demonstrated.

3 Description of Site

3.1 Description

Gosen Bridge is located approximately 3.5km south west of the village of Llangadfan, within the Tregynon/Llanerfyl landscape character area. It carries an unnamed single carriageway (local C2031 road) from northeast to southwest, crossing the Cledan River which flows to Afon Gam River to the northwest. The layout of the bridge is shown on drawing 60283248-D-008-001.

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The north-eastern approach to the structure has downward grade of 1 in 10 on approach to the bridge. There are properties located at the top of the valley to the north east of the bridge, and a property located immediately south of the existing bridge. To the west of the bridge the road forks, with the C2031 continuing south, and a second approach road heading North West up another a lower level river crossing to the north.

Bedrock was found to be exposed up to a height of 1.5m above water level at the edge of the river channel at the north of the bridge. There are steep banks leading from the river to the carriageway, these support a dense mix of hazel, birch and ash.

The access to the site is via the C2031 road. Early discussions with the local highways authority indicate a preference for the road remaining open during the works as much as possible. However short time road closures during weekends and overnight may be possible and is subject to agreement with local highways authority. Discussions with National Resources Wales and Powys County Council indicate preference for minimisation of disturbances to the river and to vegetation.

Photograph 1 - Gosen Bridge taken from the bank to the north east of the Bridge.

3.2 Survey 15th February

To summarise the findings of the survey on the 15th February 2013.

- The structure comprises a single stone masonry arch with a clear span of 5.37m. Stone masonry abutments are 4.8m in length and approximately 2m in height and are founded on bedrock. Stone parapets are nominally 7.3m in length and 1m in height. There is a clear deck width of 3.88m to 3.94m over the length of the structure. The arch crown is approximately 3m below carriageway level. There are no weight restriction signs visible on the approach to the structure.
- The north-eastern approach to the structure has an approximate downward gradient of 1:10 with the south-western approach road converging approximately 25m to the south of the structure from two separate approaches one decline (east) and one incline (west). There are corrugated steel vehicle containment barriers, secured to timber posts (150mm2 in section), at both sides of the carriageway, on both approaches to the structure. These terminate at the ends of the parapets. There are also safety fences comprising galvanised tubular steel horizontal rails, supported by angle steel posts at all four corners of the structure.

- Foundations – The existing bridge is founded on exposed bed rock and the depth of the channel of the river is 1m below the foundation level of the existing bridge. The bridge can be seen in Photograph 1 above.
- Bed rock is exposed up to a height of 1.5m above the river channel to the north of the bridge with a thin over-burden of earth bound together by light vegetation.
- Trees are present on all corners of the existing structure.

3.3 Site Visit 9th May 2013

The survey of the 9th May was a visit to identify and record the field to the north of the Afon Gam and the Gosen Bridge which is to be used as a compound area during the works and as a launching point for temporary crash decks across the Afon Gam to the Gosen Bridge and its abutments. This area is defined as the southern compound (c) on drawing 60283248-D-0800-001.

The northern side of the Afon Gam is accessible from an existing road which crosses the Afon Gam to the North West of Gosen bridge. This bridge is shown in Photograph 3 below.

A survey undertaken on the 9th May showed that a number of existing trees have fallen due to recent weather conditions and require removal. These trees to be removed are located within the areas of works for the new retaining walls and the crash deck proposed for the widening of the Gosen Bridge. The falling of these trees due to the bad weather conditions during winter 2013 has meant that the existing embankment is now exposed to the elements. Photograph 2 below shows a tree fall to the west of the Gosen Bridge on the southern bank of the Afon Gam.

This survey has also shown that recent works undertaken by Powys County Council for the existing bridge on the access road to the Afon Gam north bank located to the west of Gosen Bridge has included the laying of locally quarried boulders for scour protection along the river bank and section of retaining wall as a part of the bridge structure. The proposals shown for the retaining wall on this section of river shows similar scour protection employed.

Photograph 2 - Tree Fallen on embankment to west of Gosen Bridge, opposite Gosen Chapel

Photograph 3 - River Bank to west at Gosen Bridge, Afon Gam river crossing

4 Gosen Bridge and Road Widening

AECOM have undertaken an outline optioneering process for the Gosen Bridge and Road Widening. This process has included an outline assessment of different retaining wall and bridge options, culminating the proposals below. These proposals have taken into account the available information, and pending further geotechnical, topographical and bridge information which will be undertaken as a part of the detailed design process.

4.1 Bridge Construction - New Pre-stressed Concrete Bridge Adjacent to Existing Structure

The proposed bridge structure comprises 150mm in-situ concrete slab supported on standard precast pre-stressed concrete bridge beams and they are in turn supported on reinforced concrete bank seats benched into the existing rock.

This bridge proposal is approximately 14.6m in span and 4.8m wide located to the north of the existing masonry arch bridge. The bank seats will be in-situ concrete or precast concrete supported on prepared competent ground.

An overnight road closure is required for the purpose of lifting the beams into position from the road using mobile cranage. Further works overnight may be required to allow for jointing and resurfacing works across the bridge. These works would take place over the course of a week during which the road would be kept open during the day time with speed restrictions in place, with works taking place at night.

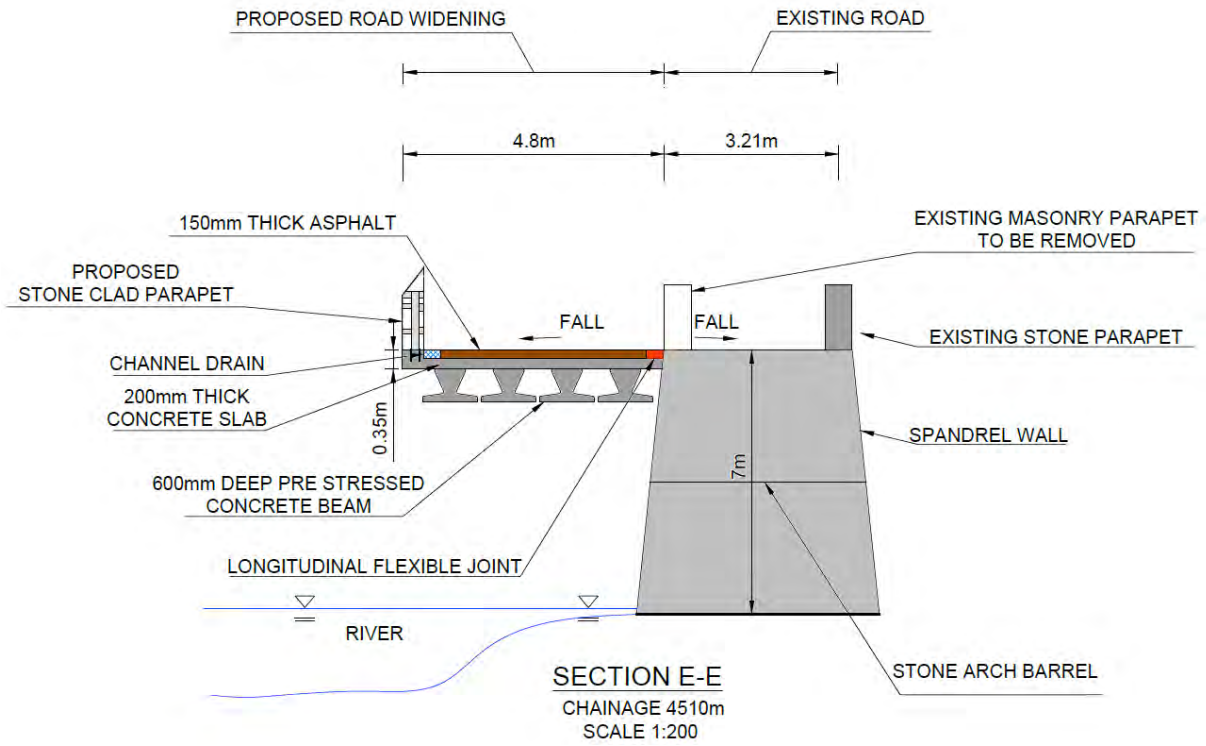

Figure 1 – Indicative Section through proposed new structure and existing Gosen Bridge (Drawing 60283248-D-008-002)

4.2 Bridge Construction – Alternative Option – New Precast concrete arch, adjacent to existing structure

The proposed bridge structure consists of precast concrete arch units supported on precast concrete bank seats with a 150mm thick in-situ concrete slab cast on top of these precast concrete arch units.

The bridge proposal is approximately 10 to 14.6m in span, 4.8m wide located to the north of the existing bridge. The precast bank and arch units will be transported to site and lowered into place on pre-prepared ground. The slab will then be cast on top of the arch.

An overnight road closure is required for the purpose of lifting the arch units and the precast sections into position from the road using mobile cranage. Further works overnight may be required to allow for jointing and resurfacing works across the bridge. These works would take place over the course of a week during which the road would be kept open during the day time with speed restrictions in place, with works taking place at night.

4.3 Retaining Structures for Road Widening on Approach Roads to North West and North East

The road would need to be widened to the north to allow for the new bridge abutments and for the widened road approaches to the bridge. Due to the varying ground conditions and ground profiles, a number of solutions are suggested at this time and will be defined at the detailed design stage. A mixture of these methods will be used to retain the bridge infrastructure and the road.

The three options detailed on drawings 60283248-D-008-002 are accessed from river level and constructed using temporary construction crash decks in the river bed from the field to the north of the Afon Gam and the Gosen Bridge. This is shown as the pink hatched area on drawing 60283248-D-008-001.

The options explored are able to be faced with local stone to blend the new structure into the landscape using stone fascia panels or through specification of the surface finishes. These options are considered to be possible means of construction of the road approaching the bridge from the south west. Each option needs further detailed analysis and consideration post planning to identify which is the best to take forward. The options maximise the use of precast manufacturing whenever possible in order to reduce the length of time needed to close the road, to reduce the impact on the environment and to allow the works to be undertaken during temporary possessions of the road. In-situ casting will be reduced as much as possible to reduce the risk of contaminating the water courses.

A drainage scheme will be incorporated into the works on both approaches to the existing Gosen Bridge to attenuate and discharge the flow from the additional and existing road area into the Afon Gam. This will likely require new pipe work to be installed in the bridge abutments and the retaining structures, replacing the existing carrier systems draining to the north of the existing Gosen Bridge that will be impacted by the new bridge proposals.

Figures 2 to 4 detail three options for the construction of the retaining structures, with a focus on the works for the north western approach widening. All three options might be employed on both the north western and north eastern approaches with these methodologies being decided post planning with the construction for this bridge undertaken via Early Contractor Involvement under a Design and Build contract and with approval from local highway and bridge authorities.

4.4 Option 1 - Precast concrete L shaped retaining wall units

This option will require several overnight road closures depending on the number of sections installed, with the wall being constructed in short segments and lifted into place from the road using mobile cranage. This solution is proposed in areas where there is existing stone for the wall to be founded on .

This option requires works in the existing highway to allow for the placement and the backfill around the retaining wall units. This excavation, placement and backfill would occur during a possession of the road during an overnight closure. During these overnight road closures, a short section of the top of the embankment will be excavated and the ground prepared. The precast L shaped concrete retaining wall units will then be lifted in place and backfilled with 6N/6P fill. On completion of backfilling and compaction, the surfacing will then be reinstated and the road re-opened to the traffic. The number of concrete units will be limited to such that allows for the work to be completed within a number of step-by-step overnight road closures.

Alternatively sheet piles could be installed to allow for the excavation without affecting the existing road. This way the disruption to the existing road can be kept to a minimum, but it can only be done if there is sufficient and suitable ground in which to drive the sheet piles without hitting rock. The driving of the sheet piles would need possession of the road over-night and the impact to the nearby properties would need to be considered. Further consideration for the piling method will be required based on the stability of the existing slope and underlying rock which may be impacted by vibration. On this basis, it is likely that a non-sheet piled option would be preferred, depending on the underlying ground conditions.

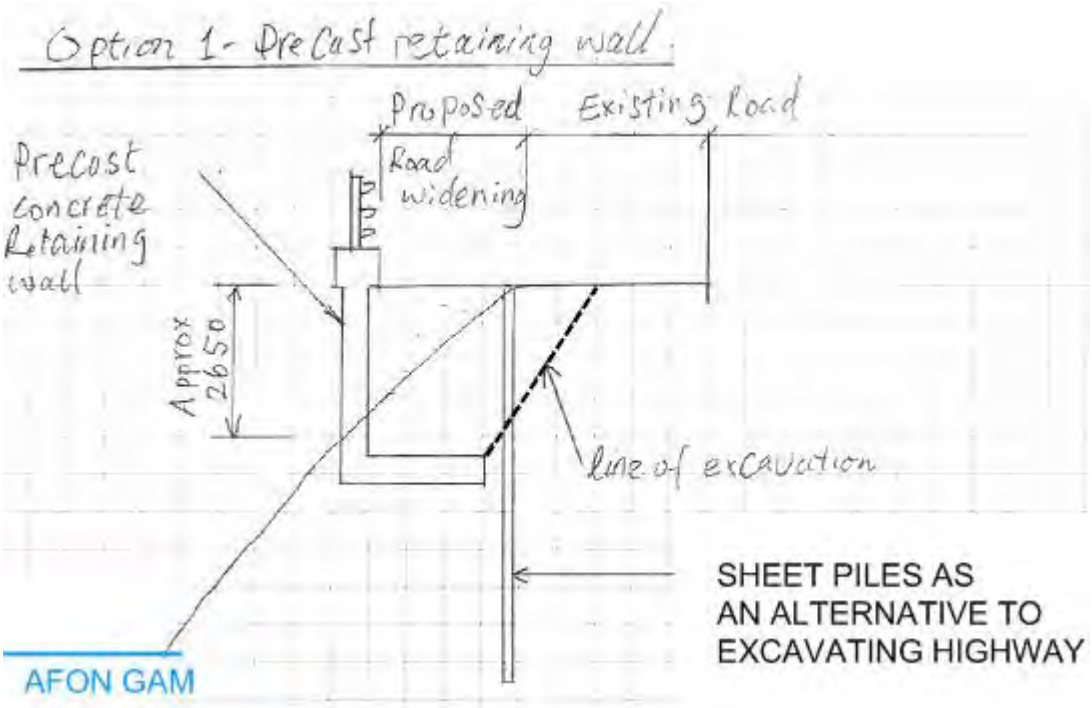

Figure 2 - Option 1: Precast Concrete Retaining Wall

4.5 Option 2 – Ground anchors and concrete panels

This option requires the construction of vertical concrete panels, secured using a combination of ground anchors and foundations drilled into the existing road and grouted. The precast concrete section on top of the panels to provide retention for the road slab and parapets. These ground anchors will be drilled into the underlying ground.

In order for installation of the ground anchors, a temporary 'crash deck' will be constructed from the bottom of the embankment from the proposed compound in the field on the Afon Gam meander to the north. Precast concrete walls will be fixed onto the ground anchors. Once secured the concrete panels will be backfilled with compacted 6N/6P fill. A precast or in-situ run-on slab will be constructed on top of the fill to provide the support to the safety barriers.

The advantage of this option is that all the works will be carried out on the temporary crash deck, and no road closure is required, except for the tie-in of road surface which could be accomplished under a single over-night closure after the installation of the new bridge deck and beams. This option requires vegetation removal on the existing embankment as well as works within the river for the crash deck. This option is reliant on the existing slope stability being sound, and the underlying geology being suitable for anchoring.

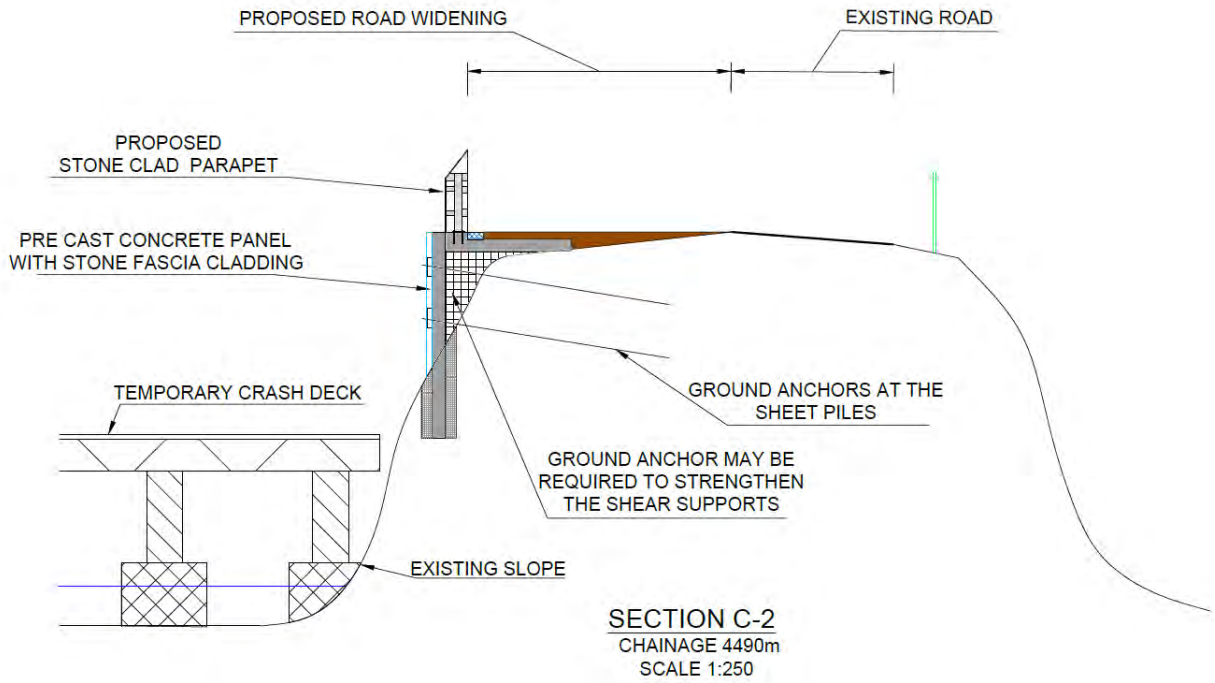

Figure 3 - Option 2 - Ground Anchoring and Concrete Panels – As proposed on Drawing 60283248-D-008-002

4.6 Option 3 – Cast in Steel Sheet Piles

Similar to Option 2, this option will require a temporary crash deck installed from the field to the north of Afon Gam and the Gosen Bridge up to the bottom of the embankment to provide a platform for the drilling and piling rigs. Continuous holes are to be bored into the rock along the proposed retaining wall position at the bottom of the proposed embankment profile to allow for sheet piles providing the lower retaining wall. These sheet piles may need to be laid along the existing river bank and river bed in order to provide support to the existing embankment. The sheet piles are lowed into these holes and the gaps will be filled with quick drying concrete. Ground anchors will then be drilled through these sheet piles into the underlying ground. The retaining wall will then be backfilled with compacted 6N/6P fill.

The base section of the precast concrete parapet unit would be constructed on the top of the embankment to provide support for a safety barrier.

The area between the safety parapet and the top of the sheet piles and cover beam can be in filled with soil to allow for a planting scheme to screen the works from the road and river. It is likely that a soil nailing and geogrid solution will be required to provide additional support to this embankment and to help establish vegetation on this slope. Further discussion of the proposed vegetation is detailed in Section 7 below.

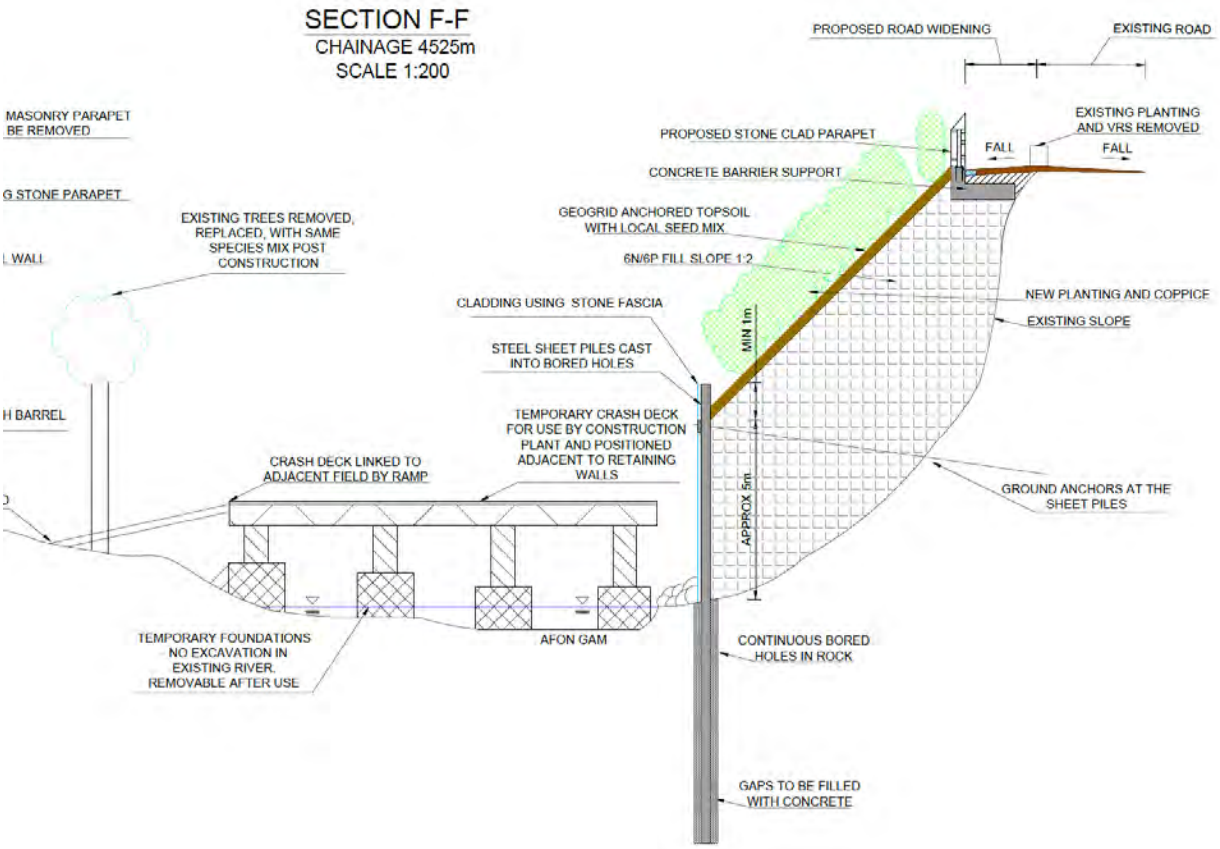

Figure 4 - Option 3 - Piles with Precast Concrete Parapet and Road Deck – As shown on Drawing 60283248-D-008-002.

5 Build ability and Access for Construction

The studies undertaken to date have focussed on the build ability of the bridge options with respect to reducing the impact on landscape, ecology, residents and users of the road. These areas are shown on the Gosen Bridge highway works plan, 60283248-D-008.

All options require the temporary use of three construction points for personnel, material and plant access:

- Northern Compound A - The existing field opposite Tywnedd Gosen Farm, for use as a turning area for HGVs, material storage and welfare facilities. Post construction, this area would be restored as a field with additional lengths of hedgerows being provided.
- Central Compound B - The area adjacent to the bridge to the north east will be regraded and cleared for construction access and the construction of a retaining structure. After the works, this area would be restored using a planting scheme with replacement trees and would be regraded to suit the former land form. Access to this small area will be for light tracked plant only or via foot and will be made via the rear of the existing property to the north east of the bridge. A strip up to 6m in width from the existing road edge and fence line will be used for access for construction of the approach road widening. The aim will be to reduce and remove impact on the existing mature trees in this location, however if during access to this area, existing trees need to be removed to gain access, they will be replaced post-construction.
- Southern Compound C - The existing field in the meander of the Afon Gam, to the north of the Gosen Bridge to be as a construction area for a temporary working platform in the Afon Gam River to allow the construction of retaining walls and abutments at river level. These would be accessed via the existing road and bridge and a temporary access at the existing field access. Post construction, this field would be restored with new trees planted along the river bank and a screening scheme to screen the construction from the river.

The temporary working platforms, or crash decks, in the Afon Gam and at the foot of the Gosen Bridge will be installed using low impact non-excavation solutions to provide a safe working platform for heavy construction plant. Limited works will be required along the existing river banks as well as some vegetation clearance and works within the river bed to allow for these platforms. The river bed will be restored to its previous condition once works have been completed.

Mobile cranes can be located on the existing carriageway to the west and east of the chapel and the Gosen Bridge to allow for the positioning of pre-cast concrete bridge components and retaining walls. Cranes will require the full width of the road and this will require closures of the road, which will likely occur over-night to reduce the impact of the closures on the road.

A further over-night closure will be required for the resurfacing of the road and the tie in of the bituminous road construction.

6 Landscape Impact and Mitigation

The key landscape and visual impacts are varied and will occur due to the following works.

The removal of mature trees and remodelling of ground levels in the area to the north-east of the bridge to enable the construction of the retaining structure will impact the existing character of the road. Although there will be removal of some trees, additional trees will be planted to offset the loss.

Photos 4 and 5 below show the north eastern embankment and the existing trees. The trees impacted by the works are detailed on drawing 60283248-D-008-001.

Photograph 4 - Existing Mature Trees on Embankment to the North East of the Gosen Bridge in area of Road Widening
Photograph 5 - Existing Bank Profile on North East of Gosen Bridge

The removal of vegetation from the steep slope to the west of the Gosen bridge to allow the construction of retaining walls and abutments adjacent to the river and the bridge. This is shown in photograph 6 below. All of the vegetation will be removed for the construction of the new bridge, as shown in drawing 60283248-D-008-001. Although this vegetation will not be able to be replaced in its current location, the proposals for the bridge and the retaining walls include for an embankment which will be planted to mitigate some of the loss.

Photograph 6 - Existing foliage and embankment on the north western side of Gosen Bridge
Photograph 7 - Existing stone retaining wall along the north western road down to the river

The introduction of a modern engineered bridge into a rural landscape, particularly as viewed from the local properties and from public footpaths to the north (on Pen Coed) and the widened carriageway of the road which could change the character of this currently narrow rural road. The impact of the bridge would be mitigated through the planting of new trees in the northern field opposite the Gosen Bridge post construction, as shown on drawing 60283248-D-008-003 and these trees would then screen the bridge from properties and public rights of way. The widened road is as a result of the works, but line markings and signage will be kept to a minimum to prevent this section of road being urbanised.

The loss of mature trees and ground remodelling will be minimised to enable re-creation of the character of the landscape in the longer term, and to integrate the new structures into the rural landscape. Trees will be replaced like for like, including Alder coppice along the river. This remodelling will be integrated into the detailed design phase of the scheme.

Local stone will be used to face retaining structures/ bridge and blend them into their surrounds. There are some existing retaining structures constructed from stone (e.g. to the north of the chapel, see photo 7 below) that could provide a reference point. These types of retaining structures are already being proposed for construction along the road as a part of the enabling works.

7 Ecological Impact and Mitigation

All of the options for the retaining structures and the bridge will necessitate the removal of a number of trees on the existing embankments and on the opposite river bank in the Afon Gam meander.

On these existing embankments, there are currently a number of rather spindly trees and a mix of hazel, birch and ash. There is little ground flora under the trees. Recent winds have caused several trees to fall opening up the bank and de-stabilising the soil at some points and this is shown in Photograph 1 above. All of the trees on this bank will need to be cleared to enable the proposed works. In addition a small section of hedge, comprising blackthorn, hawthorn, ash and hazel, will be removed to allow access to the works.

None of the mature trees adjacent to the existing property to the north east shown in Photograph 3 will be felled.

An otter survey was carried out within the river and no signs of otter were found. This will be repeated immediately prior to construction. A bat assessment of the trees has also been carried out.

No felling or hedge clearance will be carried out during the bird breeding season (March – August).

Following the works a selection of trees will be replanted at the top of the new retaining wall. These will be of a similar species mix to those lost. The trees will be planted fairly close together, and managed by coppicing to keep a dense cover and to prevent them getting too spindly causing future wind blow problems. Additionally, a geotextile soil retention solution will be explored to provide additional fixation for new vegetation.

The hedge will be replanted at the top of the new retaining wall in the area between the parapet and the embankment and will use the same species previously in the hedge, sourced from local provenance. All removed topsoil will be retained and local seed used to re-seed the embankments.

8 Summary

The Gosen Bridge and the road spanning it will be permanently widened to enable access to the Llanbrynmair Wind Farm by abnormal indivisible loads. To support this, a new structure adjacent to the existing bridge, as well as retaining walls to support the widened road will be built into the existing embankments. These are shown on drawings 60283248-D-008-001 and 002 in Appendix A.

The proposed works have an impact on the existing landscape and ecology at the Gosen Bridge and the need for mitigation against these impacts have been integrated into the proposals to produce a solution which balances these impacts. These proposed works will provide a long term community benefit by providing a new crossing which will allow two way traffic and improve safety.

Mitigation includes the planting of replacement trees, planting areas on the embankments and the use of natural stone products to face any retaining walls and embankments.

APPENDIX 10.1 - J: BUILDABILITY

Technical Note

AECOM

Project:	**Llanbrynmair Wind Farm**	Job No:	**60283248**
Subject:	**Buildability and Methods of Construction for Mitigation of Construction Traffic and AILs**		
Prepared by:	**Sebastian Reid**	Date:	**25/06/13**
Checked by:	**Steven Carmody**	Date:	**08/07/13**
Approved by:	**Kevin Martin**	Date:	**09/07/13**

Introduction

This note demonstrates:

- **the short and the long term impact of the enabling works have been considered with respect to the enjoyment and use of the road;**
- **that distruption within the scope area will be minimised during the construction, operation and decommissioning of the wind farm;**
- **how the temporary and permanent enabling works within the highway will be delivered, constructed, supplied**
- **the building processes for the works; and**

The Llanerfyl to Talerddig road has been sub-divided into three sections to assist in the referencing of the existing road conditions and the referencing of the works along the route. Each of these three sections have different traffic impacts from the Llanbrynmair wind farm and are designed using differing philosophies to suit these traffic impacts. These sections are as follows:

- Section 1 – Llanerfyl A458 (Chainage 0m) to Llanbrynmair Site Access 1 (Chainage 8250m) – 8250m in length. This section is proposed to be used for AILs only.
- Section 2 – Llanbrynmair Site Access 1 (Chainage 8250m) to Llanbrynmair Site Access 4 (Chainage 12350m) – 4150m in length. This section is used for both AILs and construction traffic arriving to site from Talerddig A470 and between the site accesses.
- Section 3 – Llanbrynmair Site Access 4 (Chainage 12350m) to Talerddig A470 (Chainage 17510m) – 5100m in length. This section is used for construction traffic only arriving to site from Talerddig A470.

General Mitigation and Buildability

The phasing of the scheme has been defined on the basis of gradually opening up access along the Talerddig to Llanerfyl road for construction of the wind farm internals.

As site accesses are opened up, further compounds will be constructed to establish welfare and storage facilities to further reduce the distance travelled for construction vehicles and plant. Beyond Site Access 1, enabling works to provide access to the site from Llanerfyl for the AILs will be supported from the compound at Site Access 1, and temporary compounds situated at Dolwen and at Gosen.

The mitigation methodologies for general construction traffic will be presented as a series of general method statements which will be applicable to the enabling works along the Llanerfyl to Talerddig road. These methods are general statements based on the width of the road and the location of works in an aim to simplify the overall strategies used for managing construction traffic on the road.

All of the proposals within the public highway employ traffic management techniques detailed within the Department for Transport's Traffic Signs Manual: Chapter 8. The most common use of this guidance document is in the provision of safety signage around works in the public highway used when works are undertaken in the verge and

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the road is kept open. An example of the road arrangement from Chapter 8 of the Traffic Signs Manual is shown in Figure 1 below. This methodology is employed across the scheme is best practice. The main purpose of using this methodology is to keep the existing traffic moving along the road and to minimise the need for closures and disruption to existing road users.

General technical details for standard practices including the installation of permanent and temporary signage, drainage and temporary works will be included in the LTMP.

Mitigation where the public highway is less than 4.5m in width

At locations where there is less than 4.5m of working space within the highway and the verges, mitigation will be constructed offline from third party land outside of the highway boundary within the red line boundary of the scheme. Additional working space outside of the highway boundary is being obtained for these works.

These areas of works will be constructed and accessed from outside the highway boundary, with a minimum road width of 3.0m being provided with a 0.5m working width on the public highway adjacent to the works. This will be delineated using temporary traffic management signage in accordance with Chapter 8 of the Traffic Signs Manual. An example of an appropriate road arrangement from Chapter 8 of the Traffic Signs Manual is shown in Figure 1 below.

The construction process for these works will include:

- Preparation of an off-road access route and temporary storage area outside the highway;
- Vegetation and Site Clearance, removal of topsoil;
- Open up access to public highway;
- Construct works up to road edge with traffic management;
- Construct back off-line; Reinstate and close up the public highway access; and
- Reinstate affected areas, eg fields, vegetation, coppicing, hedgerows, verges etc.

When the works are completed in this area, the temporary traffic management signage is removed.

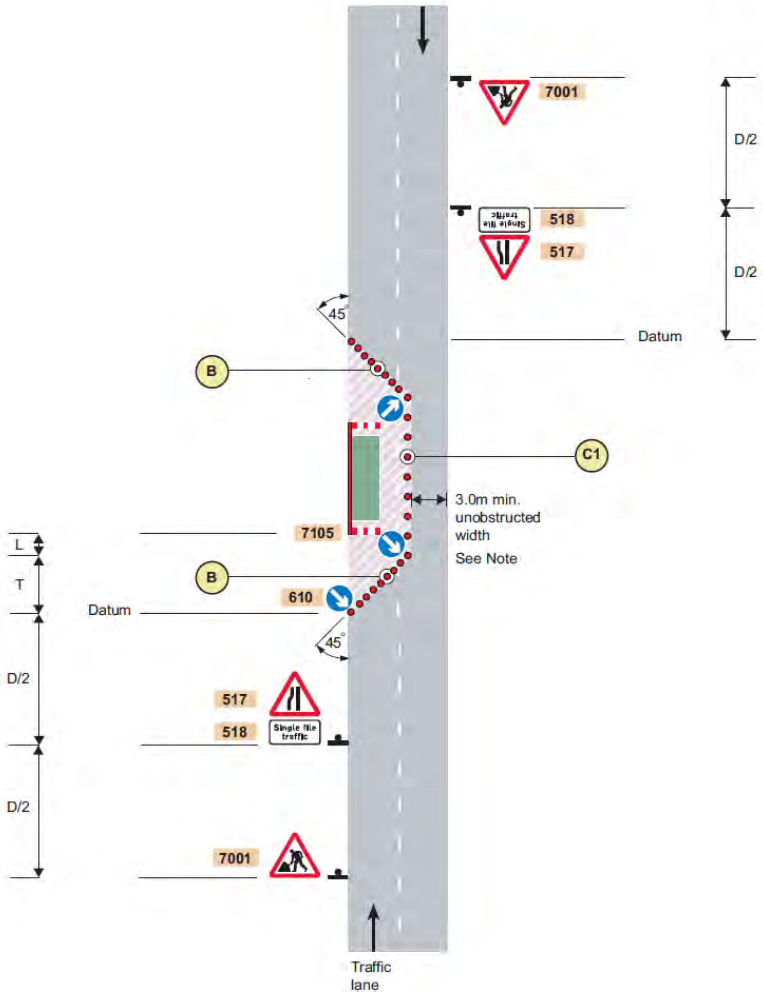

Figure 1 - Example of Traffic Management from Chapter 8 of the Traffic signs Manual

Mitigation where the public highway is more than 4.5m in width

At locations where the road is wider than 4.5m and there is an excess of 4.5m working width within the highway boundaries, the construction works will be able to be undertaken wholly within the highway with temporary traffic management installed on the road to ensure safe operation. An example of the road arrangement from Chapter 8 of the Traffic Signs Manual is shown in Figure 2 above.

A number of areas are considered small in nature and in these locations the construction methodology anticipates the use of small plant (e.g. mini-rollers rather than, for example, a JCB) in accordance with the scale of the works. For the larger sections of work, the space has been made available for larger machinery and equipment. This takes in to account safety and of road workers and the general public.

The works in the public highway will be undertaken to ensure that any detritus from the works will not impact passing vehicles or non-motorised users.

During the public highway works a minimum road width of 3.0m will be provided with a 0.5m working width between plant and passing traffic. A method of construction, using banksmen, reduced size plant or manual labour will be chosen depending on the working area available.

The construction process for these works will include:

- Vegetation and Site Clearance, removal of topsoil to allow vehicles to work and stop within the verge.
- Construct works up to road edge with traffic management;
- Reinstate affected areas, eg fields, vegetation, coppicing, hedgerows, verges etc.

When the works are completed in this area, the temporary traffic management signage is removed.

Llanerfyl A458 Junction – Section 1 – Chainage 0 – Drawing 60283248-D-041

This scheme has two designs. The first, which is the construction period arrangement, allows for the free movement of AIL vehicles from the A458 to the C2031. Post construction and AIL delivery, the junction will be modified again to install a fenceline across the access track to prevent use by members of the public.

At Llanerfyl, all of the works will be constructed from an existing field located to the south east of the existing road junction. The new off-road track will be wholly constructed with minimal traffic management installed onto the C2031 or the A458 except for warning signs.

At this location, materials for the construction of the works will be brought in from the A458 east in order to remove traffic from the C2031.

Gosen Bridge – Section 1 – Chainage 4450 - Drawing 60283248-D-008-001

The Gosen Bridge work, including the widening of the bridge, construction of the new retaining structures and the widening of the road are a multi phase series of construction works spanning a number of months. The works at Gosen Bridge will be supported by the construction of the enabling works in Section 1A from Site Access 1 east. The works at Gosen Bridge will take place as a part of the works ongoing to Section 1B to the east towards Diosg.

The construction of Gosen Bridge will require the establishment of three working areas as shown on drawing 60283248-D-008. These three areas will allow materials to be brought to site, works to be undertaken within the existing river valley, and for the installation of plant and new retaining infrastructure along the banks of the Afon Gam. The aim of these compounds will be to allow traffic to use the public highway through the works. The road through Gosen Bridge will be managed within a controlled site boundary. The road will be used as a haul route for materials as well as to transfer personnel and plant.

During the construction of the new bridge, and the retaining walls the road will require closures to allow cranage to be setup and pre-fabricated bridge sections to be lifted into place.

Further closures of the road will be required to install parapets and to surface the road, but these will be reduced as much as possible with works occurring in parallel. The majority of the works on the bridge will be undertaken off-line and accessed via the river bank through the use of temporary access solutions.

Post construction, the area will be replanted and restored as detailed on drawing 60283248-D-008-003 A detailed report demonstrating the engineering processes at the Gosen Bridge is included in the LTMP.

To the south of Gosen Bridge is a new off-road access track which bypasses existing topographical constraints and acts as a passing place for construction traffic. This infrastructure will be in place prior to the works at Gosen Bridge and will service as a haul road for the Gosen Bridge works. This access track will be constructed from third party land without requirement for closure or encroachment on the public highway, except for drainage and tie in works.

Dolwen Isaf – Section 1 – Chainage 7350 - Drawing 60283248-D-012

The Dolwen Isaf Bridge is a structure which requires remedial work to its parapets to accommodate AIL traffic as well as a large areas of over-run to the south of the bridge. The delivery of these works requires construction traffic to occupy the road space during the excavation of an existing slope to the south of the bridge. The road will not be closed during these works with traffic managed to use the new over-run areas constructed during the excavation of the southern slope. During the works on the bridge itself, these will be delivered via a closure of the footways on the bridge which will occur independently, in order to keep the right of way across the bridge open.

The off-road access track works to the north of the bridge will be constructed from outside of the highway boundary.

Site Accesses and Neinthirion Bypass

Five access junctions are required for the Site Accesses and the Neinthirion Bypass. For the bypass a further 1km of off-road access track with structures is required.

These works will be constructed from outside the highway boundary and tied into the public highway under traffic management.

These works will impact existing public rights of way. Site Access 1 will be constructed along the route of Glyndwyr's Way which follows the Llanerfyl to Talerddig road at that point. The construction works will be undertaken so as not to close this public right of way and to manage the flow of construction traffic when pedestrians and walkers are present. This will be done so using banksmen controlling construction traffic, giving right of way to pedestrians and other non-motorised users.

For the accesses to the Neinthirion Bypass, a similar process will be used, but in addition to the public right of way impact at the access junctions, the bypass crosses an existing right of way. At this location a new crossing has been proposed with gates provided on either side of the proposed bypass, tying into the existing wall and fencelines. These gates will inform walkers of the construction route and to be aware of crossing traffic. These gates will only be in place during the construction programme. During the construction of the bypass, at no point will this public right of way is closed, instead, short term diversions will be employed to ensure safe passage during the construction of the bypass.

At Site Access 2, where Glyndwyr's Way leaves the public highway and follows the site access road, a widened verge/footway will be constructed, with a managed crossing point at the proposed gate across the access junction used to ensure that non-motorised users are safe during the operation of this access. A possible temporary footpath diversion, routing the public right of way via a new footpath behind the proposed construction compound, may be proposed. The purpose of this will be to segregate construction traffic and non-motorised users to ensure that enjoyment of Glyndwyr's Way is not compromised during the construction period.

APPENDIX 10.1 - K: COLLETT REVIEW (ABNORMAL LOADS)

COLLETT
CONSULTING

Llanbrynmair Wind Farm
Powys
Design Review, Revision B

Project Number: 252165

Aecom

June 2013

Report Details

Report for
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Document Revisions

No	Date	Details
Draft	15/05/2013	Draft to cover 3 locations only
1st Issue	04/06/2013	Based on drawin 60283248-COLLETT290413
Revision A	18/06/2013	Update, based on drawing M_LLANBYNMAIR WIND FARM 120613
Revision B	27/06/2013	Update spelling errors

Contents

Company Profile

Collett & Sons Limited is a Company, established in Halifax over 45 years ago. The Company specialise in the movement of 'Out of Gauge' equipment throughout the UK and Europe. Our Company owns a modern fleet of over 40 vehicles and over 70 trailers, which are fully maintained in-house on our 5 acre site.

The day to day running of the business is fully computerised and we have direct contact with all the vehicles through GSM mobile telecommunications and satellite tracking. All employees of the Company are put through the in-house training program which encompass such areas as LGV, hazchem, forklift truck and associated specialist operations required for the use of steerable and hydraulic trailer equipment.

The Heavy Transport operations are co-ordinated centrally from our Halifax depot, and offer a range of services that include Heavy Transport, Industrial Services, Installations and Project Management.

Additionally, as logistical partners to the Renewable Energy Industry, we operate a Major International Strategic Transport and Logistics (MISTRAL) Point in Goole, where our Shipping, Heavy Lift and Port operations facility is managed. This enables our Company to offer a complete turnkey logistics and project management service for Shipping, Handling and Transport from point of manufacture through to site location.

Furthermore, by harnessing our unique expertise in this field we are able to offer an in-house transport consultancy, encompassing transport feasibility, route and site surveys, swept path analysis diagrams utilising the latest CAD technology and test drive of proposed routes to prove feasibility utilising our specialist steerable and hydraulic trailer equipment.

Further details of our Company and examples of the work undertaken can be viewed at our website, www.collett.co.uk

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	David Collett	-	Managing Director

Introduction

Collett Consulting have been appointed to provide a review of the road design proposals for abnormal load access from the A458 at Llanerfyl to the proposed three site entrances, 1,2 and 4 of the Llanbrynmair Wind Farm site.

The road design proposals have been provided by Aecom in the form of an AutoCAD drawing titled *M_LLANBYNMAIR WIND FARM 120613.*

Methodology

Using savoy AutoTrack to carry out Swept Path Analysis, the proposed route including all proposed modifications has been assessed for the following potential turbines, blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92.

In addition Google Earth was used to attain a visual representation of the route. A site visit was not conducted by Collett Consulting for this review.

The review is based on the results of the swept path analysis using AutoTrack combined with a visual assessment using Google Earth.

The review assessed the suitability of widening proposals in terms of sufficient swept area for the abnormal load vehicles required to deliver turbine components to the site. Additionally consideration was given to the gradients, crests and cross falls assessed using Google Earth.

It has been assumed that the light green colour block hatch areas are available for vehicle axles to use and that these areas will be prepared to accept suitable axle loads.

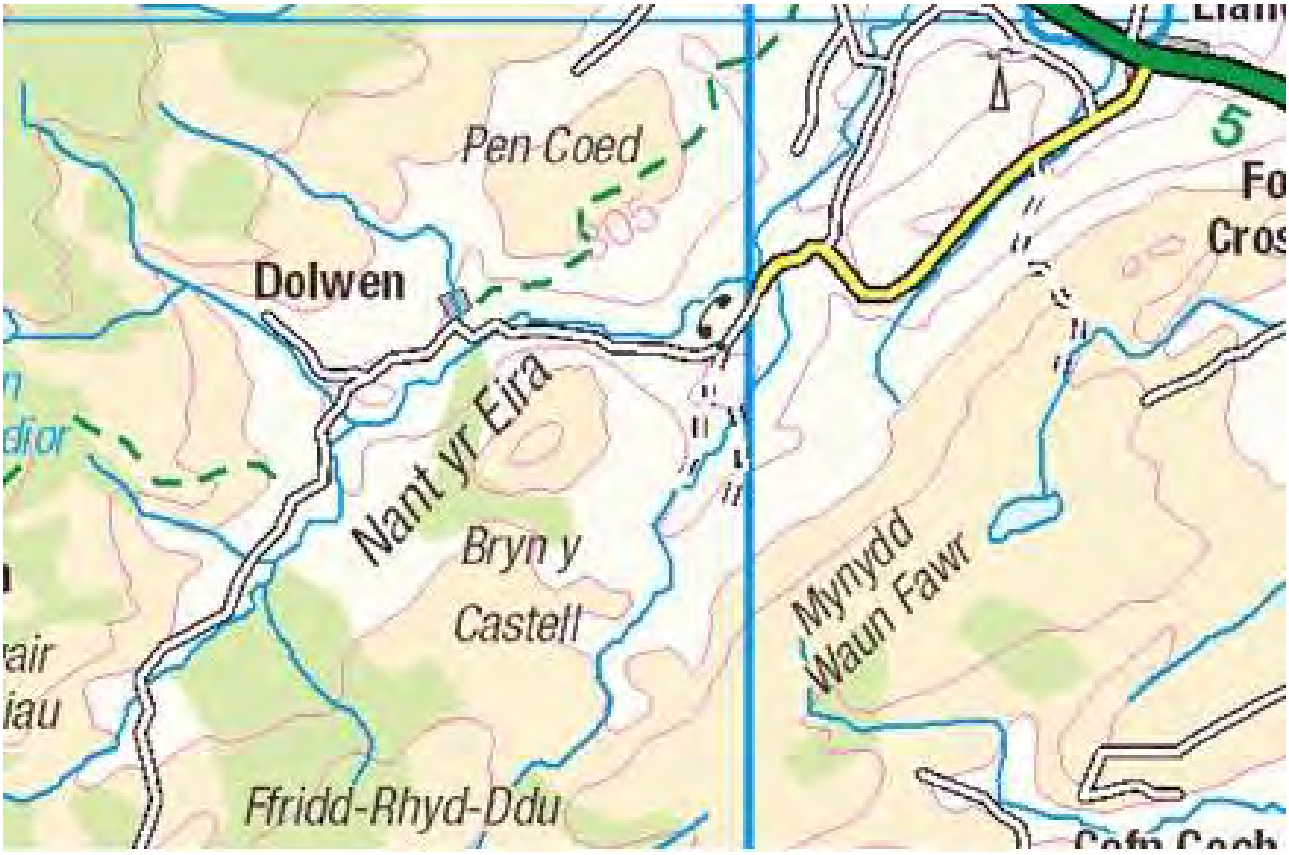
The analysis has been based on a 45.2m wind turbine blade vehicle and a 36m wind turbine tower section. The forward design speed of the AutoTrack analysis is set at 5km/h.

The review has informed changes in design based on the results; this report provides verification for the latest design with recommendations for any further design modifications.

Proposed Route

The route from the A458 at Llanerfyl, continuing on unclassified road to Site Entrance 4.

Map of Route

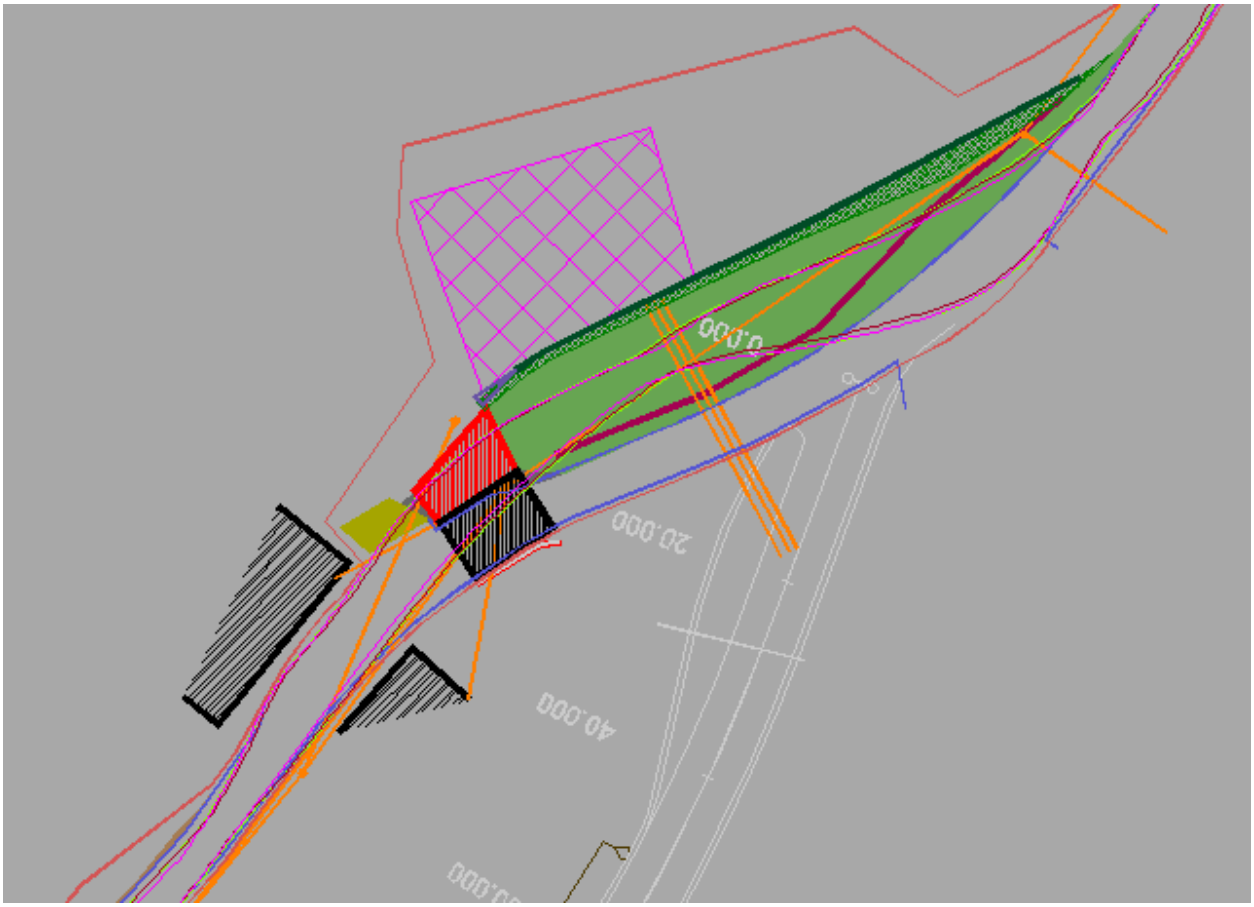


Turbine specification

The type of Turbine suggested for the purpose of this survey is: Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92.

It has been assumed that the blade will be delivered using standard extendable trailers with a rear projection, the tower sections will be delivered using tower clamp systems and the remaining components will be delivered on step frame trailers. It is advised that due to the camber and topography of the road that low loader trailers be avoided.

Example Photographs

Review
Chanage Area: 300 – 1000 The widening proposed in drawing *M_LLANBYNMAIR WIND FARM 120613* will provide a suitable path for the loaded components.
 Diosg. Chanage Area: 1000 – 1050
Diosg. Chanage Area: 1000 – 1050 The widening proposed in drawing *M_LLANBYNMAIR WIND FARM 120613* will provide a suitable path for the loaded components.
Chanage 1050 – 1400 The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

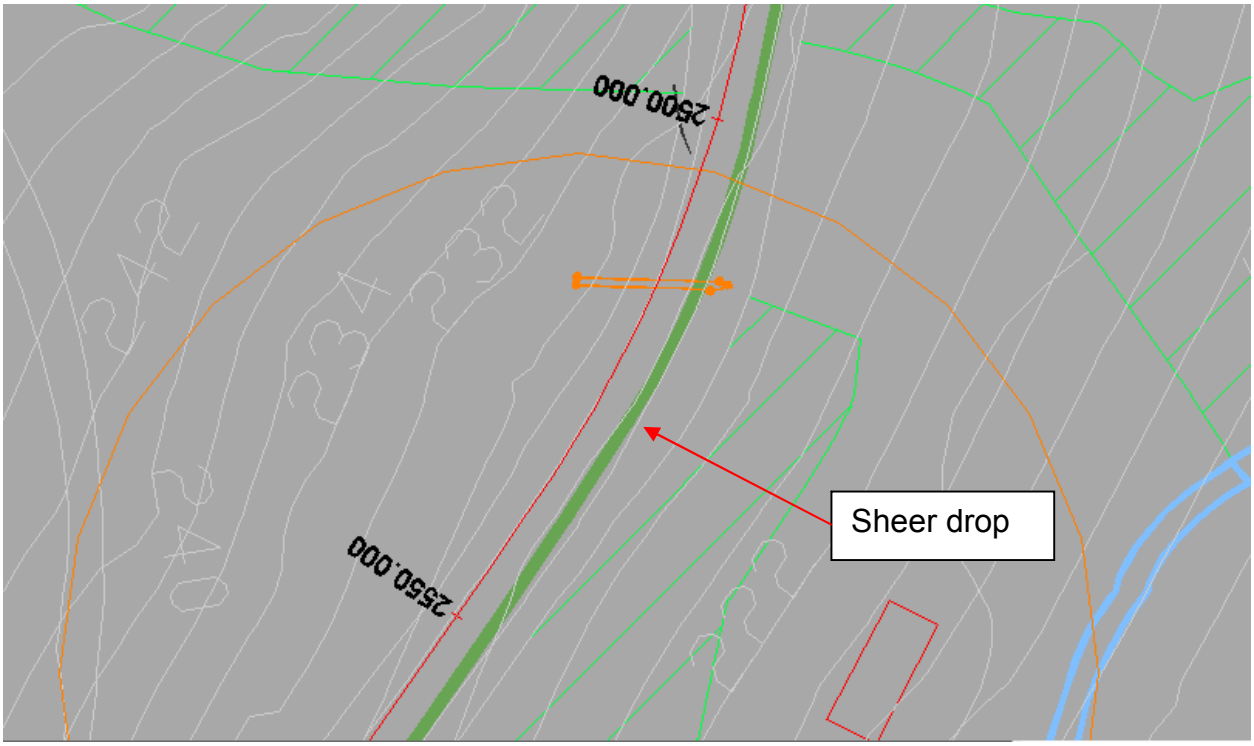
Chanage Area: 1400

Chanage Area: 1400

Widening propsed across splitter. Its essential that the widening is brought upto the level of the exising road leading to the site to avoid excessive cross fall.

Chanage Area: 1400 - 2500

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



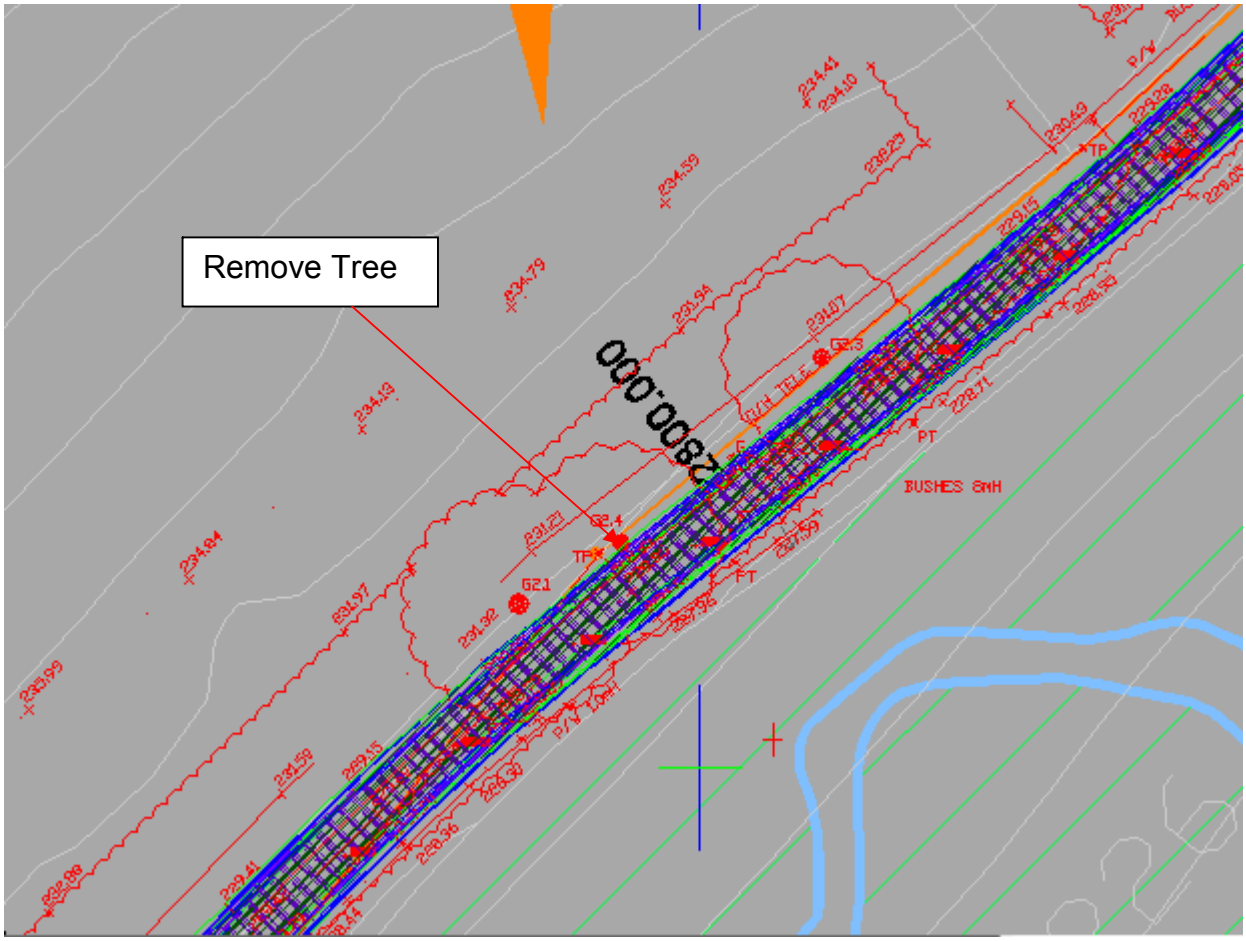
Chanage Area: 2500 – 2550

Chanage Area: 2500 – 2550

Widening propsed across near side. The heavy wide tower sections and nacelles will required to use this widened road area to run axles on to avoid the hedges and telegraph posts on opposite side of the road. Collett have concerns over the proposed widening being directly along a sheer drop, potential for unsafe ground and potential to lose vehicles over the edge at this section.
Highly recommend that widening is taken on the offside and the hedges/trees and telegraph posts removed. If widening is not possible on the offside then it is essential that the loading capacity of the widening on the near side is engineered to ensure a suitable surface and barriers in place to prevent vehicles leaving the road surface.

Chanage Area: 2550 - 2800

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



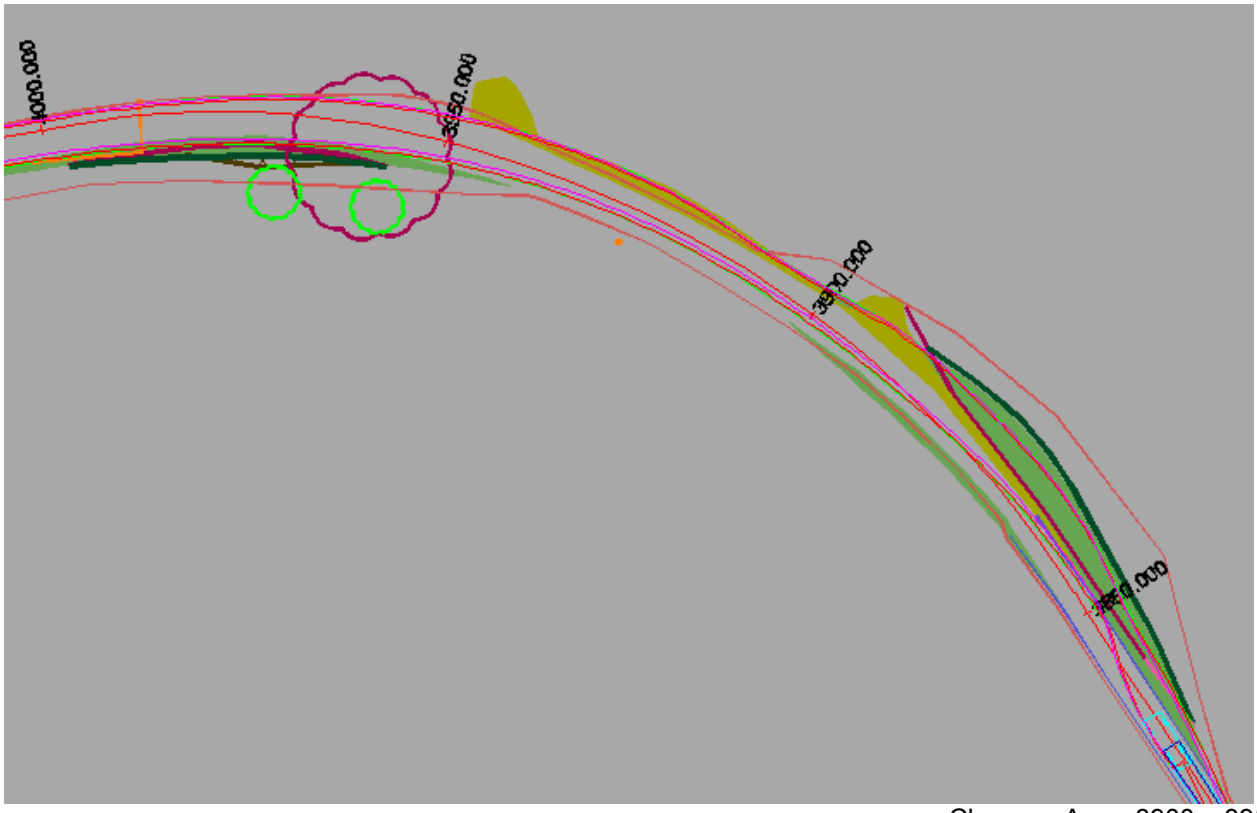
Diosg. Chanage Area: 2800

Diosg. Chanage Area: 2800

Tree to be removed for wider components

Chanage Area: 2800 - 3900

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



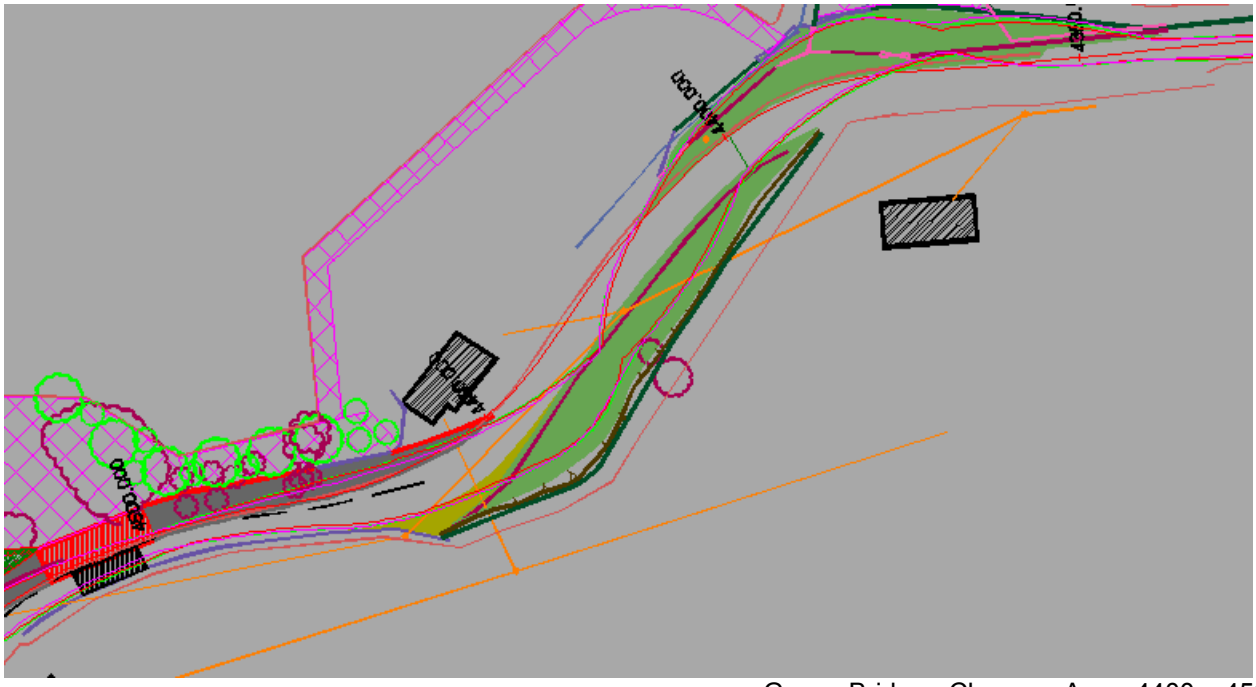
Chanage Area: 3900 – 3950

Chanage Area: 3900 – 3950

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 3950 - 4400

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



Gosen Bridge. Chanage Area: 4400 – 4500

Gosen Bridge. Chanage Area: 4400 – 4500

The design has been amended to keep a shallow turn at the bottom of the gradient to minimize the risk of jack knifing at the point. The existing bridge will be replaced as per the design in drawing M_LLANBYNMAIR WIND FARM.

Chanage Area: 4500

Chanage Area: 4500

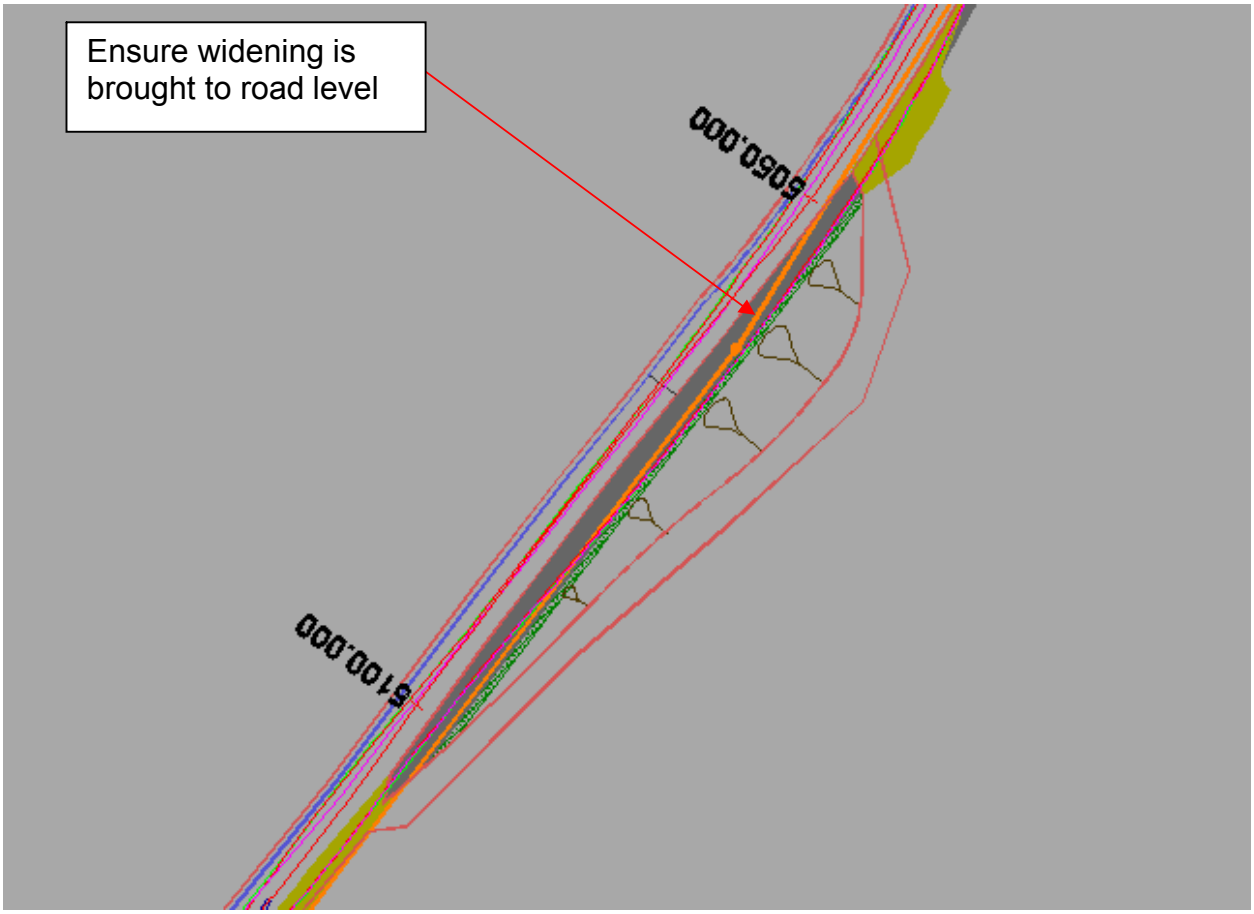
Ensure widening proposed is brought to ground level to avoid excessive cross falls

Chanage Area: 4700 – 4950 – Off Road Track

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 4950 - 5050

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



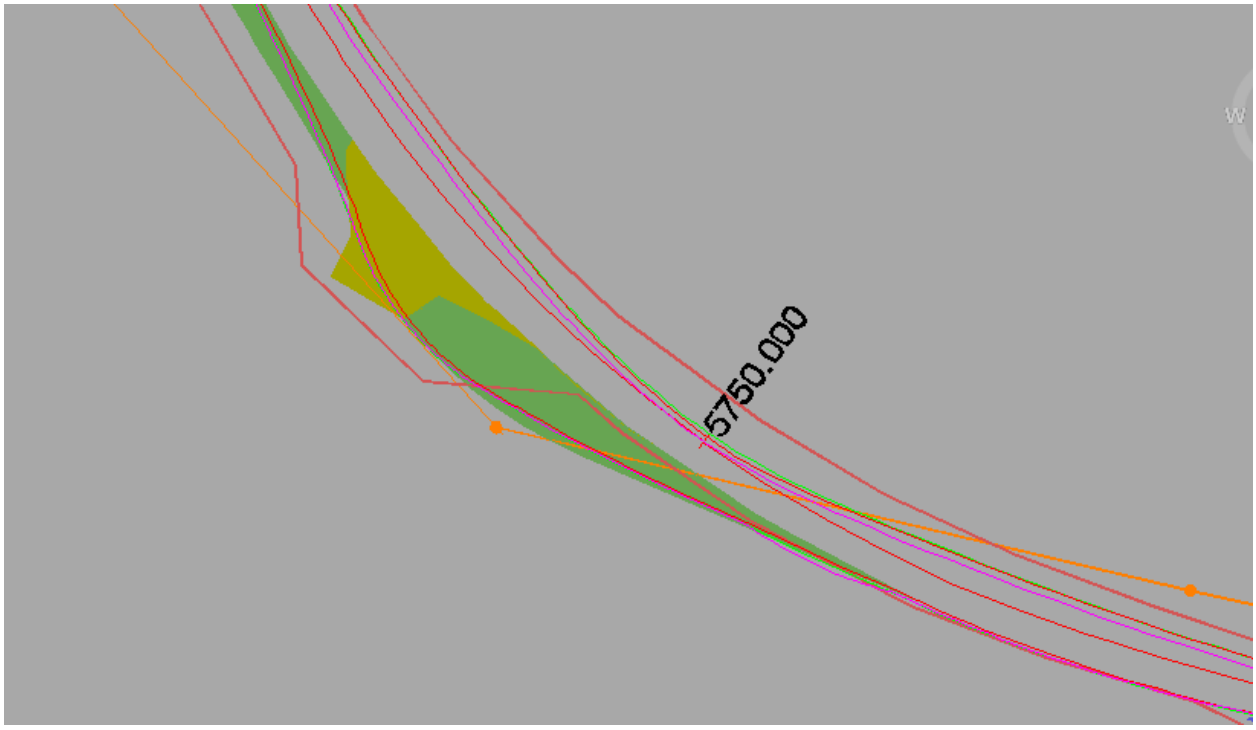
Chanage Area: 5050

Chanage Area: 5050

Ensure widening proposed is brought to ground level to avoid excessive cross falls

Chanage Area: 5050 - 5750

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



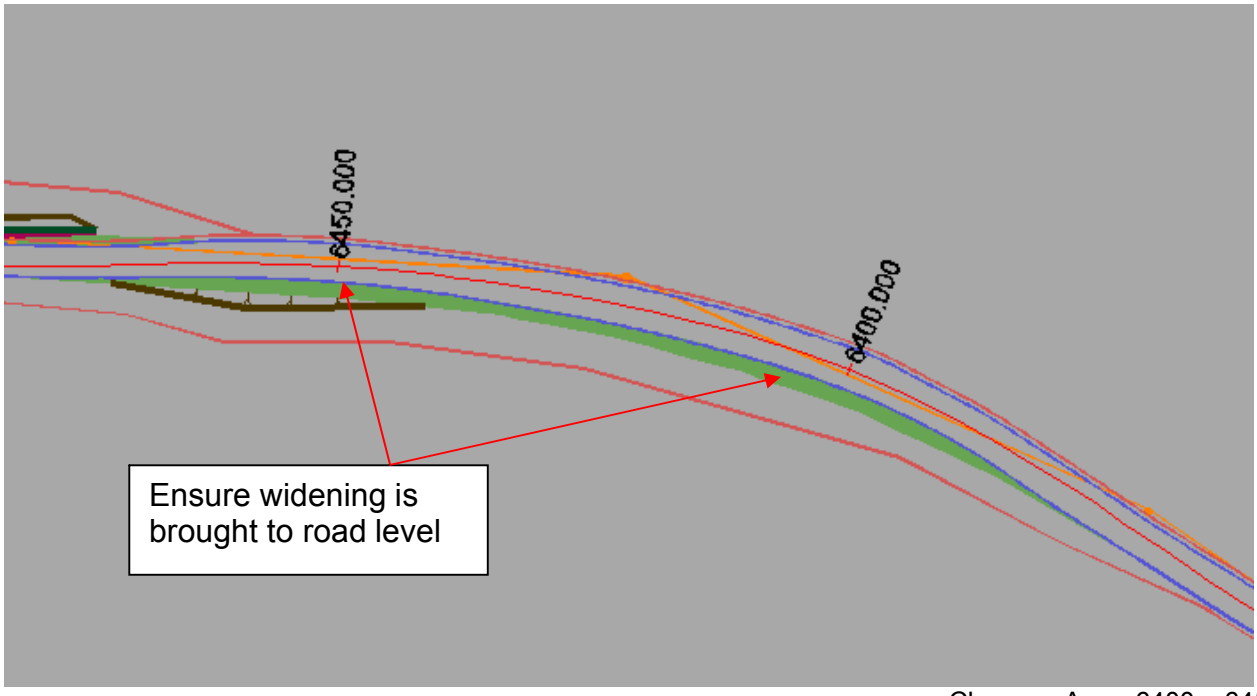
Chanage Area: 5750

Chanage Area: 5750

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 5750 - 6400

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



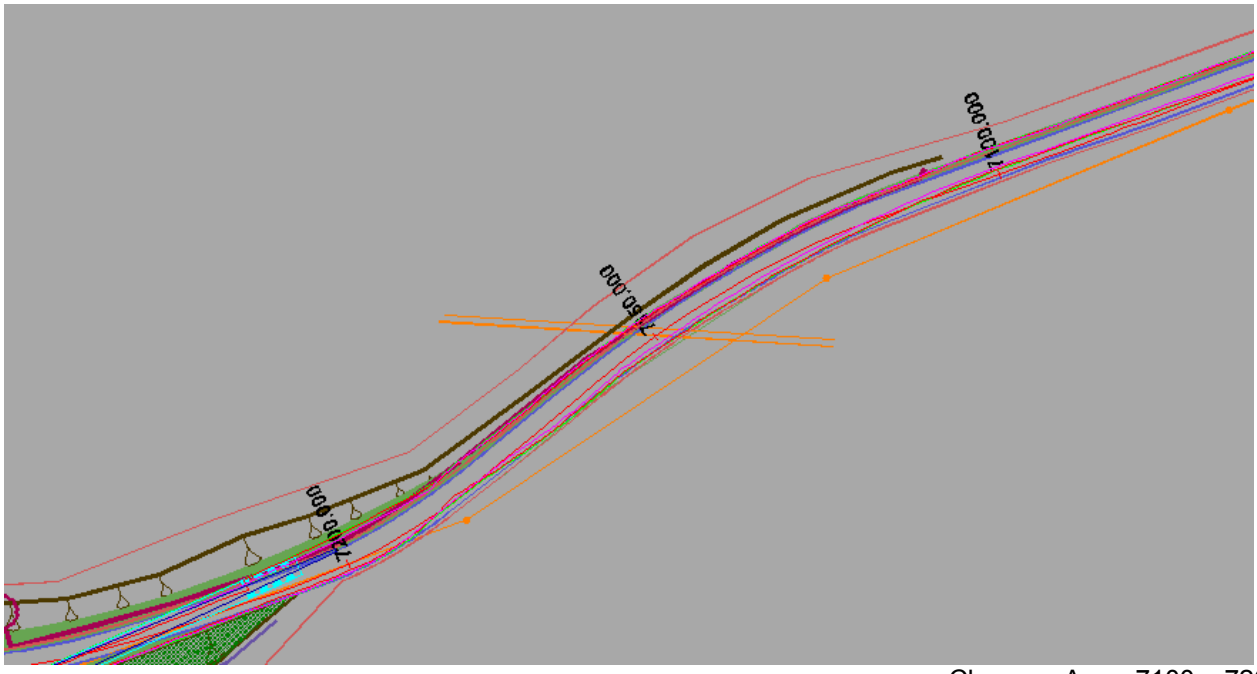
Chanage Area: 6400 – 6450

Chanage Area: 6400 – 6450

Ensure widening proposed is brought to ground level to avoid excessive cross falls

Chanage Area: 6450 - 7100

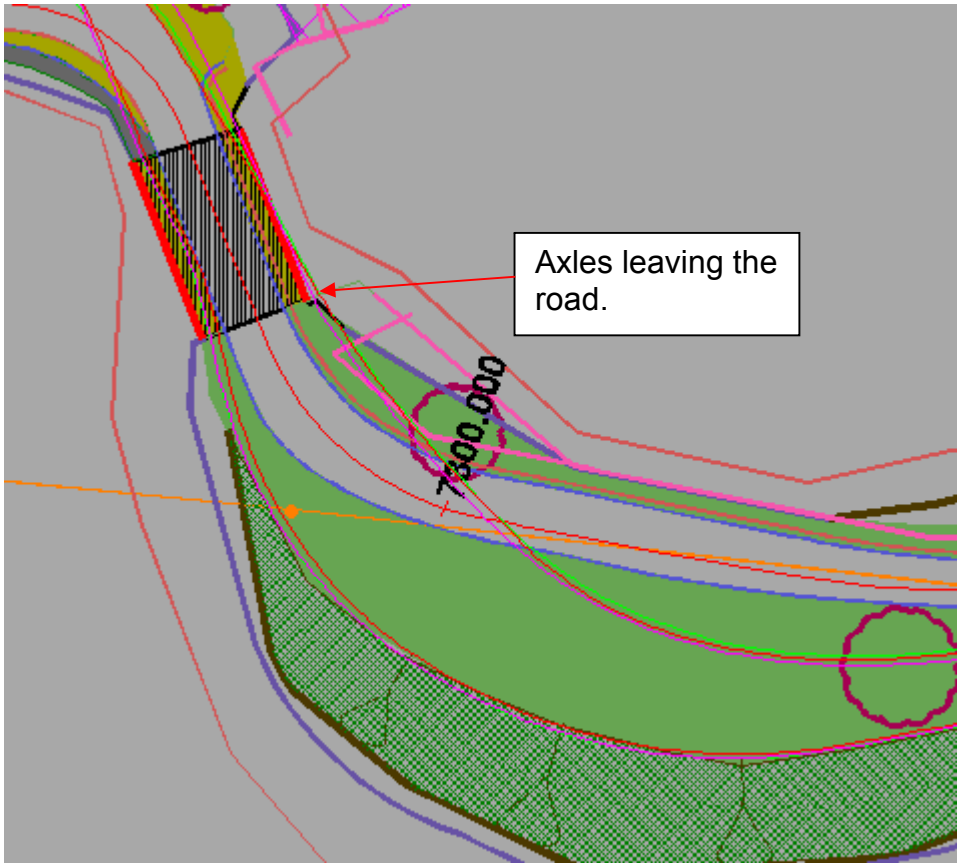
The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.



Chanage Area: 7100 – 7200

Chanage Area: 7100 – 7200

Additional widening required by approx. 0.5m allowing the components to negotiate this section.



Dolwen Isaf. Chanage Area: 7200 – 7650

Dolwen Isaf. Chanage Area: 7200 – 7650

Using the current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* loaded vehicle can not negotiate the bridge with out collision with the parapets and leaving the road.
To avoid this, a number of proposals are viable:

1) Additional widening to the south prior to the bridge. Widening will be required across the complete dark green hatched area to the south of the existing widening shown in as a light green colour block.
2) Widen the initial section of the bridge to accommodate the swept area of the vehicles.
3) Carry out manual steering at this pinch point to avoid striking the bridge parapets, it is recommended that the proposed widening be completed to aid manual steering. Manual steering will impact on delivery times significantly.

Chanage Area: 7650 - 8050

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 8050

Chanage Area: 8050
Possible area for grounding of trailers.

Chanage Area: 8250 Including Site Entrance 1

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 8250 - 8900

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 8900 – 9600 – Proposed bypass.

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 8900 – 10100 – Including Site Entrance 2.

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: 10100 – 10600.

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Chanage Area: Between 10600 and 10650

Chanage Area: Between 10600 and 10650

The fence posts and fencing on Cattle Grid to be removed on both sides, widening is proposed on the offside.

Chanage Area: 10650 – 12350 – Including Site Entrance 4.

The current proposals in drawing *M_LLANBYNMAIR WIND FARM 120613* are suitable for the delivery of the wind turbine components Blade Length 45.2m, 80m Hub Height – N90, V90, S93, MM92 along this section.

Important Notes

1. The recommendations in this report are made from a purely transport orientated view, and do not consider any political issues in terms of land ownership, or any other precincts raised that may otherwise be restrictive.

2. The information concerning current proposal for modifications to the current road network has been provided by Aecom in drawing *M_LLANBYNMAIR WIND FARM 120613*. It has been assumed that the light green block colour hatched areas are areas planned for widening and will be prepared to accept suitable axle loads.

3. The information contained in this report is privileged and confidential and is for the exclusive use of the client nominated herein.

4. A Police escort or pilot car will be required for nacelle, towers and blade component trailers in order to assist with traffic control for the entire route surveyed.

5. Permits will be required for the movement of all of the components. Form 'BE16' permits will also be required to undertake the movement of the blade and bottom tower components. These permits are at the discretion of the Highways Agency (H.A). Therefore, approval of these permits by the H.A are a major consideration before any movements can be undertaken.

6. It is recommended to have adequate warning signs implemented to warn other road users at critical points.

7. All hedges, shrubs, bushes, trees and overhanging branches along the nominated routes must be trimmed to allow a minimum envelope on the road of 5.0m wide by 5.0m high.

8. All street furniture, signage etc. along the nominated route must be removed to allow a minimum envelope on the road of 5.0m by 5.0m. Other specific street furniture has been nominated in this report to facilitate over-sailed and swept areas.

9. The turbine manufactures transport guidance notes will state the minimum road width required for the transport of components. Any roads below this stated width will require widening to reflect this. Collett recommend a road width of at least 4.5m.

10. In areas where land take or road widening is required, the road construction must be formed to the minimum specification suitable for the transfer of axle loadings up to 16Te, the road construction must be formed to the minimum specification contained in the turbine manufacturers transport and erection guidance notes.

11. The maximum gross vehicle weight anticipated for a 90m diameter rotor turbine could be the nacelle at over 100Te. Therefore, a full Route Access Survey (RAS) is recommended, in order to determine the acceptability of gross vehicle weights and axle loading issues, for bridges, culverts and structures for the entire route, the results of which have not been applied for in terms of the depth and level of reporting required for this report.

12. A test drive of the route with an empty blade trailer, from the commencement point of this route to site entrance is recommended. This is in order to verify the facts contained in this report and proof test the requirements for road alterations horizontally and vertically. The test drive should be completed with an empty trailer, so that in an emergency or at the points where land take has been recommended, but not progressed, or in the case of vertical issues there is insufficient ground clearance, the trailer can be closed until it is past the hazard. The test drive should be attended by turbine manufacturers, project managers, Police, Highways & County Council representatives and other interested parties with responsibility for road alterations.

13. It should be noted that all assessments and inspections have been done so with the intention of producing information to highlight anticipated problems. This includes highlighting of potential land take requirements, possible street furniture implications, and highway alignment issues.

14. All inspections and assessments are made for the road movement of loaded trailer equipment carrying Turbine components. These dimensions are based on the turning circles and specification of Collett & Sons trailer equipment.

15. The assessments, and subsequent conclusions and recommendations are deemed accurate by Collett & Sons Limited at the date that this report is created. We cannot be held responsible for the development of future road schemes or alterations to the routes surveyed that may leave this report inaccurate.

16. This report is based solely on swept path analysis completed on mapping data and highway modification proposals provided by Aecom and visual inspection using Google Earth only. Nothing in this report shall be construed in any way as committing Collett & Sons Limited to being able to deliver turbines to site using this route before a test drive has been undertaken, and any accommodation/remedial works undertaken which are to Collett & Sons satisfaction.