Location Specific Mitigation Measures

7.4 The assessment contained within the Environmental Appraisal (Traffic and Transport Chapter 12) identified a need for mitigation measures at a number of locations within the Study Area.

7.5 Table 7-2 presents the location-specific mitigation proposed during the construction phase of the Proposed Project, to reduce impacts and potential environmental effects arising as a result of the forecast increases in traffic volumes.

Table 7-2: Proposed Mitigation During Construction

Link Ref	Location	Location Specific Mitigation Proposed	Reference
2	A497	Traffic management to be agreed with Highways Authority on the approach to the A497/NCR8 junction. This would include, if required, a temporary speed limit reduction, introduction of high-friction surfacing, and advanced warning signage.	5,2,6
3	NCR8	Carriageway widening along route to tunnel head house access to provide passing places/ total carriageway width of 6.0m minimum (Figure 2.1). Traffic management along route to include a temporary speed limit reduction, and advanced warning signage. The use of traffic marshals located at tunnel head house access and A497/ NCR8 to communicate presence of walkers and cyclists or to hold release of HGVs from site compound. Typical HGVs used for the construction of the Proposed Project would be to the required Euro Class and could have additional cycle friendly measures such as cameras, sideguards, full length door windows, blind spot warning systems and additional mirrors (Class V and Vi).	2,5,6,7,12,14
11a	A496N	Traffic management along route to include advanced warning signage and temporary speed reduction to 30mph from Pont Briwet /A496 junction to site access. Where long distance walking routes (LDWRs) and cyclists cross the link, additional signage would be located to alert drivers to the presence of crossing pedestrians and cyclists.	5,6

7.6 It should be noted that in addition to those measures listed above the contractor(s), in agreement with the Highway Authority and National Grid, may identify a need to implement additional measures. Section 8 sets out how the CTMP is expected to be implemented during the construction phase.

8. Monitoring and Review

Communication

8.1 As a 'live' document, the management and mitigation measures included in the Outline CTMP would be developed during the construction programme within the detailed CTMP.

8.2 The Traffic Safety and Control Officer (TSCO), would be expected to continually engage with key stakeholders and the community as necessary and relevant. This could include a regular dial-in between stakeholders including the emergency services, North Wales Police and Highway Authority, for example.

8.3 It would be the role of the TCSO to act as an intermediary between National Grid, the contractor and key stakeholders to maintain open and regular channels of communication so that any effects on the transportation network associated with the Proposed Project may be addressed as soon as reasonably practicable.

8.4 Through effective and regular communication between National Grid, the appointed contractor(s), and stakeholders, the TCSO will:

- *Communicate and monitor the CTMP and its mitigation measures;*
- *Ensure records of HGV movements are maintained and reported;*
- *Act as the first point of contact for the public, stakeholders and contractors;*
- *Hold regular update meetings with Highway Authority and relevant stakeholders;*
- *Record near misses, incidents and hazards and resolve issues as informed by contractors, stakeholders and the public; and*
- *Monitor, review and improve, where necessary, the CTMP and associated mitigation measures.*

Compliance, Enforcement, and Corrective Measures

8.5 The detailed CTMP, developed on appointment of the principal contractor and following the planning process, would include specific measures describing how the contractor will ensure adherence to the mitigation measures proposed.

8.6 This would include details around the following:

- *The Traffic Safety and Control Officer's role and responsibilities;*
- *The Delivery Management System;*
- *HGV identification and tracking technology; and*
- *A highway inspection, monitoring and repair strategy, to be deployed during the construction of the Proposed Project.*

8.7 Continued stakeholder engagement by National Grid and the appointed contractor(s) would help to ensure that any issues are recorded, addressed and that appropriate corrective measures are implemented in accordance with the CTMP objectives.

Annex A: AIL Report

Nunn, Clive

Subject: FW: A487 Bontnewydd Bridge

From: Daisy Gosling [mailto:daisy.gosling@wynnslimited.com]
Sent: 02 April 2019 10:34
To: Nunn, Clive <Clive.Nunn@wsp.com>
Cc: Andy Pearce <andy.pearce@wynnslimited.com>
Subject: FW: A487 Bontnewydd Bridge

Good morning Clive,

Hope you are well.

Following Andy's email of 31.08.18, please see below email from North Mid Wales Trunk Road Agency ref Glaslyn and Snowdonia loads (highlighted in yellow).

This latest update we have been chasing for some time, regarding the problem structure on the A487, and now means that your loads can access your sites in North Wales.

If you require any further clarification, please do not hesitate to contact us.

Best regards,
Daisy

From: Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>
Sent: 26 February 2019 14:32
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales
Subject: RE: A487 Bontnewydd Bridge

Daisy

The loadings from the vehicles given with your e-mail below have been checked and the results are as given below:

Assessments of the four proposed vehicles have been undertaken as requested and all can pass, although some need to have additional control measures to movement.:

Snowdonia Cutting Head - Dwg No 18-954.TC01 Vehicle can pass over bridge
Glaslyn Cable Drum – Dwg No 18-953.TC01 Vehicle can pass over bridge
115te Transformer 3.0m Width – Dwg No FH-Ffest18-TC01 Vehicle can only pass at speeds less than 10mph and should follow East kerbline (Southbound Carriageway).
115te Transformer 2.7m Width – Dwg No FH-Ffest18-TC02 Vehicle can only pass at speeds less than 10mph and should follow East kerbline (Southbound Carriageway).

At present Bont Newydd has had intrusive investigations which have confirmed the presence of grouted backing to the bridge arch which can be accepted to extend up to 1.5m above the arch springing. The analysis and results above have been carried out based on this level of backing.

Due to high water levels in the river the current investigations had to be limited. However there is an intention to undertake further investigations to determine if the backing actually extends higher than the known location of 1.5m above the arch springing. It there is backing higher than current investigations this will provide further improvements to the structure capacity.

It should be noted that should additional depth of structural backing be found, the two 115te Transformer vehicles will be able to pass over the bridge without additional control measurers; it would therefore be worth checking vehicles again in the future if this influences your study.

If any further information or clarification is required do let me know. I trust this information meets your needs.

Regards

Martin Jackson
Prif Reolwr Strwythurau / Principal Structures Manager
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent
Automobile Palace, Temple Street, Llandrindod Wells, Powys, LD1 5HU
' 01597 829581
' 07789 654014
* martinjackson@nmwtra.org.uk
Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Bydd y ddwy iaith yn cael eu trin yn gyfartal o dan bob amgylchiadau / Both languages will be treated equally in all circumstances.

From: Daisy Gosling <daisy.gosling@wynnslimited.com>
Sent: 22 February 2019 15:31
To: Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales
Subject: RE: A487 Bontnewydd Bridge

Hi Martin,

Thanks for getting back to me so quickly.

Apologies for that – our mistake!

Please see attached 42te tractor unit that matches the axle loads in the load table of our drawing. Please note that tractor and draw bars are interchangeable, and these are indicative dimensions only.

Hope that clarifies.

Best regards,
Daisy

From: Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>
Sent: 22 February 2019 15:23
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales
Subject: RE: A487 Bontnewydd Bridge

Daisy

I thank you for your e-mail below dated 19th February. I can confirm that Gwynedd should have time to look at the loadings of the various AILs potentially crossing A487 Bontnewydd Bridge in the next week.

However they have looked through the load information provided and they think it may be missing the appropriate axle spacing for the 115te transformer loads. I hope you can assist with resolving a couple of queries. In the attached they have circled the axles and loads of the tractor unit, there appears to be three indicated in the elevation and four in the table. Can you confirm this information please? Can the number of wheels and spacings on the tractor unit axles also be confirmed please?

Regards

Martin Jackson
Prif Reolwr Strwythurau / Principal Structures Manager
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent
Automobile Palace, Temple Street, Llandrindod Wells, Powys, LD1 5HU
' 01597 829581
' 07789 654014
* martinjackson@nmwtra.org.uk
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Working on behalf of the Welsh Government

From: Daisy Gosling <daisy.gosling@wynnslimited.com>
Sent: 19 February 2019 17:10
To: Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales
Subject: RE: A487 Bontnewydd Bridge

Hi Nic,

Thanks for getting back to me.

Oh, some good news!

Please see the attached loads that I provided to Steven on the original email of this thread.

Let me know if you require any additional information.

Best regards,
Daisy

From: Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>
Sent: 19 February 2019 16:59
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>
Subject: RE: A487 Bontnewydd Bridge

Daisy,

The recent concerns over the bridge due to the initial assessment for AIL loading have been alleviated following further examination and re-assessment.

If you can provide details of exceptional loads now would be a good time to check them.

Regards,

Nic
Nic Wright
Prif Reolwr Strwythurau (Gogledd) ~ Principal Structures Manager (North)
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru ~ North & Mid Wales Trunk Road Agent
NMWTRA, Fullbrooke Buildings, Halkyn, Holywell, Flintshire, CH8 8BY
(Halkyn 01352 782120 / Mob 07971 674126
* nicwright@nmwtra.org.uk

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

From: Daisy Gosling <daisy.gosling@wynnslimited.com>
Sent: 15 February 2019 14:37
To: Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Alun.W.Jones@gov.wales; Andy Pearce <andy.pearce@wynnslimited.com>
Subject: RE: A487 Bontnewydd Bridge

Good afternoon Nic,

Hope you are well.

I've just tried to chase an update from Steven regarding the below, however I have been told he is on leave for a week from today.

Is this something you could provide an update on in his absence?

Best regards,
Daisy

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Sent: 08 February 2019 11:20
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: Alun.W.Jones@gov.wales; Andy Pearce <andy.pearce@wynnslimited.com>
Subject: RE: A487 Bontnewydd Bridge

Hi Daisy,

Thank you for your email. This is just a holding response whilst I consult with structures. I will be back in touch with a response.

Kind regards
Steve

Steven Gruffudd King LLB PGDip
Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
Network Occupancy and Abnormal Loads Officer
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent
Neuadd y Sir, Aberaeron SA46 0AT
(01545 571960
* stevenking@nmwtra.org.uk

From: Daisy Gosling <daisy.gosling@wynnslimited.com>
Sent: 06 February 2019 12:44
To: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Cc: Alun.W.Jones@gov.wales; Andrew Pearce <Andy.Pearce@wynnslimited.com>
Subject: A487 Bontnewydd Bridge

Good afternoon Steven,

Hope you are well.

Following the ongoing discussions regarding Bontnewydd Bridge, south of Caernarfon, we are still seeking confirmation of the structure's suitability for various loads required in North Wales.

Please find attached proposed loadings for your consideration, detailing the following;

Glaslyn & Snowdonia Projects

- Drawing Number 18-953.TC01 (43.35te Cable Drum) - 4 axle goose neck low bed trailer at 81.35te gross weight

- Drawing Number 18-954.TC01 (50te Tunnel Boring Machine Cutterhead) - 4 axle steerable step frame trailer at 79te gross weight (5m wide)

Ffestiniog Power Station (115te Transformer)

- 10 axle flat top trailer at 147.5te gross at 3m width
- 10 axle flat top trailer at 146te gross at 2.7m width

If you could please get back to me with an update regarding Bontnewydd Bridge only in this instance, we would be most grateful.

Trust this makes sense.

Please let me know if you require any further information or clarification.

Best regards,
Daisy

Daisy Wynn
Route Co-ordinator

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(Email Signature yet to be updated)

Abnormal Indivisible Load Access Study - Transportation of Tunnel Boring Machines to proposed locations for Snowdonia Visual Impact Provision

Prepared for WSP

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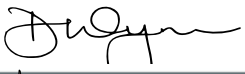
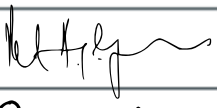
Prepared by:	Daisy Wynn		06.09.18
Checked by:	Peter Wynn		07.09.18
Approved by:	Andy Pearce		10.09.18

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DOCUMENT REVISIONS

Issue	Date	Details
0	10.09.18	Final Report
1		
2		

Contents

Executive Summary

The contents of this report include land transport feasibility investigations into achieving access to two sites in North Wales where National Grid are planning to deliver Tunnel Boring Machines (TMBs) as part of a future development scheme known as the Snowdonia Visual Impact Provision (AIP) works to reduce the amount of overhead electricity wires by installation of underground cables. These sites are located on the east and west banks of the Afon Dwyryd estuary east of Porthmadog, Gwynedd, North Wales.

North Mid Wales Trunk Road Agency (NMWTRA), working as managing agents on behalf of Welsh Government, have advised that at present, there is no route for the proposed AILs from the A55 to the Porthmadog area due to the river bridge on the A487 at Bontnewydd being recently assessed and down rated for no vehicles above Construction and Use traffic (44 tonnes). As the Secretary to the MAWR companies (Movement Along Welsh Roads), Wynns have written to NMWTRA and Welsh Government to highlight this issue. As the A487 is part of the strategic trunk road network, the capacity reduction will be a significant issue for ongoing access to the Porthmadog area. It is not clear if there are any suitable alternative routes which could be used to avoid the Bontnewydd issues and work to identify if such exists will be on going.

Wynns have also requested if the Bontnewydd structure can be temporarily bridged over and await a response from NMWTRA on this matter. It is most likely that an operation to lift in bridge rafting equipment would require a road closure and as such, Wynns will report under separate cover once these investigations have been able to clarify if this may be possible in principle.

The above is the main issue to report which of significant concern for AIL access to the locations being considered for the delivery of TBMs.

The two sites were inspected for route negotiability in August of this year, and for the purposes of this investigation have been labelled as VIP Site East and West. These locations can be found in Map 1 attached to Appendix 1 of this report.

Structural clearance has been provided for the local access from the A487 to both sites, notwithstanding the failure at Bontnewydd Bridge on the A487 which is common to both locations.

Road access to the Western site will require the use of the internal haul road which has been identified by National Grid as the preferred site access to the site compound at approx. OS Grid Reference SH 5939 3862.

Site access for the Eastern site is recommended to be from the A487 at Penrhyndeudraeth via the Pont Briwet Bridge which has been upgraded in recent years to provide access to the A496. Although a potential alternative that approaches from the north east from the A487 at Maentwrog could be utilised this is not considered as suitable for access for TBMs due to the narrow section of the A496 south to the delivery site when alternatives exist.

The routes are considered negotiable to both sites. However, as the loads are 5m in width there will be sections throughout the route where full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required. This will require more detailed discussions with North Wales Police, NMWTRA and Gwynedd County Council prior to delivery by the appointed haulage contractors.

No specific consideration of the internal haul road providing access between various laydown areas in the development area has been included and it is assumed that the developer will design this to be able to accommodate the AILs required. A detailed appraisal of the technical requirements for handling components on-site will be required as the scheme progresses in the future.

There has been no specific consideration of onsite access within the sites themselves with all route investigations ceasing at the point at which the public road access to the site is proposed to be constructed.

The report is intended to be a summary of the Abnormal Indivisible Load (AIL) route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.

1. Introduction

1.1. The contents of this report include land transport feasibility investigations into achieving access to two sites in North Wales where National Grid (NG) are planning to deliver Tunnel Boring Machines (TMBs) as part of a future development scheme known as the Snowdonia Visual Impact Provision (AIP) works to reduce the amount of overhead electricity wires by installation of underground cables. These sites are located on the east and west banks of the Glaslyn estuary east of Porthmadog, Gwynedd. The TBMs will be Abnormal Indivisible Loads (AIL) in terms of the transportation requirements on the public road network.

1.2. This will see TBM deliveries to the east and west sites that are being proposed as construction site access areas. The TBMs could be delivered via any UK port and transported to North Wales by road.

1.3. This report is a summary of the status of the current AIL access investigations and seeks to present the situation as it currently stands. The issues highlighted in this report as risks to achieving AIL access in the future, will need to be revisited and progressed as the scheme develops.

1.4. This investigation considers the potential land transport routes from the England/Wales Border via the A55 trunk road based on the assumption that movements will take place under Special Types General Order (STGO) Regulations.

1.5. No consideration of site access or the internal haul roads in the development site is included and the route surveys end at the point at which site access is proposed to exit the public highway. A detailed appraisal of the technical requirements for handling components on-site will be required as the scheme progresses in the future.

1.6. The report is intended to be a summary of the AIL route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.

1.7. The report considers access in terms of AIL transportation only. No allowance is made for Construction and Use and general traffic requirements including traffic management plans that may be associated with the wider development plan.

2. Historical Information

2.1. *Movement Along Welsh Routes (MAWR)*

2.1.1. The Movement Along Welsh Routes (MAWR) Group is a group consisting of companies with a requirement to move AILs in the North Wales area. Member companies include First Hydro Company, National Grid and Magnox. Each of these companies has a requirement for heavy load access to their associated power stations and substations in North Wales. MAWR meets every year, with representatives of the Welsh Government and local authority highway departments also in attendance, with a remit to discuss issues impacting on heavy load access to power stations and substations. This applies to routes that require AIL access and as such are regarded as being strategically important by MAWR. AIL movement requirements are infrequent but access needs to be maintained at all times to

enable expedient movement in the event of a system failure at a power station or substation resulting in the need for an emergency AIL movement.

2.1.2. It is recommended that as the VIP Project proceeds that representatives from National Grid continue to attend MAWR meetings to update relevant interested parties of future AIL requirements.

2.2. *Porthmadog and Trawsfynydd Power Station & Substation*

2.2.1. Porthmadog was originally used as the marine access port when Trawsfynydd Nuclear Power Station was constructed in the 1950/60's. This involved the construction of a dockside crane by the Central Electricity Generating Board (CEGB). This was located to the south of the harbour and is no longer in place, having been removed post construction of the power station. The crane was designed to lift loads from coastal vessels onto awaiting road transport. Once the power station had been commissioned, the crane was taken down and the harbour redeveloped and for any future heavy load movements, a barge berth was created at Pen-y-Cei (also known as The Green), with an associated license agreement for future use.

2.2.2. Since the early 1980s there has been an understanding from CEGB and its successor companies (National Grid and First Hydro) that any heavy AILs to be delivered via Porthmadog would take place via the area identified as "The Green" within the harbour itself.

2.2.3. National Grid retains the former CEGB access agreement with Gwynedd County Council to maintain access for heavy loads at Porthmadog. In principle it is understood that the area at The Green is to be protected to enable future AIL access. This is however an event that has taken place only two times since the agreement was put in place in the early 1980's and is not a regular operation. There remain logistical issues to resolve to enable access. However, as is discussed in Section 3, Special Order AILs are not required for this project and therefore the focus is on the delivery of items to North Wales by road from the wider UK motorway and trunk road network.

2.2.4. The access to Trawsfynydd from Porthmadog has traditionally been maintained by National Grid in order to enable future delivery of transformers with nett transport weights of up to circa 210te.

2.2.5. Available records indicate that the last movement to Trawsfynydd Substation of Special Order category) took place in 1987. This was for the delivery of a transformer of circa 210te nett weight which was transported on a 14 axle girder frame trailer from Porthmadog at a gross weight of 295te with axle weights of 21.07te.

2.3. *Ffestiniog Power Station*

2.3.1. In addition to the Trawsfynydd substation delivery detailed previously, Porthmadog has also been used to deliver Special Order loads to Ffestiniog Power Station, and the first part of the route is common to that used for Trawsfynydd. Available records indicate that the last movement to Ffestiniog Power Station of Special Order category took place in 1993. This was for the delivery of a transformer of circa 115te nett which was transported on a 12 axle flattop trailer from a flattop barge at Porthmadog. This vehicle had a gross weight of 158.2te.

2.3.2. Since the 1993 movement deliveries have been undertaken to Ffestiniog by road from Liverpool for transformers of 114te nett weight and below. This has been possible due to road improvements in the last 20 years to the A55 and A487 which have enabled road routing for STGO loads below 150te gross with the most recent delivery of a transformer being in 2009 at a gross weight of 147te gross transported on a 10 axle flattop trailer. This therefore avoids the need for expensive coastal shipping by enabling a road route to be utilised where available.

Library Photograph 1
1993 movement of a 115te transformer to Ffestiniog Power Station about to cross over The Cob at Porthmadog.

2.4. *Pentir Substation*

2.4.1. Recent deliveries (March 2014) have been undertaken to Pentir Substation by road from Liverpool for reactors of 112te nett weight and below and have not required Special Order permissions. These have been delivered into the region via the A55, A5, and A4244. Pentir Substation does however have SGTs that would be expected to be moved at Special Order category and as such requires that access is maintained from Port Penrhyn.

2.5. *Maentwrog Power Station*

2.5.1. The most recent delivery (2016) undertaken to Maentwrog Power Station by road for a transformer of 75te nett weight at 109te gross weight which have not required Special Order permissions. This was delivered into the region via the A55, A5, and A4244 to avoid Caernarfon and involved crossing Bontnewydd Bridge which is discussed in Section 7.1 as a structural limitation at present. Maentwrog Power Station is located to the north of the VIP East site on the A496.

3. Highways England Agreement in Principle and Legislative Requirements

3.1. *Definition of Abnormal Indivisible Load (AIL)*

3.1.1. The Department for Transport, of which Highways England (HE), formally the Highways Agency (HA), is a government-owned company with responsibility for managing the core road network in England, state that the strict definition of an AIL refers to a load which cannot, without undue expense or risk of damage, be divided into two or more loads for the purpose of carriage on roads and which, owing to its dimensions or weight, cannot be carried on a vehicle which complies in all respects with the 'standard vehicle regulations' these are:

- The Road Vehicles (Construction and Use) Regulations 1986 (as amended)
- The Road Vehicles (Authorised Weight) Regulations 1998 (as amended)
- The Road Vehicles Lighting Regulations 1989 (as amended).

3.1.2. All equipment should be stripped of their ancillaries before they are transported. HE will only accept that further dismantling is not required where it cannot be economically achieved due to the requirement for its construction within specific factory environments or where extremely high tolerances have to be maintained.

3.2. *Legislation*

3.2.1. Conventional heavy goods vehicles have an operating weight limit of 44 tonnes. The category known as abnormal indivisible loads (AIL) covers those vehicles where the gross weight exceeds 44 tonnes. An Abnormal Load is defined as that which cannot be carried under Construction and Use (C&U) Regulations. Items which, when loaded on the load carrying vehicle exceed the weights encompassed by the C&U Regulations, but do not exceed Special Order Permission Limits, are governed by Special Types General Order (STGO) categories 1 to 3 depending on size. Where dimensions exceed 6.1m in width, 30m in rigid length or 150 tonnes gross weight, Special Order from HE is required. Highways England have issued an aide memoir that explains notification requirements in more detail. This document has been attached as Appendix 3.

3.2.2. Special Order category AIL movements are authorised by the HE Abnormal Loads team, based in Birmingham.

3.2.3. STGO loads orders grant consent for loads that satisfy the following criteria:

Category 1 weight	44 – 50 tonnes and 11.5te axle weights
Category 2 weight	50 – 80 tonnes and 12.5te axle weights
Category 3 weight	80 – 150 tonnes and 16.5te axle weights
Width Restriction	3.0m (C&U) –5m (VR1 Required) – 6.1m (SO Required)
Length Restriction	18.65m (C&U) – 30.0m (SO Required)

3.2.4. The TBMs considered within these investigations are expected to be transported at STGO Category 3. Such loads are required to provide two clear working weekdays notice to be given to the Police forces on the proposed route and are required to provide 5 clear working weekdays notice together with an indemnity to the highway and bridge authorities on the route.

3.2.5. As the loads considered in these investigations are within STGO and therefore no specific consideration of Special Order requirements, including the Department for Transports (DfT) Water Preferred Policy for AILs is considered necessary and no specific marine access investigations are included.

3.3. As the loads are not restricted to Special Order requirements they will not necessarily be delivered to a North Wales Port and could arrive via any UK port and travel to the motorway and trunk road network to enter Wales on the A55 trunk road subject to route approval at the time of requirement. It was assumed at the commencement of investigations that this will be feasible without difficulty for the proposed loads as has been the case for STGO loads to Pentir Substation and Ffestiniog Power Station in recent years. The final approach to the sites from the A55 England/Wales border is discussed in terms of structural clearance in Section 7.

4. Abnormal Indivisible Load Movements - Highways Act 1980

4.1. *Recovery of Excessive Maintenance Costs - Section 59 Agreements*

4.1.1. Section 59 of the Highways Act 1980 allows the highways authority to raise a charge against a user of the highway to cover repair works necessitated by excessively heavy or unusual loads being carried on the road by that user. This provision is typically used where the passage of heavy lorries to and from industrial premises or building sites causes excessive damage to the road, requiring expensive remedial works by the Council. Under Section 59, the Council may charge on such costs to the organisation responsible for the damage, the amount payable being calculated as the excess cost of repair compared to normal maintenance costs for the road. Rather than wait to be charged such excessive repair costs, the Council and the third party may enter into an agreement under Section 59 whereby the third party accepts liability and makes payment of an agreed sum to the Council to cover the excessive repair costs.

4.2. *The Removal and Replacement of Street Furniture*

4.2.1. Where the removal and replacement of street furniture is required for the mobilisation of out of gauge vehicles into existing sites then these are generally managed under Temporary Traffic Regulation Order (TTRO) and Street Works Legislation. These are normally, but not necessarily, organised by the haulage contractor. These requirements are generally to ensure that the supervisors and operatives are competent and that the works will be carried out to a prescribe standard with the appropriate traffic management in place. In some circumstance the Highway Authority or LA will insist that their preferred contractors will carry out such work.

5. Plant Dimensions Included within Study Work

5.1. The information included within this report is based around a selection of different manufacturing contractor's potential equipment which has been made available to Wynns. All details of possible transport dimensions should be treated with caution and be understood to be in need of clarification as the scheme progresses.

5.2. Table 1 shows dimensions of the TBMs that has been included within the study for initial feasibility assessment work. These dimensions have been used to derive indicative transport arrangement drawings for presentation to highway and structural authorities as detailed in Section 7. A 200te mobile crane has also been included as it is expected that this will be required on site also.

Table 1. Selected Items to be considered.

Item	Weight	Diameter/ Width	Length/Depth	Notes
Cutterhead	50te	5m	0.3m	
1st Shield Section	30te	5m	5m	
2nd Shield Section	20te	5m	5m	Could potentially be moved within C&U under 44te gross.
200te Mobile Crane	60te	3m	15.282m	

Note: It is assumed that the diameters of 5m are maximum and will not be exceeded. If loads exceed 5m then VR1 permissions will be required.

6. Transport Configurations

6.1. *Tunnel Boring Machines*

6.1.1. The dimensions of the TBM components expected to require delivery to the sites considered in these investigations is detailed in Table 1 previously discussed. Due to the size of the components it is not possible to transport them under the regulations governing Construction and Use (C&U) vehicles (44 tonne gross, 18.65m long and 2.9m wide). It is therefore necessary to transport within the Special Types General Order (STGO) regulations as previously discussed.

6.1.2. There are numerous haulage contractors with equipment able to carry the TBM compnentes within STGO Category 2 or 3 (between 50-80te or 80te–150te gross) and these have been used to inform and produce the conceptual transport drawing considered within this report. As various haulage contractors are available, competitive tendering for the transport of cable drums is viable. For the general purposes of this investigative work we have produced a transport arrangement considerate of a maximum 50te nett cutter head section at 5m width and the 200te mobile crane as worst case anticipated transport dimensions.

6.1.3. It is assumed that road transport configuration would utilise a bed trailer or low bed type configuration. The following transport drawing has been submitted to structural authorities for comment.

- Drawing No 18-954, TC01 – 4 axle stepframe trailer at 79te gross
- Drawing No 18-954, TC02 – 200te mobile crane at 60te gross

6.2. The physical negotiability of these vehicles is discussed in further detail in Section 8.

6.3. The trailer arrangements provided to the structural authorities for consideration in this investigation have been produced to be considerate and representative of those available in the UK heavy haulage market in terms of their suitability on the potential access route from the A55 to site. The responses to these investigations are discussed in Section 7.

7. Structural Route Information

7.1. *Tunnel Boring Machine Access*

7.1.1. As the loads are not restricted to Special Order requirements, the cable drums could arrive via any UK port and travel to the A55 by way of the motorway and trunk road network. It is assumed that this will be feasible without difficulty for the proposed loads. The final approach to the Porthmadog study area from the English Border at the A55 Chester bypass has been considered which is a recognised heavy load route, and the routes to the two east and west sites from the main A487 are detailed below.

Preferred Route to TBM West Site
From English Border continue A55 westbound to A5/A55 junction
Turn left onto A5
Turn right A4244
Bear left at Pentir roundabout on A4244
Turn right A4086
Turn left Class 3 at approx. OS Ref. SH 513 632
Straight ahead at roundabout at Caeathro
Turn left on to A487 at Bontnewydd

Note 1: We are aware from previous experience that the masonry arch section of the bridge at Bontnewydd (OS grid reference SH 482 598) is unsuitable for AIL movements but the reinforced concrete extension at the northern side is expected to be adequate. Loads must travel on the downstream side of the bridge.

Continue A487 to Penmorfa
Continue A487 at Tremadog Roundabout
Continue A487 Porthmadog Roundabout
Continue A487 via Porthmadog bypass to Minffordd Roundabout
Turn right High Street
Turn right unclassified road at OS Grid Ref. SH 5872 3811
Turn left unclassified road at proposed new site access at approx. OS Grid Ref. SH 5939 3862

Preferred Route to TBM East Site
Same as route 1 to Minffordd Roundabout
Turn left A487 Eryri Terrace
Turn right Cambrian View
Continue Penrhyndeudraeth Bridge (Pont Briwet)
Turn left A496
Turn right at proposed site access at approx. OS Grid Ref. SH 6242 3795

Maentwrog Diversion to East Site
Same as route 1 to A487 Eryri Terrace
Continue A487
Turn right A496 to Maentwrog
Continue A496
Turn left at proposed site access at approx. OS Grid Ref. SH 6242 3795
Note: At Maentwrog it may be necessary depending on the final size of load to contraflow the one way system enabling access to A496.

7.1.2. The routes have been cleared by the structural authorities detailed below.

- Canal & Rivers Trust
- Highways England Historic Railways Estate
- Network Rail
- Gwynedd County Council

7.1.3. North Mid Wales Trunk Road Agency (NMWTRA) have advised (emails 29.8.18) that the A487 Bontnewydd Bridge has recently been down rated to Construction and use (44te) loads only at present, although this remains under review. This causes significant concerns in terms of getting AILs into the area on what has long been regarded as the most suitable heavy load route from the north whether via the A487 in full or via the diversion from the A55 at Banger Services on the A5, A4244 and A4086. Such a significant restriction will be a major concern to many organisations in the region as it will impact on much smaller STGO AILs and is not solely an issue for the heavier end of the electricity supply industry.

7.1.4. Traditionally it has always been understood that it is necessary for heavy AILs to avoid the old masonry arch section and to travel on the reinforced concrete extension at the northern side with the loads on the downstream side of the bridge and this has been the basis of route clearance work and actual notifications over the years.

7.1.5. For the high end STGO loads there would initially appear very little scope for alternative routes to sites that approach from the south and east although this could be investigated further and clarification has been sought from Welsh Government, North Wales Police and NMWTRA as to the suitability of potential diversion routes to avoid the problem for STGO loads.

7.1.6. Wynns have significant interest in the A487 heavy load route in our role as consultants to clients in the electricity supply industry and also as the Secretary of the of Movement Along Welsh Routes (MAWR) Group. We aware from informal discussions over the time since the last meeting of MAWR in November 2017 that there has been an assessment taking place over recent months which is what we presume has led to this significant weight restriction being imposed. We have asked for confirmation that within this assessment potential remedial measures for AILs such as travelling at crawl speed, no stopping, certain alignment requirements, no HA loading, have been considered.

7.1.7. It may be prudent to also discuss potential temporary measures such as bridging units, propping etc. These would be subject to detailed engineering proposals technically and would also have an impact on other road users due to the potential need to carry out such works under a road closure and further information is being sought from NMWTRA and Welsh Government on this option. The possible solutions would depend on the bridge length of span and method of support. Available records indicate that the bridge has a 15m span and we have experience of bridging structures in excess of this.

7.1.8. Of specific concern are the following sites and projects that our clients require AIL access to in addition to this specific cable drum project:

- Ffestiniog Power Station (First Hydro Company) – Transformer access at top end STGO for transformers in excess of 100te nett weight. Also other items that would be moved more generally at STGO.
- Trawsfynydd Substation (National Grid) – Although Special Order transformers in excess of 150te nett may be expected to be delivered via Porthmadog this is not without difficulty. In addition, other STGO loads may need to route via A487.
- Potential new SMR Power Station at Trawsfynydd (Welsh Government/Snowdonia Enterprise Zone development project) – Although Special Order loads of various components may be expected to be delivered via Porthmadog this is not without difficulty. In addition, other STGO loads may need to route via A487.
- Proposed Bryncir Substation (National Grid) – Although Special Order transformers may be expected to be delivered via Porthmadog this is not without difficulty and it may be easier and preferable to deliver them from Port Penrhyn, subject to route. In addition, other STGO loads may need to route via A487.
- Maentwrog Power Station (Magnox) – STGO loads. Most recent was 75te nett transformer in approximately 2016.
- Glaslyn Cable Feed Project (National Grid via consultants WSP) – Cable drums at STGO.
- Snowdonia Visual Impact Provision (National Grid via consultants WSP) – Tunnel Boring Machines (TBM)

7.1.9. Wynns and MAWR would hope that this is a serious enough issue to be a priority for NMWTRA and Welsh Government but it may take a period of time for permanent design of and facilitation of remedial works to be agreed and carried out. We have requested that MAWR are consulted on any future permanent strengthening schemes that may be proposed and will continue to monitor the situation but at present there is not access to loads in excess of 44te gross to the Porthmadog area.

7.1.10. The preferred route identified is a recognised diversion via the A5, A4244 and A4086 that avoids the A487 Caernarfon. North Wales Police have historically requested that loads avoid Caernarfon due to the narrow nature of some of the A487 and the need to use the one way system. The proposed diversion route is acceptable for the cable drum loads and therefore the Caernarfon option is not discussed further in this report but it could be utilised for the proposed loads with approval from NMWTRA and North Wales Police if necessary.

7.1.11. The proposed A487 Caernarfon to Bontnewydd Bypass is planned in forthcoming years which may assist in the future for access into the region. However, for current purposes the status of the route as it is now has been considered.

7.1.12. MAWR have previously highlighted required loadings for the existing Ffestiniog Power Station requirements should be included in the new bypass and it is understood the new road will be accommodating of this.

7.1.13. It is noted that both Gwynedd County Council and Network Rail have confirmed the routes are structurally acceptable. However, there is some confusion over who is responsible for the Minffordd Rail Bridge (OS Ref SH 5996 3852) on the A497 which is on the proposed route to the west site. Network Rail have advised that this is not their structure but Wynns are the view based on previous movements in the area that it is a Network Rail structure and clarification of this is being sought. This has been a recurring issue over recent years

and no significant problems are expected structurally in terms of the bridge which has been crossed by heavy loads in the past but ownership does need to be clarified.

7.1.14. In addition Network Rail have cautioned that they regularly inspect and assess bridges and occasionally have to revise the permitted load carrying capacity, as such, it would be advisable to contact Network Rail again closer to the movement date to ensure that their bridges are still adequate. It will therefore be necessary to engage further with Network Rail in respect to access over Minffordd Rail Bridge as the project progresses when routing to the west TBM delivery location.

7.1.15. The potential use of the new by-pass would open up route options from the north and Port Penrhyn that are currently restricted due to physical dimensions which present concerns to North Wales Police.

7.1.16. North Wales Police have been approached for comment on the proposed routes submitted for consultation and have yet to provide a formal response.

8. Route Negotiability

8.1. *Route to TBM West Site*

8.1.1. The proposed route from the A55/A5 junction to the West Site is detailed in Section 7 and illustrated on the maps provided in appendix 1 of this report. The negotiability of the proposed routes is discussed in the following notes and photographs.

8.1.2. The route via Pentir to Bontnewyedd has been described as the preferred route from the A55 to the general site area. This is also an established heavy load route and has been used for the delivery of much larger abnormal loads to Ffestiniog Power Station and also in part for Pentir substation and Dinorwig Power Station.

8.1.3. The route was inspected from the A55 during August 2018.

Photograph 1
Vehicle moves away from camera. Exiting A55 on to the A5 roundabout.

Photograph 2
Reverse of A5/A4244 roundabout. Vehicle moves towards camera. Negotiable.

Photograph 3
A4244/A4086 Junction. Vehicle moves away from camera and turns right on to the A4086. Negotiable.

Photograph 4
A4086/A4244 Junction. Vehicle enters photo from A4244, turns right on to the A4086 and exits behind camera.

Photograph 5
A4086 and unclassified road junction at Pont-rug. Vehicle moves away from camera, turns left unclassified road. No negotiability issues foreseen.

Photograph 6
Reverse angle of left turns on to unclassified road at Pont-rug. Negotiable.

Photograph 7
A4085 roundabout in Caeathro. Vehicle moves away from camera, and travels straight over roundabout continuing on the unclassified road. Negotiable.

Photograph 8
Unclassified road in to Bontnewydd. Vehicle moves away from camera.

Photograph 9
Unclassified road/Pwllheli Road roundabout in Bontnewydd. Vehicle moves away from camera, turns left at roundabout on to A487. Negotiable.

Photograph 10
A487/A499 Roundabout. Vehicle moves away from camera. Negotiable.

Photograph 11
A487/ Lôn Cefn Glyn Roundabout. Vehicle moves away from camera. Negotiable.

Photograph 12
East on A487. Vehicle moves away from camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.

Photograph 13
East on A487. Vehicle moves away from camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.

Photograph 14
Approaching A487/A498 roundabout. Vehicle moves away from camera, continues A487.

Photograph 15
A487/High Street roundabout. Vehicle moves away from camera continues A487.

Photograph 16
East on A487 Porthmadog Bypass. Vehicle moves away from camera.

Photograph 17
Minffordd Roundabout. Vehicle moves away from camera, turns right High Street.

Photograph 18
Reverse of A487/High Street Roundabout. Vehicle moves towards camera upon exiting roundabout.

Photograph 19
A497 West on High Street. Vehicle moves towards camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.

Photograph 20

A497 Right turn at OS Grid Ref. SH 5872 3811. Vehicle moves away from camera and turns right.

8.1.4. The surveyor has recommended a swept path assessment be carried out to confirm negotiability of the right turn from the A497 to the unclassified road that leads to the final aprpach to VIP Site West. If this is not considered feasible then the surveyor recommends driving past the junction and reversing on to the unclassified road to the proposed new site access approximately 700 meters. This would avoid the need to travel via Porthmadog town centre.

Photograph 21

Unclassified road. Vehicle moves away from camera.

Photograph 22

Vehicle moves away from camera. Full occupation of the highway necessary. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.

Photograph 23

Potential new site access for TBM West Site at approx. OS Grid Reference SH 5939 3862.

8.1.5. It is understood from consideration of sketch number PDD-33494-TUN-SK01-001 (attached in Appendix 2) that the TBM proposed construction laydown area is to be accessed via a new internal haul road to be constructed from the point shown in photograph 23 above. It is assumed that the developer will design the internal haul road to be able to accommodate the AILs required. The transport arrangement drawings provided in Appendix 2 can be used for indicative ground loadings and turning circles that are required.

8.2. *Route to TBM East Site*

8.2.1. The proposed route from the A55/A5 junction to the East Site is detailed in Section 7 and illustrated on the maps provided in appendix 1 of this report. The negotiability of the proposed route is discussed in the following notes and photographs. The preferred route is to exit the A487 trunk road at Penrhyndeudraeth and approach the development site from the south west on the A496 at Trem-y-Garth.

Photograph 24

Minffordd Roundabout. Vehicle moves away from camera, continues left onto A487. Negotiable.

Photograph 25

A487/Cambrian View. Vehicle moves away from camera, turns right Cambrian View.

Photograph 26

A487/Cambrian View. Vehicle moves away from camera, turns right Cambrian View. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.

Photograph 27
East on Pont Briwet. Vehicle moves away from camera.

Photograph 28
East on Pont Briwet. Vehicle moves away from camera.

8.2.2. The bridge at Pont Briwet has been significantly upgraded in recent years and confirmed as structurally acceptable by Gwynedd County Council who also advised at the commencement of the investigations that they considered this the most suitable access route to the proposed TBM delivery location on the A496.

Photograph 29
Reverse angle of Pont Briwet/A496 Junction. Vehicle enters junction middle right, turns left, exits behind camera. No negotiability issues foreseen.

Photograph 30

North East on the A496. Vehicle moves away from camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.

Photograph 31

North East on the A496. Vehicle moves away from camera.

Photograph 32

Proposed TBM East Site Access. Site access to be designed to accommodate proposed AIL delivery vehicles.

8.2.3. An alternative route was looked at via Maentwrog although this is deemed unsuitable due to the turn from the A487 to the A494 at Maentwrog which has a restricted left turn adjacent to a property.

Photograph 33
A487/A496 junction. Left turn will not be negotiable for AIL delivery vehicles.

8.2.4. It may be feasible to avoid the left turn highlighted by contraflowing the old bridge at the junction. Although Maentwrog has been accessed via this route in the past the section south on the A496 to the proposed TBM delivery location is narrow with multiple bends. Although the route could be considered if absolutely necessary it is not as suitable as that described in 8.1 that approaches from the south and therefore it is recommended that it is not considered further at this stage.

9. Summary and Conclusions

9.1. As the loads will be moved under STGO Category 3 legislation it is assumed that the road route to the A55/A5 junction will be accessible from a suitable UK port of delivery.

9.2. At present there is no access to the development area due to a significant downgrading of Bontnewydd Bridge on the A487 to C&U traffic only (44te gross). This has been advised by NMWTRA and Wynns are in discussions with them to find a way forward as this is a strategic route affecting many sites in North Wales. The restriction is on an established heavy load route and the importance of this has been highlighted to NMWTRA and Welsh Government.

9.3. Notwithstanding the Bontnewydd Bridge restriction, the proposed routes have been structurally cleared for all loads from the A487 to the two development sites where TBMs are required to be delivered in terms of both East and West sites in terms of local access requirements.

9.4. The route surveys carried out have found that access is possible to both the East and West sites in terms of physical negotiability, although the West site will require the delivery vehicles to use new site access points and use of the proposed internal haul road.

9.5. There are no major problems with access to the East site although the new site access points will need to be carefully considered.

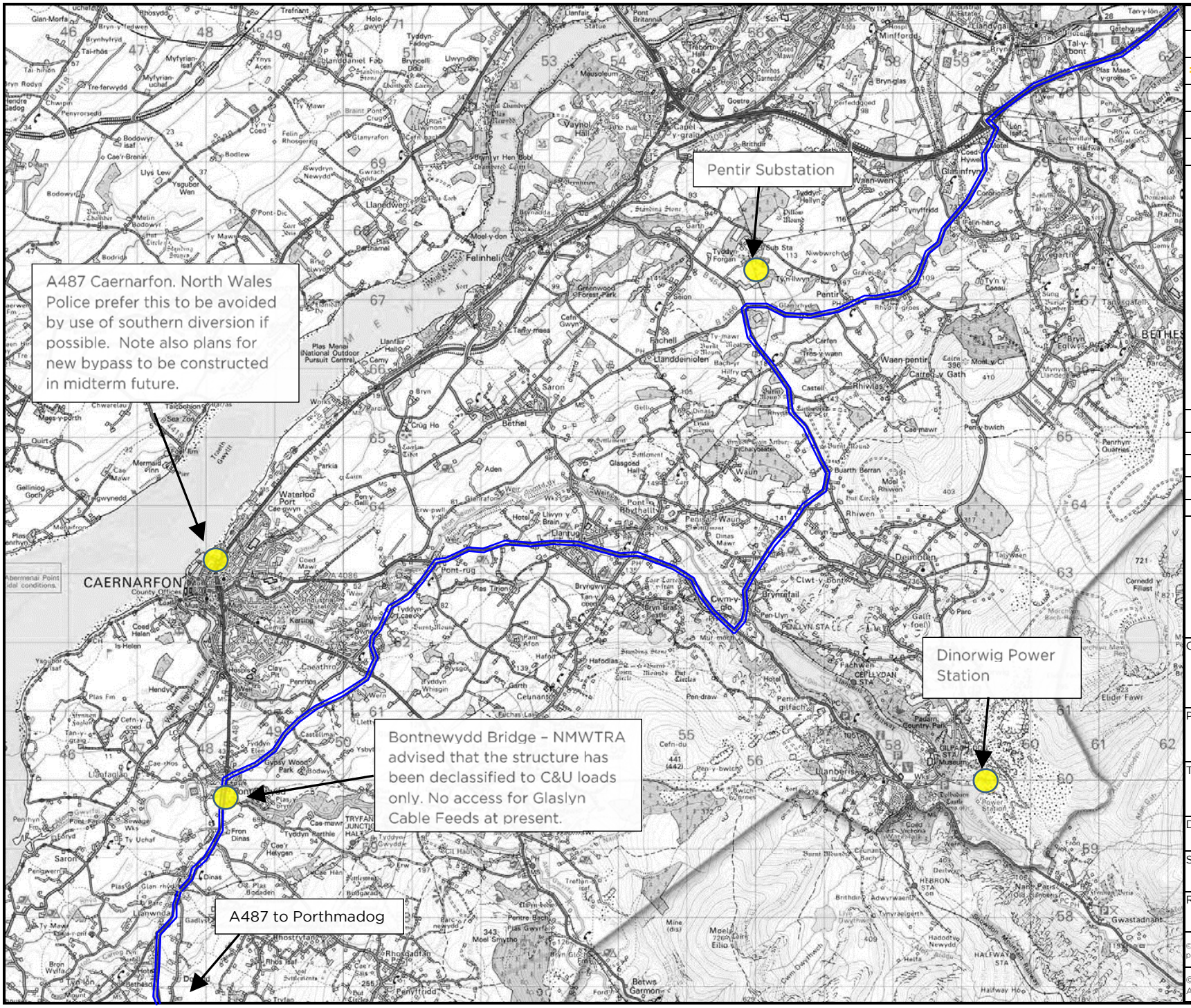
9.6. As the loads are 5m in width there will be sections throughout the route where full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required. This will require more detailed discussions with North Wales Police, NMWTRA and Gwynedd County Council prior to delivery by the appointed haulage contractors.

9.7. The route investigations detailed are a view of the current status of the proposed heavy load route options only and do not consider any other components or traffic to the site.

9.8. The report is intended to be a summary of the AIL route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.

Appendix 1

Maps



Key

	Route to TBM West Site A
	Route to TBM East Site B
	Maentwrog Diversion
	Point of Interest
	Proposed Laydown Areas

Rev	Date	Amendments:
B		
A		
0	06.09.18	First Issue

Revisions

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Client:

Manchester Technology Centre, Oxford Road, Manchester, M1 7ED

Project:

Snowdonia Visual Impact Provision

Title:

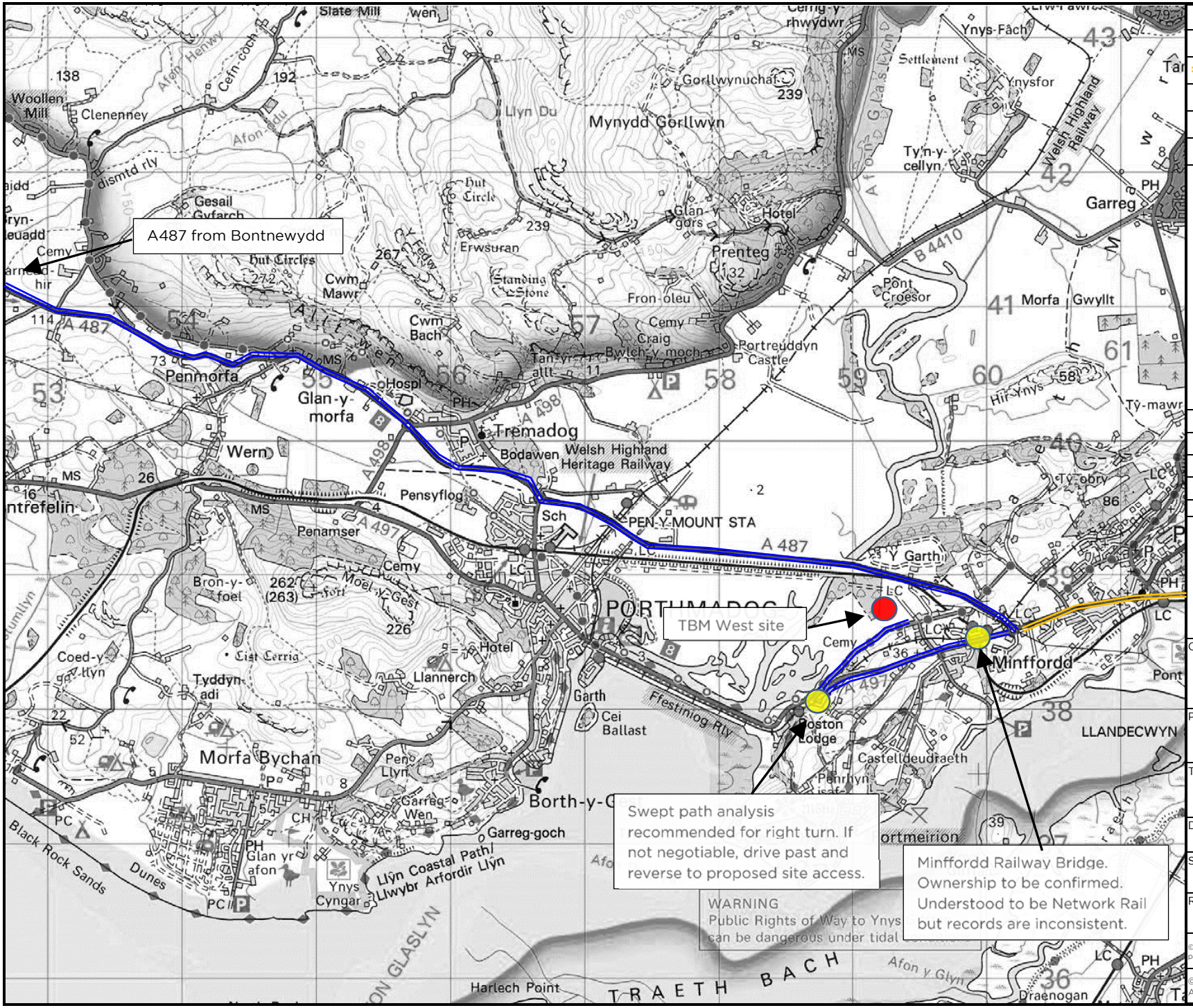
Map 1 – Routes to Proposed Site Locations

Drawing Status:

Final Report

Scale (A4):	Drawn by:	Checked by:
NTS	DMW	ARP

Ref No.:	Sheet:	Rev.:
WSP-VS-Map1	1 of 3	0



Key

	Route to TBM West Site A
	Route to TBM East Site B
	Maentwrog Diversion
	Point of Interest
	Proposed Laydown Areas

Rev	Date	Amendments:
B		
A		
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Title:
Map 1 – Routes to Proposed Site Locations

Drawing Status:
Final Report

Scale (A4):	Drawn by:	Checked by:
NTS	DMW	ARP

Ref No.:	Sheet:	Rev.:
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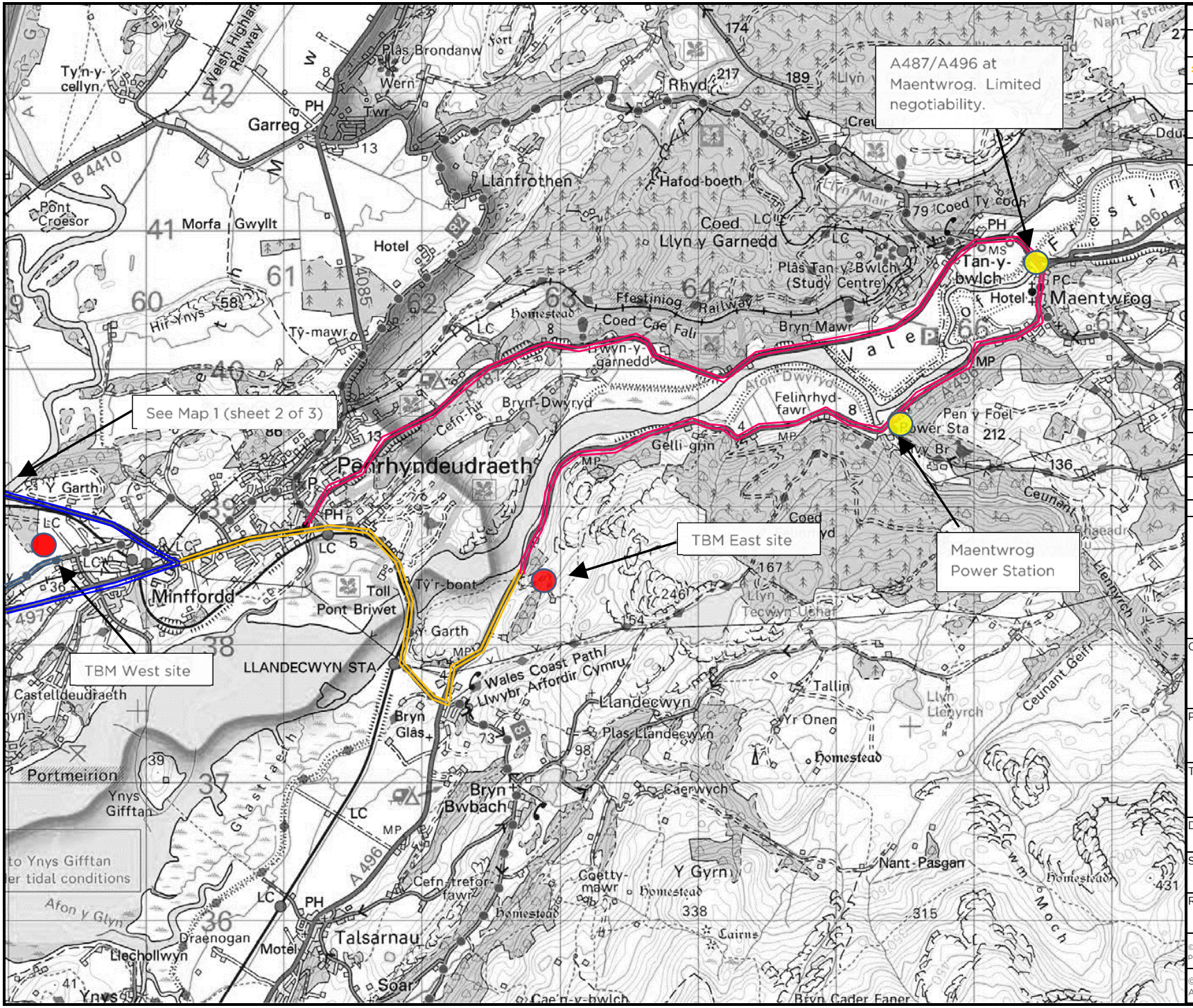

Rev	Date	Amendments:
B		
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Drawing Status:

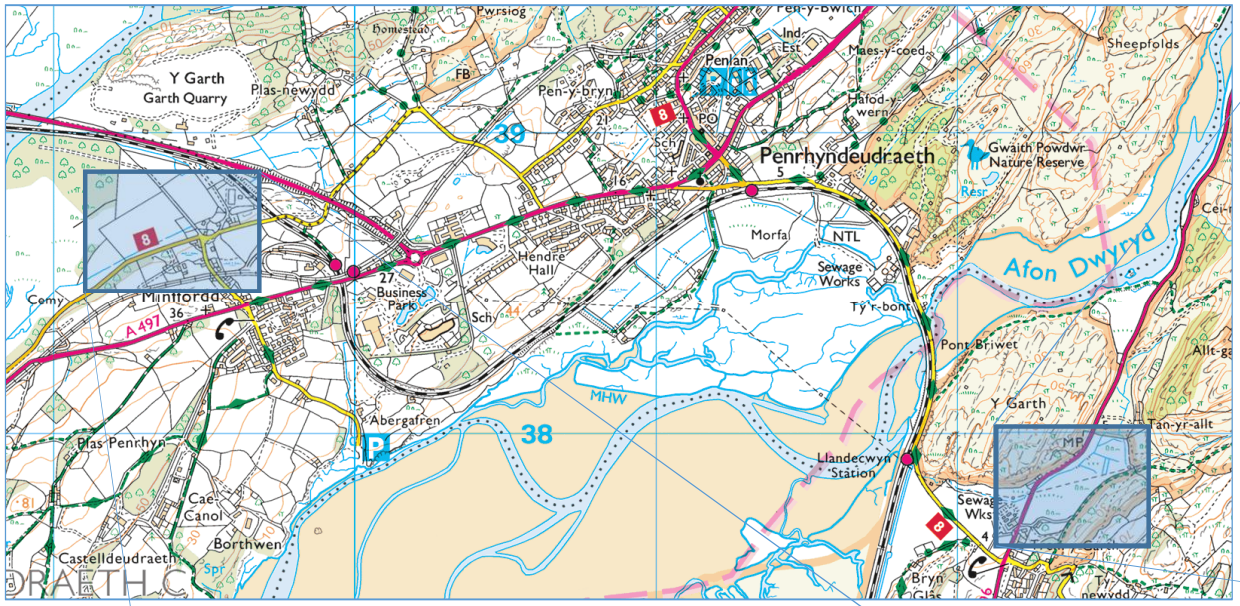
Final Report

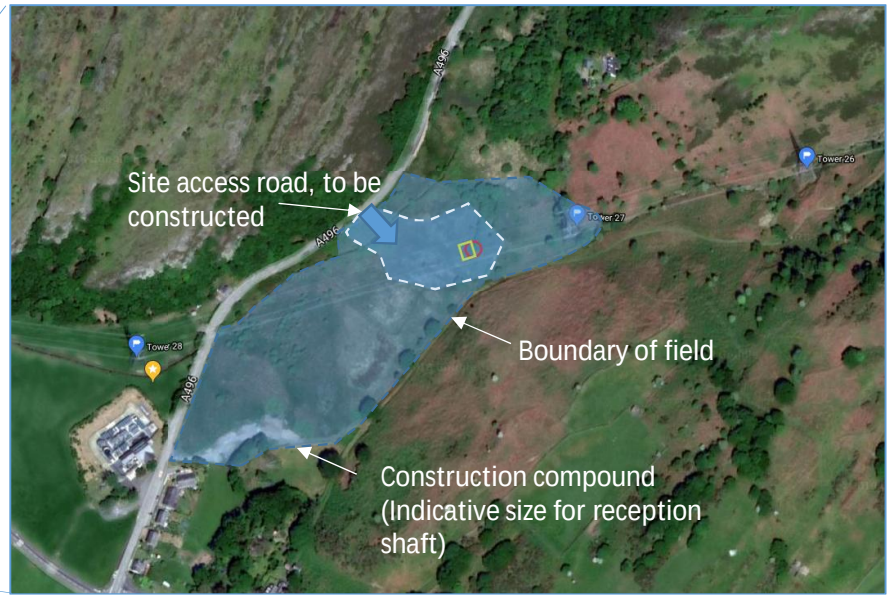
Scale (A4):	Drawn by:	Checked by:
NTS	DMW	ARP

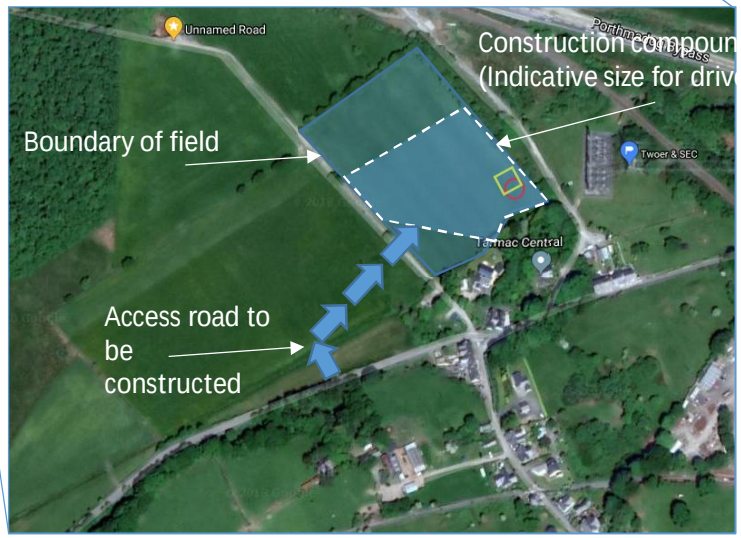
Ref No.:	Sheet:	Rev.:
WSP-VP-Map1	3 of 3	0

Appendix 2

Drawings & Transport Configurations





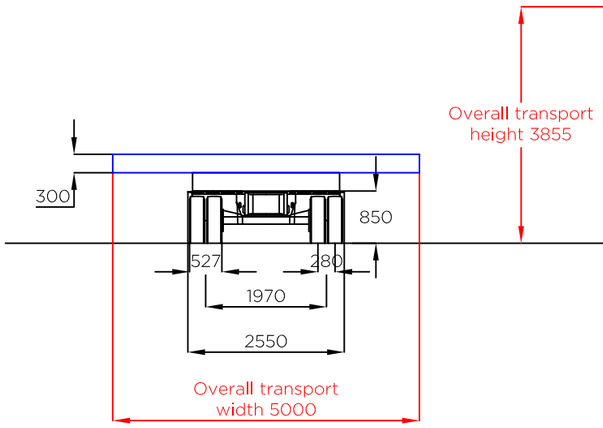


○ Shaft (15m diameter)
□ Headhouse

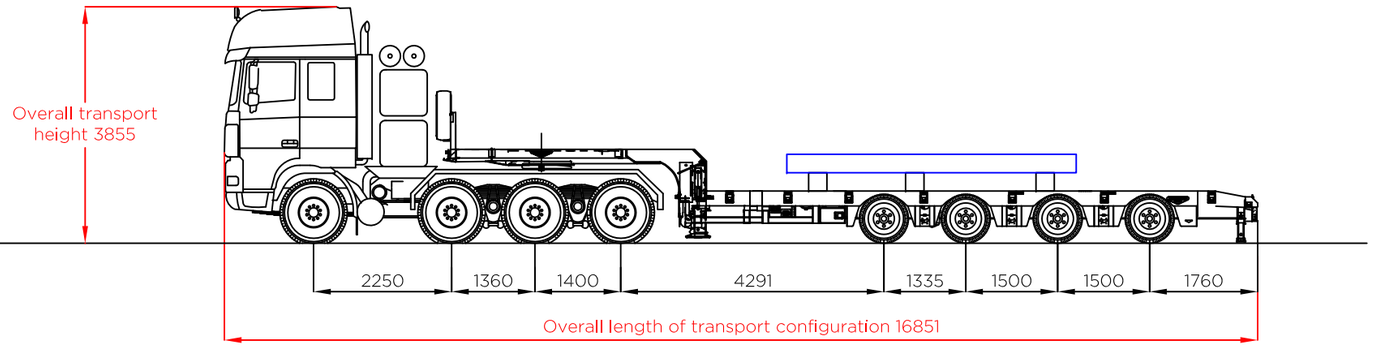
○ Shaft (12.5m diameter)
□ Headhouse

nationalgrid
wsp

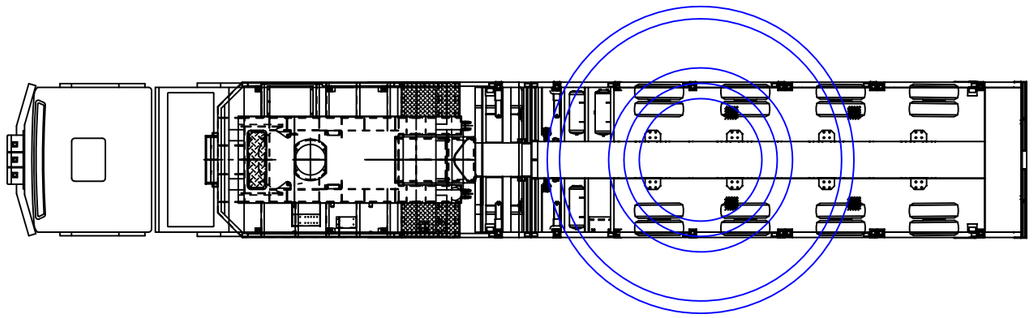
Snowdonia Visual Impact Provision
Provisional Shaft Locations & Construction Compounds
Sketch for information only
PDD-33494-TUN-SK01-001 AJW – 06/03/2018



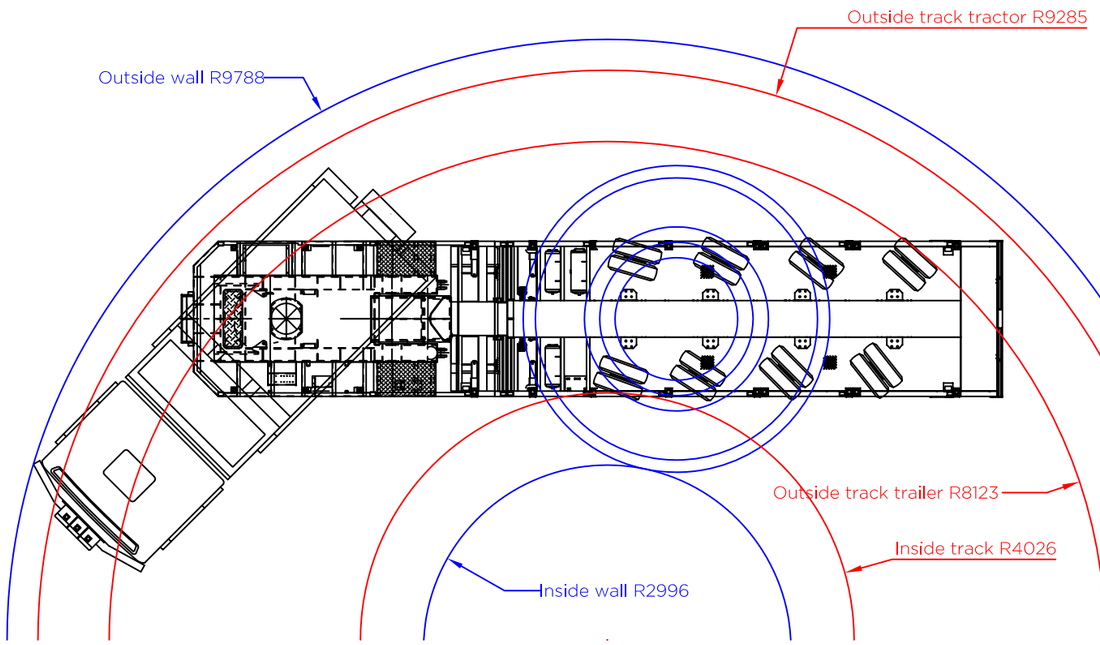
End elevation



Side elevation - 4 axle steerable stepframe
Indicative 5.0 m dia cutting head



Plan view - 4 axle steerable stepframe
Indicative 5.0 m dia cutting head



Minimum turning radii
4 axle steerable stepframe
Indicative 5.0 m dia cutting head

Load Table	
4 axle steerable stepframe	
Self weight of load	50.0 te
Self weight of trailer	15.0 te
Self weight of tractor	14.0 te
Total combined weight	79.0 te
Load per axle line	9.88 te
Load per wheel (4 per axle)	2.47 te
Overall ground bearing pressure	3.32 te/m²
Tractor (14 te)	
Front axle	6.0 te
Second steer	8.0 te
Rear axle	9.17 te
Rear axle	9.17 te

Notes:-
[1] The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.

[2] Actual dimensions including axle spacing and mean running height may vary slightly depending on manufacturer of trailer deployed.

[3] All linear measures in millimetres unless stated otherwise.

[4] Drawing of cutting head indicative only.

Rev.	Date	Amendments
1		
0	16.07.18	Issued for comment

Revisions

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Project:
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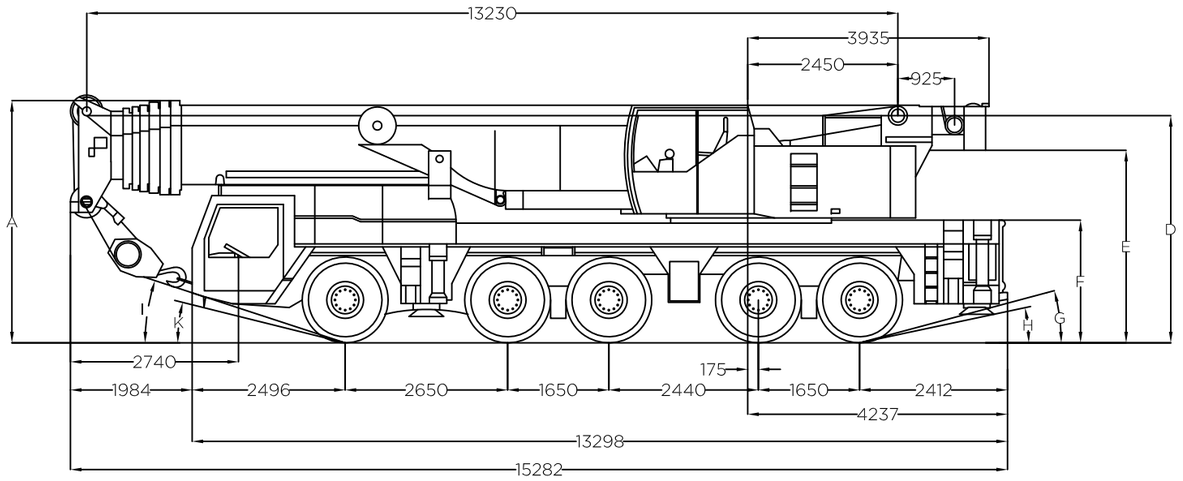
Title:
Indicative Transport Configuration
for delivery of 5.0 m Dia 50 te cutting head
shown on 4 axle steerable stepframe trailer and articulated tractor

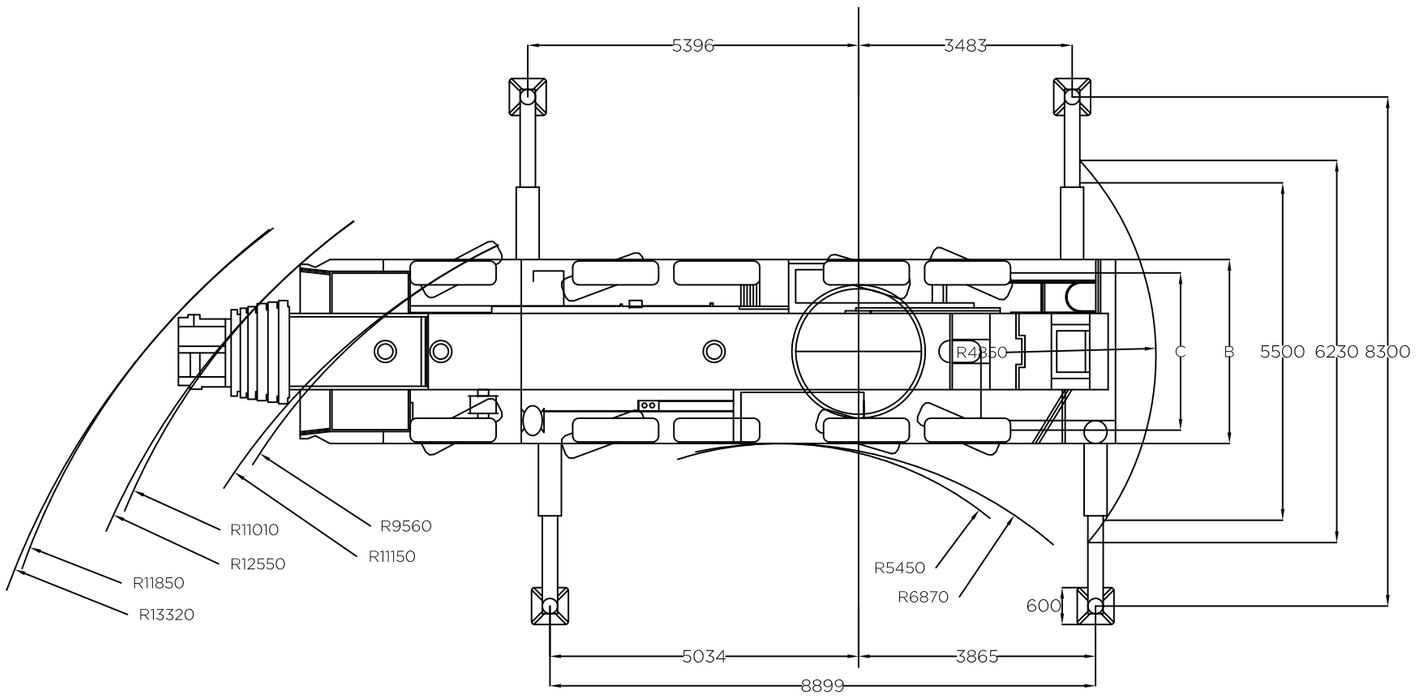
Drawing Status:
Final report

Scale (A3):	Drawn By:	Checked By:
1:100	SJW	AP
DWG. No:	Sheet:	Rev:
18-954.TC01	1 of 1	0

P:\Clients\Existing Clients\WSP (ex Parsons Brinckernoff)\18-954 Snowdonia\Transport configuration\18-954.TC01 WSP Snowdonia cutter head transport configuration R0.dwg



Side elevation - 200 te mobile crane



Plan view - 200 te mobile crane

	Dimensions mm										
	A	A 150mm	B	C	D	E	F	G	H	I	K
14.00 R 25	3950	3800	3000	2563	3704	3139	2000	15°	12°	18°	14°
16.00 R 25	4000	3850	3000	2551	3754	3189	2050	17°	14°	20°	16°
20.5 R 25	4000	3850	3100	2573	3754	3189	2050	17°	14°	20°	16°

Load Table

200 te mobile crane - axle loads	
Axle 1	12.0 te
Axle 2	12.0 te
Axle 3	12.0 te
Axle 4	12.0 te
Axle 5	12.0 te
Minimum gross load	60.0 te

Notes:-

[1] The figures shown above are representative of the transport configuration portrayed. However as transport arrangements can vary then the loads and dimensions indicated should be treated as probable values.

[2] Actual dimensions including axle spacing and mean running height may vary slightly depending on manufacturer of trailer deployed.

[3] All linear measures in millimetres unless stated otherwise.

Rev.	Date	Amendments
1		
0	16.07.18	Issued for comment

Revisions

Prepared By:

Shaftesbury House, 2 High Street,
Eccleshall, Stafford ST21 6BZ
Tel: (01785) 850411

Independent Transportation Engineers

Client:

WSP Global
Manchester Technology Centre
Oxford Road
Manchester
M1 7ED

Project:

Snowdonia

Title:

200 te mobile crane
Negotiability and set up arrangements

Drawing Status:

Final report

Scale (A3):	Drawn By:	Checked By:
1:100	SJW	AP
DWG. No:	Sheet:	Rev:
18-954.TC02	1 of 1	0

P:\Clients\Existing Clients\WSP (ex Parsons Brinckernoff)\18-954 Snowdonia\Transport configuration\18-954.TC02 WSP Snowdonia 200 te crane transport configuration R0.dwg

Appendix 3

Highways England Aid Memoir

Aide Memoire for notification requirements for the movement of Abnormal Indivisible Loads or vehicles by road when not complying with The Road Vehicles (Construction and Use) Regulations 1986 (commonly known as C & U)

Weight

Gross weight of vehicle carrying the load exceeding C & U limits up to 80,000kgs (78.74 tons)	2 clear days notice with indemnity to Road and Bridge Authorities.
Gross weight of vehicle carrying the load exceeding 80,000kgs up to 150,000kgs (147.63 tons)	2 clear days notice to Police and 5 clear days with indemnity to Road and Bridge Authorities.
Gross weight of vehicle carrying the load exceeding 150,000kgs (147.63 tons)	Highways England Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities

Width

C & U loads:- width exceeding 2.9m (9ft 6ins) up to 4.3m (14ft 1 ins) STGO loads:- width exceeding 3.0m (9ft 10ins) up to 5.0m (16ft 5ins)	2 clear days notice to Police
Width exceeding 5.0m (16ft 5ins) up to 6.1m (20ft)	Highways England form VR1** plus 2 clear days notice to Police
Width exceeding 6.1m (20ft)	Highways England Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities

Length

C&U loads:- length exceeding 18.65m (61ft 2in) up to 27.4m (90ft) - See C&U Regulations 1986 for definition of length STGO loads:- length exceeding 18.75m (61ft 6 ins) - See part 2, article 12 of the Road Vehicles (Authorisation of Special Types) (General) Order 2003 (Commonly known as STGO) for definition of length	2 clear days notice to Police
Overall length of a part 2 vehicle-combination exceeding 25.9m (85ft)	2 clear days notice to Police
Maximum length exceeding 30.0m (98ft 5ins) – see STGO Schedule 1, part 4, paragraph 25 for definition of maximum length NB For some very light loads, such as yacht masts, that are moved on conventional motor vehicles not exceeding 12 tonnes gross weight or trailers not exceeding 10 tonnes gross weight, a Highways England Special Order* will be required if the rigid length exceeds 27.4m (89ft 11ins)	Highways England Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities.

NOTE 1 "Clear days Notice" excludes Saturdays, Sundays or a public holiday in any part of Great Britain in relation to movements authorised by the Special Types General Order only, there being no such exclusion in Special Orders unless specifically stated.

NOTE 2 There is no statutory limit governing the overall height of a load, however, when applying for a Special Order or VR1 it should, wherever possible, not exceed 4.95m (16ft 3ins) in order that the maximum use can be made of the motorway and trunk road network.

NOTE 3 The notification requirements for mobile cranes can be found in the Road Vehicles (Authorisation of Special Types) (General) Order 2003, statutory instrument number 1998 (Part 2 Articles 10 to 18), which is available on the OPSI website: http://www.legislation.gov.uk/uksi/2003/1998/contents/made

NOTE 4 Application to move Special Types or Special Purpose vehicles, such as very large agricultural vehicles, that may not be fully permitted by the Construction & Use (C&U) Regulations or fall outside the scope of the Special Types General Order should be made to the Vehicle Certification Agency (VCA). Their website is at http://www.dft.gov.uk/vca/

*A Special Order application can be completed and submitted online at www.highways.gov.uk/esdal. The Special Order application form BE16 can also be downloaded and e-mailed to the address below. Approval is not automatic and is at the discretion of the Highways England abnormal loads team acting on behalf of the Secretary of State for Transport. To ensure that the necessary clearances can be obtained in good time from the Police, Highway and Bridge Authorities, you should request permission for the move by returning the completed form 10 weeks prior to the scheduled date of the move. In fact you cannot apply too early and we invite manufacturers or hauliers to contact us at pre tender stage, before making a financial commitment to supply the load, to check whether permission would be granted.

** A VR1 application can be completed and submitted online at www.highways.gov.uk/esdal. The form can also be downloaded but must not be e-mailed or faxed because the VR1 form is a legal document and so we must receive the original signed form. Approval is not automatic and is at the discretion of the Highways England abnormal loads team acting on behalf of The Secretary of State for Transport. To ensure that the necessary formalities can be completed in good time, you should request permission for the move by posting the completed form 2 weeks prior to the date of the scheduled move. Again, you cannot apply too early and we invite manufacturers or hauliers to contact us at pre tender stage, before making a financial commitment to supply the load, to check whether permission would be granted.

Forms and enquiries to:
Highways England
Abnormal loads team
9th Floor, The Cube
199 Wharfside Street
Birmingham B1 1RN

E-mail: abnormal.loads@highwaysengland.co.uk
Tel: 0300 470 3004

Appendix 4

Selected Correspondence

Daisy Wynn

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Sent: 29 August 2018 10:19
To: Daisy Wynn
Cc: Jackson Martin (CEFNFFYRDD); Wright Nic (CEFNFFYRDD); Abnormalloads
Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Daisy,

Sorry for any delay.

At this point in time I have the following comments:

The A487T north of Caernarfon is a North Wales Police prohibited route so you will need to contact them regarding this.
Even if the A487T north of Caernarfon is avoided, then A487T Bontnewydd bridge is currently a prohibited structure and I have no information on any works in the pipeline to rectify this.
The Bontnewydd / Caernarfon bypass could be underway or completed.
As the loads are up to 5m wide then cars will need to be moved at Penmorfa village and at the eastern end of Penrhyndeudraeth. We will need to apply for an order 12 weeks beforehand.
Traffic will need to be stopped at the pinch point just to the west of the Oakley Arms, Maentwrog.
The presumption is that a police escort will be used.

Thanks

Steve

Steven Gruffudd King LLB PGDip
Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
Network Occupancy and Abnormal Loads Officer
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent
Neuadd y Sir, Aberaeron SA46 0AT
☎ 01545 571960
✉ stevenking@nmwtra.org.uk

From: Daisy Wynn <Daisy.Wynn@wynnslimited.com>
Sent: 24 August 2018 16:11
To: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>

Cc: Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>; Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>
Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

Hi Steve,

I've just tried to get hold of you regarding the below enquiry I sent at the end of last month.

Have you managed to give this anymore consideration?

We are hoping to complete our reporting next week so would appreciate if you could get something over to me as soon as possible.

Hope you have a great weekend.

Best wishes,
Daisy

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Sent: 31 July 2018 14:01
To: Daisy Wynn <Daisy.Wynn@wynnslimited.com>; RSGBRB@jacobs.com; Lisa Wheelwright-Brown (Lisa.Wheelwright-Brown@canalrivertrust.org.uk) <Lisa.Wheelwright-Brown@canalrivertrust.org.uk>; Abnormal Loads Officer (abnormal.loads@NetworkRail.co.uk) <abnormal.loads@NetworkRail.co.uk>; Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>; Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>; Susan Jones (abnormalloads@nthwales.pnn.police.uk) <abnormalloads@nthwales.pnn.police.uk>
Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

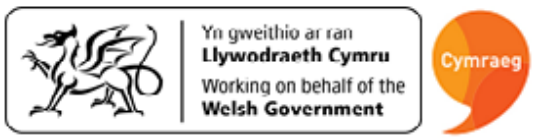
Hi Daisy,

Just a little note to say that we are considering this. At a first glance the two main issues you have are the A487T north of Caernarfon and the A487T at Bontnewydd Bridge. I am not sure what state Caernarfon bypass will be at the time of your movements – hopefully completed but will get back to you when I have more info.

Thanks

Steve

Steven Gruffudd King LLB PGDip
Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
Network Occupancy and Abnormal Loads Officer
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent
Neuadd y Sir, Aberaeron SA46 0AT
☎ 01545 571960
✉ stevenking@nmwtra.org.uk



From: Daisy Wynn <Daisy.Wynn@wynnslimited.com>
Sent: 25 July 2018 15:21

Daisy Wynn

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Sent: 29 August 2018 12:44
To: Andrew Pearce; Daisy Wynn
Subject: A487T Bontnewydd Bridge, south of Caernarfon

Hi Andy,

As requested:

The A487T Bontnewydd bridge is 'Pen y Bont Bridge' located at SH 48279 59866.

It was assessed recently as only suitable for C&U only, but this is being reviewed.

Thanks

Steve

Steven Gruffudd King LLB PGDip
Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
Network Occupancy and Abnormal Loads Officer
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent
Neuadd y Sir, Aberaeron SA46 0AT
☎ 01545 571960
✉ stevenking@nmwtra.org.uk

Daisy Wynn

From: Chapman Jonathan (YGC) <jonathanchapman@gwynedd.llyw.cymru>
Sent: 03 August 2018 11:29
To: Andrew Pearce
Cc: Daisy Wynn; Jones Owen Rhys (YGC)
Subject: RE: AIL Access via Pen y Mount Level Crossing
Attachments: Cable Drum B - Hiway Extent.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Morning Andrew,

I have marked up the attached indicating the extent of the public rights of way around the Cable Drum B location. On the alternative route past the football ground, just after turning of the Porthmadog Bypass, the road passes over a twin box culvert. This structure was built as part of the bypass around 2011 and so will able to carry the proposed loads.

With regards to all other routes off the trunk road network there is only one structure on Drum Route D. This structure is adequate to carry the proposed vehicles.

Cofion/Regards,

Jonathan Chapman, *MEng CEng MICE*
Prif Beiriannydd / Principal Engineer
YGC
Swyddfa'r Cyngor, Stryd y Jêl, Caernarfon, Gwynedd, LL55 1SH
t: 34481 | 01341 424 481 (Dolgellau) / 32311 | 01286 679 243 (Caernarfon)
e: JonathanChapman@gwynedd.llyw.cymru

From: Andrew Pearce <Andy.Pearce@wynnslimited.com>
Sent: 02 August 2018 12:23
To: Chapman Jonathan (YGC) <jonathanchapman@gwynedd.llyw.cymru>
Cc: Daisy Wynn <Daisy.Wynn@wynnslimited.com>; Jones Owen Rhys (YGC) <owenrhysjones@gwynedd.llyw.cymru>
Subject: AIL Access via Pen y Mount Level Crossing

Jon,

Thank you for your time during our telephone conversation on this today. You will no doubt get the cable drum and tunnel boring machine loads that my colleague Daisy has sent to authorities for consideration only last week via the formal channels but for info please see a copy of that sent to Rhys on this current project.

In the meantime can you clarify the extent of the public highway on the route labelled Cable Drum B Route as attached as we discussed? I also attached an extract of mapping data from my client detailing the potential site access points we are looking at. My understanding is that the public highway ends to the west of the level crossing at approximate OS Ref SH 5739 3963. Therefore for the loads to use the remainder of the road/bridleway and the level crossing the each private land owner would need to be contacted. We are already in discussions with the Welsh Highland railway/Ffestiniog Railway Company on the issue of using the level crossing.

Daisy Wynn

From: Nicholson Katie <Katie.Nicholson@networkrail.co.uk> on behalf of Network Rail Abnormal Loads <NetworkRailAbnormalLoads@networkrail.co.uk>
Sent: 27 July 2018 09:31
To: Daisy Wynn
Subject: RE: Q-652 AIL Access to Glaslyn and Snowdonia Sites

Follow Up Flag: Follow up
Flag Status: Completed

Hi Daisy,

Your proposed routes do not affect any Network Rail owned road over rail bridges or tunnels therefore we have no objection to them.

Please note we only check the load carrying capacity of Network Rail owned road over rail bridges affected we do not check anything else including:

- Load carrying capacity of level crossings
- Clearance to bridge parapets
- Clearance under a rail bridge
- Clearance to overhead wires at level crossings

Just so you are aware, one of your sites is very near the structure below, so if the route changes to cross this, we will need to be notified.

Structure: DJP/B/117-73.25
Road Name: Road From Osmond Terrace Passing Syenite Terrace And Erw Wen To Bwlch Bryn Road, Penrhyndeudraeth (View Map)

Indicative capacities:
STGO 1: 50
STGO 2: 80
STGO 3: 120
Crane Cat A: 36
Crane Cat B: 63
Crane Cat C: 67

If you have any further questions please let us know.

Many Thanks

Katie Nicholson
Abnormal Loads Assistant
Abnormal Loads Help Desk: 01908 783 140

NetworkRail Route Services

Abnormal Loads | National Records Group | Route Services
The Quadrant | Elder Gate | Milton Keynes | MK9 1EN
W http://www.networkrail.co.uk/abnormal-indivisible-road-loads/

Daisy Wynn

From: Howell, Tania <Tania.Howell@jacobs.com>
Sent: 26 July 2018 11:56
To: Daisy Wynn
Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

Follow Up Flag: Follow up
Flag Status: Completed

Hi Daisy,

Wow – you've certainly made me earn my keep with this one!!

I've looked at all the options……

There's a twin-bore tunnel passing beneath the A487 (at an oblique angle) about 2/3 of the way between the A55 and the A4087/B4547/A487 roundabout. The portals for this are a long way off the road, and there appears to be plenty of fill above them, so they should be OK for the specified vehicles.

I have nothing else on any of the other roads specified.

Cheers for now
Tania

Tania Howell
Abnormal Loads Officer
Jacobs
DDI: 0118 946 8911

If your mail concerns abnormal load movements, please reply to RSGBRB@jacobs.com

---

From: Daisy Wynn [mailto:Daisy.Wynn@wynnslimited.com]
Sent: 25 July 2018 15:21
To: RSGBRB@jacobs.com; Lisa Wheelwright-Brown (Lisa.Wheelwright-Brown@canalrivertrust.org.uk) <Lisa.Wheelwright-Brown@canalrivertrust.org.uk>; Abnormal Loads Officer (abnormal.loads@NetworkRail.co.uk) <abnormal.loads@NetworkRail.co.uk>; Martin Jackson (martinjackson@nmwtra.org.uk) <martinjackson@nmwtra.org.uk>; Nic Wright (NicWright@nmwtra.org.uk) <NicWright@nmwtra.org.uk>; King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Susan Jones (abnormalloads@nthwales.pnn.police.uk) <abnormalloads@nthwales.pnn.police.uk>
Subject: [EXTERNAL] AIL Access to Glaslyn and Snowdonia Sites

Dear All,

I'm writing with regard to a new route enquiry for several locations in North Wales requiring the delivery of cable drums, tunnel boring machine components and a mobile crane.

These deliveries are related to two separate projects; Glaslyn Cable Feed and Snowdonia Visual Impact Provision.

Daisy Wynn

From: Lisa Wheelwright-Brown <Lisa.Wheelwright-Brown@canalrivertrust.org.uk>
Sent: 31 July 2018 08:13
To: Daisy Wynn
Subject: FW: AIL Access to Glaslyn and Snowdonia Sites
Attachments: 0081-25.07.18 - AIL Access Study - Snowdonia and Glaslyn Projects, North Wales.pdf

Hi Daisy

Hope you are well?

The proposed routes attached do not affect the Canal & River Trust's infrastructure.

Kind Regards

Lisa Wheelwright-Brown
Technical Administrator

T 0113 2005759 (6259)
E lisa.wheelwright-brown@canalrivertrust.org.uk

Canal & River Trust
Fearns Wharf, Neptune Street, Leeds, LS9 8PB
canalrivertrust.org.uk

From: Lisa Wheelwright-Brown
Sent: 30 July 2018 11:58
To: Abnormal Loads <Abnormal.Loads@canalrivertrust.org.uk>
Subject: FW: AIL Access to Glaslyn and Snowdonia Sites

Appendix 5:

Biosecurity Risk Assessment

National Grid

Visual Impact Provision (VIP), Snowdonia Project

Biosecurity Risk Assessment

660952

SEPTEMBER 2019

RSK

RSK GENERAL NOTES

Project No.: 660952

Title: VIP, Snowdonia – Biosecurity Risk Assessment

Client: National Grid

Date: September 2019

Office: Helsby

Status: Rev01

Author	Will Holden	**Technical reviewer**	Tom Smith
Signature		Signature	
Date:	16 September 2019	Date:	18 September 2019

CONTENTS

1 INTRODUCTION

1.1 Purpose of this Method Statement

The Visual Impact Provision (VIP) represents a major opportunity to conserve and enhance the natural beauty, wildlife and environmental heritage within protected landscapes. The project will make use of a £500 m allocation by Ofgem to carry out work to help reduce the impact of existing transmission lines in English and Welsh Areas of Outstanding Natural Beauty (AONBs) and National Parks.

The VIP Snowdonia Project in the Snowdonia National Park aims to reduce the visual impact of National Grid's 4ZC overhead line (OHL) across the Dwyryd Estuary near Penrhyndeudraeth, Gwynedd by relocating a section of the OHL below ground.

Surveys of the proposed construction area and access routes undertaken by RSK Environment Ltd in 2018 (RSK, 2018) recorded large stands of *Reynoutria japonica* (Japanese Knotweed) as well as smaller stands of *Crassula helmsii* (New Zealand Pigmyweed), *Crocosmia ×crocosmiiflora* (Montbretia) and *Parthenocissus quinquefolia* (Virginia-creeper). The location of the invasive species within the vicinity are shown on *Figure 1*.

This Biosecurity Risk Assessment focusing on the management of invasive species relates to construction of the access routes, works compounds, tunnel head houses and sealing end compounds as well as removal of overhead lines that are close to any areas of invasive non-native species.

This is a working document that should be reviewed and maintained throughout the construction period as a record of activities. It details measures to prevent the spread of invasive non-native plant species into the surrounding environment as a result of the construction works being undertaken. It also provides advice on the process of eradicating non-native invasive plant species in the area of permanent structures.

2 INVASIVE NON-NATIVE SPECIES LOCATIONS

The confirmed locations of invasive plant species are shown on *Figure 1*. A description of the invasive species present at each location on *Figure 1* is given in detail in the botanical survey report (RSK, 2018).

A summary of the species present at each location on *Figure 1* is provided below:

Location	Species	Notes
1	Japanese Knotweed	15 m x 10 m in woodland.
2	Japanese Knotweed	4 m x 2 m in corner of residential garden and smaller stands c.1 m x 1 m along access road.
3	Japanese Knotweed	1 m x 1 m adjacent to access track.
4	Japanese Knotweed	25 m x 15 m adjacent to lay by and access road.
5	Japanese Knotweed; Montbretia	Japanese Knotweed and Montbretia *c.*5 m x 1 m scattered throughout area of Bramble.
6	Japanese Knotweed	15 m x 20 m adjacent to lay by and access track.
7	Japanese Knotweed	4 m x 1 m in an area of Bracken.
8	Japanese Knotweed	20 m x 10 m on railway embankment next to road bridge.
9	Japanese Knotweed	Remnants of treated Japanese Knotweed root stocks c.2 m x 5 m. Some re-growth around 5 cm high adjacent to field gate.
10	Japanese Knotweed	Remnants of treated Japanese Knotweed root stocks c.10 m x 10 m. Some re-growth around 5 cm high at the base of pylon.
11	Virginia-creeper; Japanese Knotweed	Virginia-creeper - c. 10 m x 5 m alongside railway embankment and small stand of Japanese Knotweed c. 0.5 m x 0.5 m adjacent to farm access track.
12	Japanese Knotweed	40 m x 3 m alongside road and railway embankment.
13	New Zealand Pigmyweed	At northern margin of pond.
14	Montbretia	5 m x 1 m in a single patch amongst ruderal herbs.
15	Japanese Knotweed	1 m x 2 m at the base of an earth bund.
16	Japanese Knotweed	1 m x 2 m adjacent to the entrance to the compound.

Please note, botanical survey to record the presence of invasive species are non-intrusive. While they can record visible plant species, they can not record the presence of species under the ground or contamination of spoil where no above ground growth is observed.

The information regarding the presence of invasive species, contained within this method statement, was recorded in summer 2018. It is possible that stands of invasive species have spread or appeared since the most recent survey was completed.

3 CHARACTERISTICS AND ECOLOGY

3.1 Japanese Knotweed

Japanese Knotweed (*Reynourtia japonica*), a rhizomatous perennial, was introduced from Asia to Europe in the mid-nineteenth century as an ornamental and fodder plant. It is an aggressive species growing to a height of 2-3 m, with bamboo-like stems, arching branches and clusters of creamy white flowers appearing late in the season. The orange to brown coloured, woody, dead stems persist erect throughout the winter and new shoots, produced from the extensive rhizome system, grow up amongst these the following spring to form dense thickets. The dead stems and leaf litter decompose very slowly and form a deep organic layer which prevents native seeds from germinating. Once present at a site, Japanese Knotweed increases in area very rapidly and soon forms monoculture stands.

Reproduction is primarily by vegetative regeneration from any fragment of the plant, but especially the rhizomes and fresh stems. The rhizome system may extend from a parent plant up to 7 m laterally and to a depth of 3 m. Very small fragments of rhizome (as little as 0.7 g) give rise to new plants. Fresh stems produce shoots and roots when buried in a soil medium or floated in water. Stems in water may produce viable plants within six days.

Japanese Knotweed thrives on disturbance and is spread by natural means and by human activity. In the past, fly-tipping and transportation of soil containing rhizome fragments have been a major cause of spread, particularly in the urban environment.

3.2 Montbretia

Crocosmia species are easily recognised when in flower by the distinct shape and colour of their flower heads. All are non-native in the UK. The hybrid called Montbretia, with relatively short stems and orange flowers, is the main species to have escaped into the wild; however, a number of other ornamental *Crocosmia* species are grown in gardens and other landscaped areas.

Montbretia was originally created in France from parent plants of South African origin. Introduced to the UK in 1880 as a garden plant, it escaped by 1911 both naturally and through the disposal of garden waste, and spread rapidly across the UK in the latter part of the 20th century.

Montbretia can completely dominate habitat where it grows, sometimes excluding native plant species. It spreads mainly by rhizomes and culms (bulb-like structures), rarely by seed.

3.3 New Zealand Pigmyweed

New Zealand Pigmyweed is a submerged, emergent and terrestrial plant. It is a perennial with yellowish-green opposite; succulent leaves around 20 mm long and solitary white or pale pink flowers. It is readily recognisable when growing at the edges of water bodies by its fleshy leaves. Submerged leaves are less easy to see and recognise. It reproduces from very small stem fragments but does not produce viable seed in the UK.

Originally introduced in 1911 as an oxygenating plant for ponds and, since the 1970s, has spread rapidly. It forms dense mats and can impede drainage, causing flooding as well as displacing other aquatic plant species and reducing amenity use of the waterbody. It can cause oxygen depletion of the underlying water leading to a decline in invertebrates, frogs, newts and fish.

3.4 Virginia-creeper

Virginia-creeper is a deciduous perennial woody climber that can grow 15 m or more over trees or up walls and structures. It climbs by means of cup-like adhesive shoot tips borne on branched tendrils. It has stalked five-lobed leaves which turn crimson before falling in the autumn. Each leaflet is 3-15 cm long with toothed margins. Inconspicuous small white-green flowers are borne on loose clusters and berries are rounded, 4-6 mm in diameter and blue-black when ripe.

It is most typically found in man-made habitats such as urban railway embankments, old walls and buildings and road verges but it also invades scrub and hedgerows.

3.5 Legislation

Japanese Knotweed, Montbretia, New Zealand Pigmyweed and Virginia-creeper are non-native invasive plant species and are listed under *Schedule 9* to the *Wildlife and Countryside Act 1981* with respect to England and Wales. It is an offence to plant or otherwise allow these species to grow in the wild.

Japanese Knotweed is very easily spread from cut stems and particularly through fragments of rhizomes (underground stems). Due to the invasive nature of the plant and the ease at which it can spread, Japanese Knotweed can cause serious problems if left unchecked, getting into brickwork, foundations, services, drains, walls and easily pushing through tarmac surfaces.

Montbretia is spread by the disturbance or distribution of rhizomes and corms in excavated contaminated spoil.

New Zealand Pigmyweed dispersal in the UK is by vegetative fragments, of which even a single node on 10 mm of stem can root to form a new plant. It is spread by movement

of vegetative fragments on boats, machinery used to manage water bodies, clothing and possibly wildfowl.

Virginia-creeper grows from seed and usually spreads by rooting wherever stems touch the ground. It is likely to reproduce vegetatively, either by rooting at nodes wherever stems are in contact with the ground or from a creeping rootstock which throws up new shoots at intervals. It can regenerate from root fragments discarded in garden waste.

Japanese Knotweed

Montbretia

New Zealand Pigmyweed

Virginia-creeper

4 METHOD STATEMENT

4.1 Overview

The methods outlined below are the most effective for the control of non-native invasive species at each location. The types of work that will take place include:

- temporary impacts at temporary access routes, cable installation, construction compounds and removal of overhead power lines, where land will be returned to the landowner on completion of the project; and
- permanent impacts where a permanent construction footprint will remain (including tunnel head houses, sealing end compounds and permanent access routes).

This Method Statement therefore considers methods for site access and works within 10m of any stands of the non-native invasive plant species. It also includes options for management of invasive species in permanent construction areas. Measures contained in relevant DEFRA and Environment Agency best practice guidance on the control and removal of invasive weed species will be implemented.

Long-term management is not covered in this method statement.

These methods are required for any works within 10 m of any stands of non-native invasive plant species (listed in *Section 2*). Distances should always be measured from the outermost visible plant stem. Although the method statement focusses on the works listed above, the principals should be applied to any other work undertaken close to any non-native invasive plant species

4.2 Temporary Development Areas

This section covers temporary works areas, such as temporary access routes, site compounds and open cut cable installation. This is only relevant for areas where eradication of invasive species is not required, but methods to prevent their spread are appropriate. It assumes that these works will take place in areas where, on completion, land will be returned to its previous use and condition.

4.2.1 Responsibilities and Timescales

Responsibilities and liabilities for the precautionary methods of works and site set up are to be agreed by National Grid and the site construction contractor prior to works commencing. All parties are to be made aware of the risks and control procedures for dealing with non-native invasive plant species.

Prior to and during any traffic entering the site, the following methods will be employed to prevent the spread of non-native invasive plant species.

4.2.2 Site Set Up – Access

- A suitable fence that can clearly be seen should mark out the areas of infestation with an exclusion zone of at least 7 m (preferably 10 m). Signs should warn people working there that there is Japanese Knotweed, Montbretia, New Zealand Pigmyweed or Virginia-creeper contamination.
- The barrier fencing will be inspected daily to check suitability for use and any defects address immediately.
- An ecological clerk of works responsible for overseeing the Method Statement will be identified and will brief all site staff.
- Any site access tracks within 10 m of any non-native invasive plant species should be lined with root barrier membrane to prevent the transport or spillage of contaminated material on to the site. The barrier membrane should be covered with hardcore stone to prevent it becoming punctured. Once works have been completed, the root barrier material should be classed as contaminated and be disposed of to a suitably licenced landfill site in accordance with waste Duty of Care. The waste carrier (if relevant) and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste.
- Vehicles with caterpillar tracks should not be used within the infested areas but may use trackway installed over the top of invested areas..
- Vehicles carrying contaminated spoil, which are leaving the area, should be covered to prevent contaminated material escaping, and either be confined to access routes protected by root barrier membranes, or be pressure washed *in situ*.
- A boot brush and wash will be provided for the cleaning of footwear when leaving the contaminated area.
- All machinery, equipment, footwear and clothing working in areas of invasive species infestation should be checked and washed down *in situ* to remove all plant fragments before leaving the site.

4.2.3 Temporary Construction Works

- A root barrier membrane should be placed around the site of the proposed works in areas which are within 10 m of any stands of non-native invasive plant species.
- All temporary construction works should only be carried out under direction of the ecological clerk of works responsible for overseeing the works.
- Excavated materials from areas that are contaminated (any areas within 7 m of a stand of non-native invasive plant species) should be placed on a root barrier membrane to prevent cross-contamination of the site.
- The excavated material should be covered and cordoned off from the rest of the site with appropriate signage in place.
- Stockpiled contaminated material and barrier fencing will be inspected daily to check suitability for use and any defects address immediately.
- Machinery used to excavate material must be cleaned *in situ* to prevent the accidental spread of contaminated material from the site.
- All contaminated spoil must remain on the site and should be returned to the same excavation from which it has been removed when the works are completed.
- Any soil samples removed from the site for testing should be disposed of as contaminated waste.
- Once construction works have been completed, all root barrier membranes from the works area and access tracks must be disposed of as contaminated waste to a suitably licenced landfill site in accordance with waste Duty of Care. The waste carrier and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste.
- Following completion of the works construction areas should be inspected by the ecological clerk of works for any evidence of spilt contaminated material.

4.3 Permanent Development Areas

This section covers permanent works areas, such as permanent access routes and tunnel head house locations and sealing end compounds. This is relevant for areas where eradication of invasive species is required and methods to prevent their spread are appropriate.

Although there are a number of options available for the control and treatment of invasive species, the majority require a number of years to be effective. The methods outlined below are those that may be most appropriate given the level of infestation and the timescales involved.

These methods are required for any works within 10m of any invasive species. The principals should be applied to any other work undertaken in close proximity of any non-native invasive plant species.

4.3.1 Responsibilities and Timescales

Responsibilities and liabilities for the treatment of invasive species at the site are to be agreed by the client, principal contractor and invasive-species contractor prior to treatment commencing. All parties are to be made aware of the risks and control procedures for dealing with invasive species on the site.

A programme of timescales for treatment and management as well as for construction of the project should also be agreed by the principal contractor, client and invasive- species contractor prior to works commencing.

4.4 Excavation and Disposal

Prior to and during any traffic entering the site, the following methods will be employed to prevent the spread of non-native invasive plant species.

4.4.1 Site Set Up – Access

- A suitable fence that can clearly be seen should mark out the areas of infestation. Signs should warn people working there that there is Japanese Knotweed, Montbretia, New Zealand Pigmyweed or Virginia-creeper contamination.
- An ecological clerk of works responsible for overseeing the Method Statement will be identified and will brief all site staff;
- Any site access tracks within 10m of any non-native invasive plant species should be lined with root barrier membrane to prevent the transport or spillage of contaminated material on to the site. The barrier membrane should be covered with hardcore stone to prevent it becoming punctured. Once works have been completed, the root barrier material should be classed as contaminated and be disposed of to a suitably licenced landfill site in accordance with waste Duty of Care. The waste carrier (if relevant) and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste.
- Vehicles with caterpillar tracks should not be used within the infested areas, unless confined to suitable access trackway.
- Vehicles leaving the area should either be confined to access routes protected by root barrier membranes, or be pressure washed *in situ*.
- A boot wash will be provided for the cleaning of footwear when leaving the contaminated area.
- All machinery, equipment, footwear and clothing working in areas of invasive species infestation should be checked and washed down *in situ* to remove all plant fragments before leaving the site.

4.4.2 Excavation

- Excavation of contaminated soil should include all areas within 7 m of the nearest above ground growth of any invasive non native plant species.
- Machinery used to excavate material must be cleaned *in situ* to prevent the accidental spread of contaminated material from the site.
- Stockpiled contaminated material and barrier fencing will be inspected daily to check suitability for use and any defects address immediately.
- Excavation should be to *c.* 3m depth for Japanese Knotweed and *c.* 0.5 m depth for all other invasive species, although in some cases, particularly for established stands, deeper excavations will be required. Final excavation depths should be agreed by the invasive species contractor in consultation with the principal contractor and ecological clerk of works.
- Following completion of the works construction areas should be inspected by the ecological clerk of works for any evidence of spilt contaminated material.

4.4.3 Disposal to Landfill

Contaminated waste taken off site must be taken by a licensed waste carrier to a suitably authorised landfill site (as per the Environmental Protection Act). The waste carrier and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste. An experienced clerk of works will supervise excavation and disposal ensuring that the work is undertaken under controlled conditions and that appropriate health and safety measures are implemented.

4.5 Post-development Works

A programme of treatment may be required following completion of the works to prevent the spread of invasive species onto the site from untreated areas adjacent to the construction site. This should be conducted until no regrowth is observed. Discussion with the landowners for the adjacent land will be required to gain agreement for the treatment programme. It is the responsibility of National Grid to ensure post-construction treatment is carried out.

Treatment options include spraying the plants with an appropriate herbicide, but this may affect non-target plant species. The treatment chemical and most appropriate timescales for application should be identified by the invasive species contractor in consultation with the client and ecological clerk of works. These works should be carried out before the plants flower or set seed and may be required for up to or more than five years for successful control to be established.

Invasive plant species are susceptible to a range of herbicides including glyphosate, the active ingredient in products such as 'Roundup biactive' and 'Glyphos biactive'. While the more persistent chemicals containing active ingredients, such as Icade, are also effective, glyphosate has many properties which make it more suitable for use as part of this treatment programme. Many formulations of glyphosate are currently suitable for use in or near water; the product is deactivated by micro-organisms in soil; it doesn't

leach and it has low toxicity to animals. The biactive formulations of glyphosate are generally regarded as the most suitable.

Care must be taken to avoid drift onto non-target plants and lawns, and to apply the herbicide during suitable weather conditions. If there is risk to other plants, a weed wiper or stem injection should be used instead of a spray.

Natural Resource Wales must be contacted before using any herbicide in or near a stream or river to consult regarding any necessary approvals that may be required.

The person undertaking the spraying must hold a Certificate of Competence for herbicide use or should work under the direct supervision of a certificate holder. A COSHH assessment must be carried out for all activities involving herbicides.

Contractor qualifications and insurances should be obtained prior to works commencing and appended to this method statement. In addition, monitoring records (including photographs) should also be appended to this method statement to track the progress of the treatment at the site.

5 METHOD STATEMENT SIGN OFF

Declaration – by signing this document, I confirm that I have read and understood this document, and that I will comply with all measures detailed above.

NAME (PRINT)	ORGANISATION	SIGNATURE	DATE

6 REFERENCES

Defra (2013). Environmental management – guidance Prevent harmful weeds and invasive non-native plants spreading. https://www.gov.uk/japanese-knotweedgiant-hogweed-and-other-invasive-plant.

https://www.property-care.org/wp-content/uploads/2018/05/PCA-COP-Control-of-Knotweed-24pp_04.05.18-WEB.pdf

RSK Environment Ltd (2018). *National Grid – Snowdonia Botanical Report REV01*

GB Non-native species secretariat ID guides:

Japanese Knotweed
https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=369

Japanese Knotweed (Welsh)
https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1231

Montbretia
https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=362

New Zealand Pigmyweed
https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=360