Renewable UK Cymru

Mid Wales Wind Farms Transport Route

Environmental Assessment

20 December 2013

AMEC Environment & Infrastructure UK Limited

Renewable UK Cymru

Mid Wales Wind Farms Transport Route

Environmental Assessment

20 December 2013

AMEC Environment & Infrastructure UK Limited

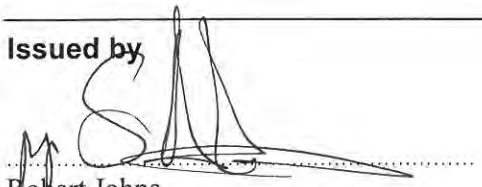
Report for

Mr L Rhys
Renewable UK Cymru
21 Cathedral Road
Cardiff
CF11 9AY

Main Contributors

Richard Breakspear
Joanne Ellam
Ian Gates
Lianne Grogan
Ian Hepplewhite
Robert Johns
Thomas Jones
David Kenyon
Nick Masters
Tom Murray
Richard Wells
Andrew Whitfield

Issued by



Robert Johns

Approved by

David Kenyon

AMEC Environment & Infrastructure UK Limited

Canon Court, Abbey Lawn, Abbey Foregate,
Shrewsbury SY2 5DE, United Kingdom
Tel +44 (0) 1743 342 000
Fax +44 (0) 1743 342 010

h:\projects\31775 mid wales wind farms transport route\docs\rr194i6.doc

ISO 9001 - FS 13881
ISO 14001 - EMS 69090

Copyright and Non-Disclosure Notice

Third Party Disclaimer

Document Revisions

No.	Details	Date
1	Draft for client comment	June 2013
2	Draft report	20 November 2013
3	Complete Draft	4 December 2013
4	Final Draft	6 December 2013
5	Revised Final Draft	12 December 2013
6	Final Report	20 December 2013

Executive Summary

Purpose of this Report

This report has been prepared to set out the environmental effects arising from proposals for highway works to facilitate the delivery of abnormal loads into mid Wales, for the construction of wind farms in TAN 8 Strategic Search Areas (SSAs) B and C. These works include the creation of lay by areas (passing places), lay down areas and works required as a result of swept path and vertical alignment analysis.

Contents

1. Introduction

1.1.1 This report has been prepared to report upon the assessment of the environmental effects arising from proposals for highway works to be carried out to the proposed strategic route to facilitate the delivery of abnormal loads into mid Wales, for the construction of wind farms in TAN 8 Strategic Search Areas (SSAs) B and C. These works include the creation of lay by areas (passing places), lay down areas and works required as a result of swept path and vertical alignment analysis.

1.1.2 Consistent with the Environmental Impact Regulations, the assessment of potential environmental effects has been scoped to include a description of the likely significant effects arising from the development upon the environment.

1.1.3 AMEC has been commissioned by Renewable UK Cymru (ReUK) to produce this assessment, based on information that has been provided to Grontmij and Aecom consultants (acting on be half of ReUK) for the production of the strategic Traffic Management Plan (sTMP) for Mid Wales Wind Farms.

2. The Development

2.1 Overview

2.1.1 This section introduces the proposed works and briefly sets out the context for the sTMP which comprises five route sections. A generic description is provided of common elements of work proposed along the five route sections. Assumptions on which the assessment has been undertaken are presented, including an indication of the length of the construction programme. Where assumptions are made, such as in locations where works will be subject to detailed design, these are based on the realistic worst-case scenario.

2.1.2 The Welsh Government commissioned a series of studies to investigate options for the delivery of turbine components into all SSAs in Wales: Ellesmere Port was the preferred port of entry for access into SSA B and C[1]. The strategic route set out in the sTMP is consistent with the recommended options outlined in the Welsh Government studies. Turbine components for Mid Wales wind farms will be moved as abnormal loads in convoys from Ellesmere Port docks into Mid Wales via a strategic route along the public highway network. This will require localised improvements to the highway network to facilitate passage of the convoys and specifically new passing places to accommodate the convoys, as well as layover areas off the public highway to enable the journey to be split into sections.

2.1.3 The assessment of proposed works along the route has been split into the following transport route sections identified in the sTMP:

- Common Section of the route (Ellesmere Port to Welshpool) (sTMP Section 2);
- Welshpool to SSA B (North) (sTMP Section 3);
- Route from Welshpool to Newtown (sTMP Section 4);
- Newtown to SSA B (South) (sTMP Section 5); and
- Newtown to SSA C (sTMP Section 6).

2.1.4 This assessment has been undertaken using the following revisions of the sTMP, which are the most recent available at the time of the report:

- Section 1, Revision F (August 2012);
- Section 2, Revision E (August 2012);
- Section 3, Revision E (August 2012);
- Section 4, Revision D (August 2012);
- Section 5, Revision E (August 2012); and

[1] Capita Symonds Ltd for Welsh Assembly Government *Transport and Strategic Regeneration, Powys Wind Farms – Alternative Means of Component Delivery*, March 2010.

- Section 6 (Mochdre Option, December 2013).

2.1.5 The proposals set out in Sections 1 through 6 of the sTMP have been agreed with the Welsh Government.

2.1.6 A summary of the works required along these sections of the route are described in Section 4.2 below. Layover areas generally use existing highway depots, although some changes will be necessary to allow better access/egress.

2.1.7 Passing places will comprise hardened verges at the same level as the adjacent carriageway with no upstand, unless the existing carriageway requires a kerb as part of a positive drainage system: in these situations a low level vehicle crossing kerb will be provided. Three types of passing places are proposed:

- Hardened verges to hold the convoys entirely off-carriageway;
- Hardened verges to hold the convoys partly off-carriageway, where the existing verge is too narrow to accommodate the full width of the convoy vehicles; and
- Existing wide sections of carriageway, where opposing and following traffic could pass under police direction without any physical works.

2.1.8 The detailed design of the passing places and other highway works will be agreed with the relevant Highways Authorities, in light of specific requirements of the permitted schemes. Each location should be reviewed individually, although generally the assessment assumes they are likely to be formed in cellular grassed reinforced concrete paving such as grasscrete, or similar, to maintain the free draining nature of the verges. In situations where the existing verge slopes away from the carriageway, minor earthworks may be required to re-profile the slope such that the hardened verge can be incorporated adjacent to the carriageway with minimum crossfall. A minor retaining structure may be necessary where there is insufficient width of verge to accommodate a re-profiled slope at a suitable safe angle.

2.1.9 The Mochdre Option (Section 6) would require greater 'cut and fill' earthworks in order to cross the Black Hall Brook watercourse and achieve the gradient required for the change in level from 134 m AOD in the industrial estate to 142 m AOD at the A483 Dolfor Road and allow effective passage of the convoy vehicles.

2.1.10 In summary, the following assumptions have been made in the assessment with regard to construction methodology:

Likely Duration of the Works

2.1.11 It is anticipated that the works required on the sections of the route described in sTMP would be completed within a 6 month period. Specific works at individual locations may be completed in less than 2 weeks; while works for the Mochdre Link are anticipated to take approximately two months, the only impact on the public highway will be on completion of the link onto the A483. Works will be structured in a fashion to minimise disruption to the network in consultation with all key stakeholders.

Construction Activity Hours

2.1.12 Hours of construction are likely to be restricted by Planning Condition to 7am to 7pm during weekdays and 7am to 1pm on a Saturday. It is likely that there would be a restriction on working on Sundays and bank holidays as well as any other embargo

periods dictated by the trunk road agencies. There may be occasions when the relevant highway authority will require or approve overnight working in specific locations in order to minimise inconvenience or delay to other users of the network. This for example may apply to rural sections of the highway remote from residential areas.

Plant and Vehicles

2.1.13 It is anticipated that the following plant and vehicles will be used:

- Tracked Excavators (JCB or other);
- Tracked Grader;
- Dumper Trucks;
- Generators;
- Portable Lighting (where work is permitted during darkness/night-time);
- Pneumatic drills and compressors;
- Vans;
- Tipper Lorries;
- Low Loaders (deliveries of Plant);
- Ready Mixed Concrete Wagons; and
- Occasional Heavy Goods Vehicles (HGV) (delivery of materials).

2.1.14 Where carriageway widening is required using bitumen macadam materials then other plant such as Compacting Rollers will be used. All of the above plant and vehicles are typical of those that are commonly and frequently used in association with roadworks upon and/or adjacent to the public highway.

Traffic Management

2.1.15 The Contractors' method statement will outline the traffic management measures (for example; signage, bollards, temporary traffic signals) that may be required to enhance road safety and provide any necessary protection of the works during the construction period. There may be locations where, on occasion, the temporary use of traffic signals may be used to control traffic movements. All of these measures shall comply with Chapter 8 of the Traffic Signs Manual[2] and it will be an obligation of the appointed contractor, within the principal contract, to comply with identified safety measures.

Detailed Design and Mitigation Measures

2.1.16 The detailed design of the works will, as a requirement of Planning Conditions, be submitted for technical approval by the relevant Highways Authority and be subject to a Stage 2 Road Safety Audit. The Contractor will be required, as a contractual obligation, to submit a Method Statement (MS) for approval by the relevant highway authority. This will demonstrate how measures will be undertaken to control the construction sequences so as to minimise any inconvenience or delay to other road

[2] *Traffic Safety Measures and Signs for Road Works and Temporary Situations*, Parts 1 and 2, 2009, TSO London.

users. The MS will provide details of any specific measures deemed necessary to mitigate the impact upon any sensitive receptors (for example: working close to trees and hedgerows, property or land drains).

2.2 Route Sections

Common Section of the Route: Ellesmere Port to Welshpool (sTMP Figures 2-1 to 2-6 Inclusive)

2.2.1 The route from Ellesmere Port to Mile End Roundabout, Oswestry (the junction between the A5 and the A483), over some 57 km, follows trunk roads which will only require minimal changes for the transport of turbine components. Improvements are limited to minor changes to existing highway infrastructure such as roundabouts and footways.

2.2.2 A layover area is proposed in the vicinity of Mile End Roundabout. Two options are being considered: the Shropshire Council site adjacent to the north-east of the roundabout, which comprises some 22.8 ha of agricultural land under pasture, identified for employment use in Shropshire Council's long term strategy; and Oswestry Livestock Market, some 350 m west of the roundabout, where planning consent has been obtained for a replacement livestock market and mixed use regeneration scheme, which will include a livestock market dedicated lorry park. The groundworks for this scheme are currently underway and the completed consented scheme is considered to form part of the baseline for this assessment.

2.2.3 The remainder of the Common Section of the route, from Oswestry to Welshpool, covers some 24 km. A second layover area is proposed at the existing Pool Quay highway depot on the A483 to the north of Welshpool. This is located at the existing Pool Quay highway depot, used by Powys County Council, on land owned by the Welsh Government, who have confirmed in principle that it can be used as part of this scheme. A new gated access from the A483 will be required at the north-eastern corner of the depot and the existing gated access in the south-eastern corner of the depot will be modified. A new secure perimeter fence may also be required.

2.2.4 A third layover area is proposed at Abermule, as discussed at 2.2.6, below. The haul road proposed as part of the Mochdre Option –the Mochdre Link –is also suitable for use as a layover area.

Welshpool to SSA B (North) (sTMP Figures 3-1 to 3-6 Inclusive)

2.2.5 This section of the route uses the B4381 through Welshpool and then the A458 into SSA B (North), covering some 35 km. The convoy movement through Welshpool will require a temporary diversion, utilising the existing one way system, entailing the closure of the A458 Raven Street to eastbound traffic for a duration of 10 minutes. Eight passing places are proposed along the route, requiring some landtake from the existing highway verge. Swept path analysis has indicated that minor carriageway widening and kerb realignment will be required at one location -on the A458 near Melin-y-ddol -with an associated retaining wall or steepened earthworks as necessary.

Route from Welshpool to Newtown (Figures 4-1 to 4-6 inclusive)

2.2.6 This section of the route uses the A483 and covers some 21 km. Five passing places are proposed along the route, requiring some landtake from the existing highway verge. A layover area is also proposed at Abermule, north of Newtown. This will use an existing highway depot, used by Powys County Council, on land owned by the Welsh Government, who have confirmed in principle that it can be used as part of this scheme. The depot which will require some modification to the existing entrance on to the A483 and the provision of a new exit to the south-eastern corner.

Newtown to SSA B (South) (sTMP Figures 5-1 to 5-6c Inclusive)

2.2.7 This section of the route uses the A489 Llanidloes Road and then the A470 into SSA B (South) over a total of some 28 km. Six passing places are proposed along the route, requiring some landtake from the existing highway verge, which will be hardened for this purpose. Swept path analysis has indicated that changes will be needed in several locations, which will mostly be within the existing highway, other than in the following locations:

- A489/A470 junction at Caersws, to include landtake from the existing highway verge, some third party land and the removal of a length of hedgerow;
- Realignment of approximately 225 m of public highway north of the rail bridge on the A470 at Plas Llysyn, incorporating widened verges into third party land;
- Realignment of approximately 150 m of public highway on the A470 at Tirymynach, into third party land and including a retaining wall.

Newtown to SSA C (sTMP Figures 6-1 to 6-4 Inclusive)

2.2.8 A number of options have previously been considered for the Newtown to SSA C section of the route, in order to avoid Dolfor Road Rail Bridge on the A483 on the southern side of Newtown which has a registered height restriction of 4.04 m. The sTMP includes the preferred Mochdre Option, while other options have been suggested in support of specific wind farms.

2.2.9 The Mochdre Option follows the A489 Llanidloes Road out of Newtown as far as the Mochdre Industrial Estate. It then uses the main route through the industrial estate and it is proposed to extend this to re-join the A483. To provide this route it will be necessary to construct a haul road to link the existing industrial estate road to the A483, crossing Black Hall Brook using a culvert. This is referred to as the Mochdre Link. The incline from the existing industrial estate road at 134 m AOD to 142 m AOD at the A483 requires a 1:2 embankment, which would be approximately 13 m wide on each side of the 10 m wide road, 5 m wide overrun and 1 m wide verge.

2.2.10 The haul road would be of sufficient length to allow long term off road storage of an entire convoy including escort vehicles if required.

2.2.11 The route continues on the A483 as far as Gwynant. Four passing places are proposed on the A483 between Mochdre and Gwynant and nine locations have been identified where swept path analysis indicates that some highway construction work will be required.

3. Methodology

3.1 Overview

3.1.1 This section sets out the overall approach which has been undertaken to the assessment of potential environmental effects. The assessment includes for the consideration of the potential for environmental effects upon the following topics:

- Ecology/Ornithology;
- Landscape and Visual;
- The Historic Environment (Cultural heritage);
- Hydrology;
- Noise;
- Traffic and Transport; and
- Socio-economics.

3.1.2 Owing to the need to culvert Black Hall Brook under the Mochdre Option, and following consultation with Natural Resources Wales (NRW), a provisional assessment of flood risk has also been undertaken of this option.

3.1.3 The approach to the assessment has been desktop data collection exercise supplemented by site visits. For those topics where data has been gathered, a study area of 1 km has been used from passing place locations and other highway works, including those arising from swept path analysis[3]. This is a standard study area for an assessment of this type.

3.1.4 Detailed survey work has not been undertaken where standard survey methodologies require the survey of an area, the land within which would extend beyond the highway boundary, such as for the identification of suitable habitats for Great Crested Newts. However in such cases visual inspections from publicly accessible locations have been made. The relatively minor nature of works to be undertaken along the majority of the route, and the ready accessibility of many proposed works locations (i.e. adjacent to the highway) is such that consideration has been given as to locations where more detailed survey may be required, in light of detailed design proposals. To that end, this assessment anticipates the realistic worst case scenario, in consideration of current baseline conditions and a review of available data. Locations where further survey work is recommended are identified within the relevant sub-sections of this report. It is anticipated that this will be secured through the imposing of Planning Conditions on any permission. In the cases identified, the requirement for a specific survey is to provide the necessary information to comply with protected species legislation and it

[3] Some proposed passing places have moved since data was ordered, although the 1 km allows sufficient data to account for this.

does not reflect a lack of information with which to conclude a significant effect in EIA terms.

3.1.5 Effects have been considered where these may arise either from the construction of the development, or its operational phase, i.e. the movement of vehicle convoys along the route sections. In terms of construction effects, locations have been included in this assessment where there are *prima facie* grounds for a potential effect, based on the information provided in the sTMP.

3.2 Assessment of Significance

3.2.1 An evaluation is made of the significance of predicted effects. Significance is generally a product of the importance or sensitivity of the environmental resource or receptor and the nature and magnitude of the predicted effects. Effects are assessed as being significant or not significant.

3.2.2 Resource value is determined by reference to criteria such as rarity or sensitivity, or to a geographical hierarchy of designations. For example: Sites of Special Scientific Interest (SSSIs) are of national biodiversity value, whereas Sites of Importance for Nature Conservation (SINCs) are of local biodiversity value.

3.2.3 Receptor sensitivity is related to the type of use, for example residential dwellings are generally considered more sensitive than commercial premises, and schools and hospitals may be especially sensitive, depending upon the type of effect identified.

3.2.4 The magnitude of the effect refers to its degree or extent, defined where possible in quantifiable terms. The different dimensions of magnitude might include variables such as the area of a particular resource or number of receptors which are affected, or the duration, frequency or extent of an effect. Examples might include the area of land-take, the increase in noise levels or the extent of visibility of new infrastructure.

3.2.5 These considerations, together with any relevant environmental standards or guidelines, form the basis upon which professional judgement is used to assess the significance of effects is judged for each topic. In concluding whether an effect is significant the following matrix is used:

Table 3.1 Establishing the Significance of Effects

Magnitude	Receptor Importance/Sensitivity			
	High	**Medium**	**Low**	**Negligible**
High	Significant	Significant	Not Significant	Not Significant
Medium	Significant	Not Significant	Not Significant	Not Significant
Low	Not Significant	Not Significant	Not Significant	Not Significant
Negligible	Not Significant	Not Significant	Not Significant	Not Significant

3.2.6 The Significance table above assumes that effects are certain. This is the approach taken within the individual topic assessments, for example, it is not known that Great Crested Newts or breeding birds are present within the study area, however it has been assumed for the purpose of this assessment that they are and as such mitigation measures have been identified and an assessment of significance made, with such measures in place.

3.2.7 The following definition is adopted when defining significance:

- Significant: An effect which should be a key material factor in the consideration of the development. The Environmental Impact Assessment (EIA) regulations state that significant effects should be identified and evaluated;
- Not Significant: An effect which merited detailed assessment because it might have been significant but which following further consideration are considered to not be a material factor in the consideration of the development.

3.3 The Project Team

3.3.1 The project team are as follows:

- Project Director and Socio-Economics: David Kenyon BA(Hons) MA MRTPI, Technical Director;
- Project Manager and Historic Environment: Rob Johns BA(Hons) AIFA, Senior Consultant;
- Ecology (including Ornithology): Andy Whitfield BA PGCert MA CIEEM CEnv, Associate Director;
- Ecology (including Ornithology): Nick Masters BSc(Hons) MSc CIEEM, Senior Consultant;
- Ecology (including Ornithology: Section 6 only): Joanne Ellam MSc MCIEEM, Consultant;
- Hydrology: Richard Wells BSc(Hons), Senior Consultant;
- Flood Risk (hydrology): Richard Breakspear BSc PhD, Senior Consultant;
- Flood Risk (hydraulic modelling): Lianne Grogan BSc, Senior Consultant;
- Flood Risk: Thomas Jones MPhys MSc, Assistant Consultant;
- Noise: Ian Hepplewhite BSc(Hons) PGDip FIQ MIOA MISEE, Associate Director;
- Landscape and Visual: Ian Gates BA(Hons) MLD CMLI, Associate Director;
- Landscape and Visual: Tom Murray MA CMLI, Consultant;
- Traffic and Transport: Nick Secker BEng (Hons), Associate Director.

4. Scope

4.1 Introduction

4.1.1 The previous chapter has shown that the potential for significant effects is a product of the resource or receptor value/sensitivity and the nature and magnitude of the predicted effect. In order to determine the extent to which the environmental topics set out in Section 3 require detailed consideration it is considered appropriate to consider the nature of the effects relative to each and subsequently the extent to which the receiving environment includes receptors that are of value/sensitive.

4.2 Nature of Effects

Ecology/Ornithology

4.2.1 This section relates to the effects of the proposed works on habitats and fauna which may be considered valuable or for which there are relevant legal requirements. These are set out in Box 4.1 below. The assessment of ecology/ornithology considers direct and indirect effects.

4.2.2 It should be noted that the assessment of effects and identification of appropriate mitigation measures are based on a walkover survey and/or desk study, and have not included any specific surveys for target species. This methodology is considered appropriate given the scale of the works, the small size of working areas and the disturbance-prone nature of the habitats affected, which are adjacent to existing highways. Based on this information it is possible to make useful conclusions regarding the type of fauna which could be present, and the potential population sizes of any such fauna which could occur. For example, although reptiles could in theory be found on the grassland verges which may be affected, their actual presence is unlikely and even if present the population sizes would be inherently very small due to the small area of disturbance likely to occur.

4.2.3 Effects are most likely to arise where construction impacts comprise works outside the metalled highway, such as direct ground disturbance, the removal of hedgerows and/or trees, etc. No effects are predicted as arising from a range of minor works comprising alterations within the existing highway such as changes to junctions, the configuration of roundabouts, and movement of signage, street furniture, etc. Indirect effects resulting from the occasional use of the passing places/laydown areas during the operational phase are considered to have no potential for effects upon ecological/environmental receptors.

4.2.4 A data-gathering exercise was undertaken to obtain any available information relating to statutory and non-statutory nature conservation sites, priority habitats and species, and legally protected and controlled species (see **Boxes 4.1** and **4.2**). Information was collected within 1 km of the route as potential effects beyond this distance were assessed as unlikely to occur (based on the level of construction impact proposed and professional judgement).

4.2.5 A desk-based review was also undertaken to identify all waterbodies within 250 m of the work locations to determine the potential for great crested newts (*Triturus cristatus*) to be present. Whilst great crested newts can travel further than 250 m from breeding ponds, it is considered unlikely that the limited nature and extent of the works would result in a si gnificant effect at distances beyond that. P onds were identified using the Ordnance Survey 1:25 000 scale map and aerial photographs of the route.

Box 4.1 Designated Wildlife Sites, and Priority Habitats and Species

Statutory Nature Conservation Sites

Internationally important sites: Special Areas of Conservation (SACs) and candidate SACs, Special Protection Areas (SPAs) and proposed SPAs, Sites of Community Importance, Ramsar sites and European offshore marine sites.

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not subject to international designations and National Nature Reserves (NNRs).

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as biodiversity. Their level of importance is defined by their other statutory or any non-statutory designation (e.g. if an LNR is also an SSSI but is not an internationally important site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of borough/district -level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory Nature Conservation Sites

Sites of county importance: Non-statutory nature conservation sites notified as Local Wildlife Sites.

Priority Habitats and Species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats and species of principal importance for the conservation of biological diversity in England or Wales (see the fourth bullet point below) are identified as of national species/habitat importance reflecting the fact that these species/ habitats have been defined at a national level. The level of importance pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued (other than for waterfowl, for which thresholds have been defined for national/international 'population importance).

- International importance: populations of species or areas of habitat for which European sites are designated;
- International importance: populations of birds meeting the threshold for European importance (1% of the relevant international population);
- International importance: species listed as Near Threatened, Vulnerable or Endangered in the UK on the IUCN Red Data List (http://www.iucnredlist.org/apps/redlist/search);
- National importance: Habitats and species of principal importance for the conservation of biological diversity in Wales listed in Section 42 of the NERC Act 2006.(http://www.biodiversitywales.org.uk/en-GB/Section-42-Lists) or in England listed in Section 41 of the NERC Act 2006.(http://www.ukbap-reporting.org.uk/news/details.asp?X=45). These include those UK BAP priority habitats and species that occur in Wales and England;
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern Red List;
- National importance: Nationally Scarce species, which are species recorded from 16-100 10x10km squares of the national grid;
- National importance: Populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data is available);
- National importance: Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600);
- County importance: Habitats and species listed in the local County BAP;
- County importance: Species listed in County Red Data Books or listed as a County notable species;
- County importance: Populations of birds comprising at least 1% of the relevant County breeding/wintering population (where data is available).

Box 4.2 Legally Protected and Controlled Species

Legal Protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this appraisal, legal protection refers to:

- Species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale (see Section 9[5] and 13[2]), reflecting the fact that the Scheme does not include any proposals relating to the sale of species;
- Species included on Schedules 2 and 5 of the *Conservation of Habitats and Species Regulations 2010 (as amended)*; and
- Badgers, which are protected under the *Protection of Badgers Act 1992*.

Legal Control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it is an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

The Historic Environment

4.2.6 The historic environment encompasses archaeology and ancient monuments, listed buildings, conservation areas and historic parks, gardens and landscapes (Planning Policy Wales 5, 2012). These can be designated, specifically identified through statutory and non-statutory registers, or non-designated. The historic environment is a consideration in determining planning applications.

4.2.7 The assessment of the historic environment considers the direct and indirect effects. Direct effects on the historic environment are most likely to arise during construction, where impacts comprise works outside the metalled highway, such as direct ground disturbance, the removal of hedgerows and/or trees, etc. Only these locations are taken forward for consideration and assessment. The potential for direct effects to occur on any built heritage features which may be present in and adjacent to the highway has also been considered. No effects are predicted for those locations where minor works are proposed, such as those comprising alterations within the existing highway, movement of signage, etc.

4.2.8 Indirect effects on the historic environment are most likely to occur as a result of changes to the setting of a feature, whether permanent or temporary. Therefore construction activities may have an effect, although these are normally considered as a result of the completed (operational) scheme. The setting of a feature can be considered whether or not it is legally protected, although setting is most relevant to designated features, such as scheduled monuments, listed buildings (W.O. Circular 61/96, paragraph 11) and sites on the Register of Landscapes, Parks and Gardens in Wales (W.O. Circular 61/96, paragraph 16). Similarly to direct effects, minor works such as those within the highway have no potential to cause likely significant effects on the setting of historic environment features.

4.2.9 Data on the following historic environment constraints were obtained:

- Statutory heritage designations[4]; and
- Sites recorded on the Historic Environment Records (HER), maintained by Clwyd Powys Archaeological Trust (CPAT) and Shropshire County Council (SCC).

[4] Datasets from English Heritage, 11/02/2013; Cadw, January 2013.

Landscape and Visual

4.2.10 The following landscape and visual considerations have been included in the assessment based upon definitions provided in the most recent edition of the Guidelines for Landscape and Visual Impact Assessment[5]:

- "*An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.*" This includes direct effects upon the landscape elements alongside the proposed routes and effects upon landscape character (as defined by LANDMAP) and landscape designations although the route does not pass through any national or local landscape designations;
- "*An assessment of visual effects deals with the change and development on views available to people and their visual amenity.*" These people are termed visual receptors and for the purposes of this report include people with views from their residential properties, local communities, people undertaking outdoor formal and informal recreational activities, principally people using along public rights of way as well as people travelling along sections of the routes in vehicles or on bike. Specific effects will arise from changing the constituent factors in a visual receptor's views which for these propose works could involve the loss of specific visual elements such as individual hedgerow trees or sections of hedgerow and/or the introduction of new elements in the manner set out in Section 2.1.

Construction Period (including Permanent Land Take)

4.2.11 Landscape and visual effects during the construction period could arise from each individual construction activity and from the cumulative effect of the individual activities in a particular visual receptor's view, along a section of a route or within a LANDMAP aspect area.

4.2.12 The schedule of the proposed construction works that have been identified has been reviewed against the landscape and visual baseline in order to ascertain if any individual sites or route sections can be scoped out of the landscape and visual assessment. The outcome of this review has been to scope out the potential for most individual site construction works and cumulative effects for the Common Section of the route to Welshpool (sTMP Section 2). This reflects the fact that only a small number of sites along this long section would be required as this is routed along major trunk roads. Proposals for the passage of convoys require either no change at all, a new hardened section of the verge adjacent to the existing highway or minor overruns on roundabouts. Minor road improvement works such as these are to be expected periodically along such roads where the trunk road and its associated elements are already well-established landscape and visual elements. In these circumstances it is assessed that the temporary landscape and visual effects arising from any construction activities and small-scale loss of widely available landscape and visual elements, principally short sections of roadside verges would typically result in negligible magnitudes of change. Hence even if the affected landscape or visual receptors possess high sensitivity the level of landscape or visual effect would be expected to be

[5] As defined in the recently published third edition of the Guidelines for Landscape and Visual Impact Assessment.

not EIA significant. The only exceptions along the Common Section of the route where the scale of the potential works could result in higher magnitudes of landscape or visual change on a limited number of landscape or visual receptors could be with regard to the two potential layover area options close to Mile End Roundabout, east of Oswestry, the potential layover area at Pool Quay to the north of Welshpool and a limited number of passing places. Consequently these sites have been included in the assessment.

4.2.13 Along the remaining route sections (sTMP Sections 3-6) all the proposed construction sites have been taken forward into the landscape and visual assessment. For these sites the scope of the landscape and visual assessments has been defined as follows:

- Landscape effects have been assessed with regard to the potential effects upon local landscape elements including both loss of any existing landscape elements and the introduction of new landscape elements; and effects upon landscape character as defined by both LANDMAP Visual and Sensory Aspect Areas and the Powys Landscape Character Areas that these route sections pass through. Landscape effects upon landscape designations would also normally be assessed but there are no national or local landscape designations within 1 km of any parts of these route sections (sTMP Sections 3-6), hence landscape designations have been scoped out by default;
- Visual effects have been assessed with regard to potential effects upon visual receptors located within 1km of any of the proposed sites. These visual receptors include people living in properties (isolated individual properties and in settlements), people undertaking outdoor recreational activities including using public rights of way and people travelling along the roads themselves.

Operational Period

4.2.14 The visual effects arising from the temporary parking of abnormal loads are considered not to have the potential to be significant in either landscape or visual terms because they would be only temporary effects and the temporary presence of parked vehicles is to be expected alongside roads. Also it should be noted that during the operational period the gradual establishment of any new hedgerow, scrub or tree planting and/or the re-establishment of any translocated sections of hedgerow may serve to further reduce the magnitudes of landscape and visual change.

Hydrology

4.2.15 Effects on hydrology, which for the purposes of this study is taken to include water quality and flow considerations, are most likely to arise where construction impacts comprise works in close proximity to surface water features (e.g. streams, standing water) and outside the existing highway footprint.

4.2.16 The assessment of potential hydrology effects has due consideration for:

- A baseline road environment which comprises existing drainage controls and road runoff (which will contain concentrations of suspended solids and other pollutants such as Cu and Zn);
- Potential pathways by which potential effects may reach hydrology receptors (streams and other water features); and

- Pollution prevention measures and good construction practices, including sustainable urban drainage (SUDs) where appropriate and which are assumed to form part of the project design.

4.2.17 At the initial scoping stage the use of professional judgment concluded that no effects were predicted to arise from the range of proposed minor works comprising alterations within the existing highway, movement of signage, street furniture etc.

4.2.18 A secondary scoping exercise was conducted following review of each individual project component (each passing place, layover area and development required as a result of swept path analysis) in the context of the baseline surface water environment and the considerations listed above (in bullets). A summary of this secondary scoping exercise, which should be read in conjunction with this section, is presented as part of the Baseline Hydrology discussions (from 4.3.55).

Flood Risk

4.2.19 The potential for flood risk was identified as a result of the need to (further) culvert Black Hall Brook under the Mochdre Option (Newtown to SSA C). Consultation was undertaken with NRW and Powys County Council, who are both the Local Planning Authority (LPA) and the Lead Local Flood Authority (LLFA). The site is not located within an Internal Drainage Board district.

4.2.20 NRW identified the potential increase in flood risk which may be caused by the further culverting of the Black Hall Brook watercourse. T here is a commercial building and car park immediately upstream of the proposed culvert location which has been identified as a receptor to potential increased flow attenuation caused by the new culvert. A thorough culvert assessment would therefore be required to inform the design proposals for the watercourse crossing. A key aspect of the culvert assessment is the accurate determination of peak flows within the catchment.

Noise

4.2.21 Effects are most likely to arise from the construction aspects arising from the sTMP as well as the actual transport of turbine parts to their respective wind farm sites via the vehicle convoys. The scoping of potential noise effects concentrates on the road links identified within the Overview Report (sTMP Section 1), as the potential impact of general construction operations including traffic within the local area of each individual wind farm project is outside the scope of the sTMP and this assessment.

4.2.22 The construction aspects of the scheme include activities associated with the construction of lay over areas and passing places as set out in Section 2 of this report. The types of activities associated with the construction of these areas are likely to include:

- Fencing activities;
- Some resurfacing activities; and
- Upgrading of and/or new access arrangements.

4.2.23 The passing places are likely to comprise of a combination of:

- Hardened verges entirely off carriageway;

- Hardened verges partly off carriageway, and
- Existing sections of wide carriageway.

4.2.24 The hardened verges are likely to be constructed of cellular grass reinforced concrete paving, e.g. grasscrete. Some regrading of the existing highway verge is generally indicated to facilitate passing places where these are off carriageway. In other locations, the potential requirement for cut and fill earthworks is implied by the potential need for a retaining wall (e.g. Figure 3-3j).

4.2.25 The main source of construction noise is likely to be from the operation of the plant and equipment used to construct the laying over and passing place areas. These vehicles will be similar to those used in typical roadworks/maintenance activities comprising of plant and equipment capable of being transported to and from the site on normal HGVs and are set out in Section 2.1 under Plant and Vehicles. Traffic management systems may also be required during construction works, along with their associated power packs. As set out in Section 2.1, it will be an obligation of the appointed contractor, within the principal contract, to comply with identified safety measures.

4.2.26 The transportation of turbine parts will require a convoy comprising 2 abnormal load carry vehicles (increasing to three if agreed with Police), two civilian convoy escort vehicles, one police convoy escort vehicle (possibly also motorcycle escorts), a temporary traffic signal team (in a separate vehicle) and a dedicated vehicle repair support service vehicle. The main noise sources associated with this element of the works will be the individual vehicle engines/powertrains associated with the convoys. In addition, traffic management system power packs may also be used.

Traffic and Transport

4.2.27 Effects arising in relation to traffic and transport could be those caused to users of the highways (drivers, cyclists and pedestrians) during construction, and those caused during operation (i.e. the implementation of the sTMP).

4.2.28 The construction activities to take place are set out in Section 2. It is assumed that the hours of working will be limited by Planning Condition and would not require the closure of the highway. Works along sections 2 to 5 of the sTMP are unlikely to take longer than six months in total and will be completed on a staged basis. It is estimated that works along Section 6 of the sTMP will be completed in approximately two months. The majority of the works can be completed from the Mochdre Industrial Estate utilising the existing gate entrance to the field at the end of the road as the site entrance. The connection of the link onto the A483 will require traffic management, predicted to be shuttle working temporary traffic signals. The interface works between the link and the A483 are estimated to take approximately 2 weeks, with non continuous traffic management. As set out in Section 2.1, a Contractors' method statement will outline the traffic management measures which will require the agreement of the relevant highways authority, and will be made a contractual obligation. With such measures in place, issues of severance and delay for example are unlikely to be significant and as such construction effects are scoped from further assessment.

4.2.29 With regard to operational effects, the rationale for the sTMP is to establish the general principles for managing the delivery of turbine components on abnormal loads in order to prioritise the safe, efficient delivery of those loads whilst at the same time minimising delay to the travelling public and reducing the potential for impacts upon the amenity of local communities. The sTMP has been developed through detailed discussion with key stakeholders, including the relevant local and strategic highway and planning authorities, police forces and developers. The sTMP does not consider the impact of general non–AIL (abnormal indivisible loads) construction traffic on the public highway network, or the total number of convoys to be moved, although convoys are to be limited to a maximum of one per day and one of the stated aims of the sTMP is to limit delays to the travelling public to no more than 10 minutes.

4.2.30 As the purpose of the sTMP is to establish a protocol, with associated physical works, to prevent the occurrence of likely significant traffic and transport effects, consideration of this topic has been scoped out of the assessment.

4.2.31 The effects arising from the passage of general construction traffic along the highway, in support of the construction of individual wind farm projects, should be presented within the EIA for each wind farm project intending to make use of the sTMP. These operational effects have not therefore been assessed within this document.

Socio-economics

4.2.32 The potential for socio-economic effects upon receptors such as local businesses and communities is related to the potential for effects arising from the transportation effects associated with the sTMP. As an example, potential driver delay resulting from the passage of an abnormal load along the highway network could, if it were to be time consuming and frequent in occurrence, result in secondary economic effects arising from increased journey times for businesses or to reductions in visitor numbers as a result of longer transit times into mid Wales. This document has already recorded that the rationale for the sTMP is to avoid such effects occurring, specifically it sets out highway management principles for the transportation of abnormal loads, the frequency of the convoys and provides for a number of passing places to ensure that driver delay is minimised to an extent which has been agreed by the relevant stakeholders. With this in mind it is therefore considered that there is little or no potential for likely significant socio-economic effects to arise.

4.2.33 Socio-economics is therefore scoped out of the assessment.

4.3 Baseline Overview

4.3.1 This section sets out the environmental baseline overview for each of the topics listed above, where these were not scoped out. Its purpose is to identify the potential for sensitive receptors along the section of the route in question, for each environmental topic. Where a potential for sensitive receptors is identified, and given the nature and magnitude of change identified at Section 4.1, then a decision is made as to whether any further environmental topic can be scoped from detailed consideration.

4.3.2 For each environmental topic baseline conditions are provided consistent with the following sections as reported in the sTMP where this is appropriate:

- Common Section of the route (Ellesmere Port to Welshpool) (sTMP Section 2);

- Welshpool to SSA B (North) (sTMP Section 3);
- Route from Welshpool to Newtown (sTMP Section 4);
- Newtown to SSA B (South) (sTMP Section 5); and
- Newtown to SSA C (sTMP Section 6).

Ecology/Ornithology

Common Section of the Route (Ellesmere Port to Welshpool) (sTMP Section 2)

4.3.3 The statutorily designated sites Llanymynech & Llynclys Hills SSSI and Montgomery Canal SAC and SSSI are present within 1km of the proposed highway works (refer to Table 5.1 for more detailed distances between these sites and specific working areas).

4.3.4 Llanymynech & Llynclys Hills SSSI is designated for limestone hills which have been extensively mined and quarried for stone and minerals. There are also extensive grassland, scrub and woodland communities and also natural rock faces, screes and a series of abandoned quarries.

4.3.5 Montgomery Canal SAC and SSSI is designated for its excellent assemblage of aquatic plants, in particular floating water plantain (*Luronium natans*).

4.3.6 Other sites of ecological importance present within 1km include sites of ancient semi-natural woodland.

4.3.7 Habitats affected by the works have the potential to support protected species such as breeding birds, badgers, reptiles and amphibians.

Welshpool to SSA B (North) (sTMP Section 3)

4.3.8 The statutorily designated site Berwyn a Mynyddoedd De Clwyd/Berwyn and South Clwyd Mountains SAC; Berwyn SPA/SSSI is present within 1 km of the proposed enhancements (refer to Table 5.1 for more detailed distances between these sites and specific working areas).

4.3.9 Berwyn a Mynyddoedd De Clwyd/Berwyn and South Clwyd Mountains SAC is designated for various notable habitats including dry heaths, blanket bogs, dry grasslands, screes/rocky slopes, mires and quaking bogs.

4.3.10 Berwyn SPA is designated for its breeding populations of hen harrier (Circus cyaneus), merlin (Falco columbarius) and peregrine falcon (Falco peregrinus).

4.3.11 Berwyn SSSI is designated for its moorland, heath and bog habitats, as well as the assemblage of upland breeding birds.

4.3.12 Other sites of ecological importance present within 1 km include sites of ancient semi-natural woodland and a local wildlife trust nature reserve.

4.3.13 The habitats present within the proposed working areas are summarised in Table 5.1 but have the potential to support breeding birds, badgers and reptiles.

Route from Welshpool to Newtown (sTMP Section 4)

4.3.14 The statutorily designated sites Montgomery Canal SAC and SSSI and Hollybush Pastures SSSI are present within 1 km of the proposed enhancements (refer to Table 5.1 for more detailed distances between these sites and specific working areas).

4.3.15 Montgomery Canal SAC and SSSI is designated for its excellent assemblage of aquatic plants, in particular floating water plantain (*Luronium natans*).

4.3.16 Hollybush Pastures SSSI is designated for its unimproved dry neutral grassland.

4.3.17 Other sites of ecological importance present within 1 km include sites of ancient semi-natural woodland and a local wildlife trust nature reserve.

4.3.18 The habitats present within the proposed working areas are summarised in Table 5.1 but have the potential to support breeding birds, badgers and reptiles.

Newtown to SSA B (South) (sTMP Section 5)

4.3.19 There are no statutorily designated sites within 1 km of the proposed road enhancements. Other sites of ecological importance present within 1 km include sites of ancient semi-natural woodland.

4.3.20 The habitats present within the proposed working areas are summarised in Table 5.1 but have the potential to support breeding birds, badgers, otters, reptiles and amphibians.

Newtown to SSA C (sTMP Section 6)

4.3.21 Mochdre Dingle SSSI is located as near as ~465 m to the west of proposed enhancements (refer to Table 5.1 for more detailed distances between these sites and specific working areas). Other sites of ecological importance present within 1km include sites of ancient semi-natural woodland.

4.3.22 The habitats present within the proposed working areas are summarised in Table 5.1 but have the potential to support breeding birds, bats, badgers, otters, reptiles and amphibians.

Conclusion

4.3.23 Although the habitats present do have the potential to support protected and notable species, no evidence of the presence of such species was found during the field surveys, and the information returned from desk study does not indicate that any such species would be adversely affected.

4.3.24 It is a key consideration that the actual land-take of any of the works is very small, and will cause localised disturbance only, restricted to land immediately adjacent to the highway. As is often the case with ecological assessments, the small areas affected are considered very unlikely to be in regular use by protected species (especially as the areas are all adjacent to busy roads which are subject to inherent and unavoidable disturbance from traffic). It is not possible to say that protected and notable species will not be affected by the works, and for this reason, mitigation measures are discussed subsequently (see Chapter 5). However, an assessment requires a receptor (in this case, a particular site species or group of species) to be of value, which in the case of ecology relates to populations of a notable size or legally protected sites. In which case it is possible to justifiably surmise that the areas affected will not support valuable populations due to their small size and disturbance-prone position. It is also appropriate to conclude that no legally protected sites will be affected given the restricted spatial impacts of the works and that no designated sites lie within any of the proposed working areas. For this reason, it is concluded that no significant effects will occur.

The Historic Environment

Common Section of the Route (Ellesmere Port to Welshpool) (sTMP Section 2)

4.3.25 A number of prehistoric and Roman sites are known at points along the route, evidenced from artefact findspots and particularly from cropmarks. These indicate an Iron Age or Roman enclosure between the A5 and Oswestry at Mile End Roundabout, as well as enclosures, ring ditches and a potential pit alignment in the vicinity of Llynclys Crossroads. An Iron Age double-ditched enclosure was also excavated in advance of the building of the current road in close proximity to the proposed passing place at Arddleen.

4.3.26 Medieval remains along the convoy route include mostly the remains, or recorded locations, of ridge and furrow cultivation and field systems. However, as the convoy route passes across the current and historic England-Wales border there are also a number of features of greater interest. The route crosses the line of Wat's Dyke, an early medieval earthwork dating to the 8th or 9th century, which runs from the River Dee Estuary to Maesbury, Shropshire. The dyke forms a land boundary and may have had a defensive element, its topographic situation allowing outward views and the western ditch suggesting the defence of land on the English side. Better preserved sections of the dyke are scheduled, including two sections to the west of the proposed layover areas at Mile End Roundabout (1010265; 1020618). Wats' Dyke generally runs more or less parallel to the better known Offa's Dyke, scheduled sections of which lie in relatively close proximity to the convoy route at Four Crosses (MG033). Another medieval site of interest along the convoy route is the scheduled monument of *Strata Marcella Abbey* (MG120), to the north-east of the passing place at Rhallt Lane/The Moors.

4.3.27 There are a number of buildings listed at Grade II in the vicinity of proposed works, which are discussed in Table 5.2. In addition, the convoy route passes over *Pont Llanymynech* a Grade II* listed masonry bridge (14194). As this is part of the existing highway there are no proposals which directly affect this structure, although it will be assessed for loading capacity, and will be strengthened if found to be inadequate. This would require listed building consent.

4.3.28 The majority of features recorded along the convoy route relate to non-designated built features, including those noted on historic maps which do not comprise standing remains, and industrial remains relating to railways, canals, mining and limestone quarrying. The route passes through the scheduled remains of *lime kilns, associated tramways, structures and other buildings* (1021412) at Llanymynech, although no changes are proposed to the highway in this location and these will not be affected; the road is in any case excluded from the scheduling. The convoy route also runs alongside and crosses the Shropshire Union Canal (Montgomeryshire Branch) from Llanymynech to Welshpool.

Welshpool to SSA B (North) (sTMP Section 3)

4.3.29 There are a number of prehistoric sites and monuments known along this section of the convoy route. These include Bronze Age burial mounds, some of which are scheduled such as *Cae'r Lloi Round Barrow* (MG273) some distance to the south-east of Dol-y-Maen passing place, standing stones or evidence for the former locations of these and some cropmarks of possible contemporary settlement. Where the route is flanked by higher ground it also passes a number of hillforts, including the scheduled

monuments of *Y Golfa* (MG132), *Pen y Foel Camp* (MG010), *Pen y Coed Hillfort, Cyfronydd* (MG233), *Gogerddan* Camp (MG074), all within the study areas used around passing places along the route. Other Iron Age enclosures have also been identified from cropmarks.

4.3.30 Sections of the convoy route into SSA B (North) also follow the route of the Long Mountain to Mallwyd Roman road. This is mostly a projected route, although in places, such as near Middle Sylfaen passing place, earthwork remains consistent with a Roman road are recorded in proximity to proposed highway works. Otherwise, there are few recorded sites of a Roman date.

4.3.31 The majority of recorded sites are those relating to post medieval settlement, agriculture and (mostly extractive) industry, many of which are locations noted from historic maps. There are some records pertaining to medieval settlement and ridge and furrow cultivation.

4.3.32 There are a number of buildings listed at Grade II in the vicinity of proposed works, although none is in close proximity. These are mostly houses and agricultural buildings.

Route from Welshpool to Newtown (sTMP Section 4)

4.3.33 There are a relatively large number of prehistoric sites recorded at the northern end of the route, particularly in the vicinity of the passing place at the A483/A490 Roundabout and at Luggy Brook. This is due in part to work undertaken in 1998-9 in advance of the construction of the Sarn-y-Bryn-Caled roundabout (Cambrian Archaeological Projects, 2002/3), which identified remains from the Neolithic, Romano-British and early medieval periods. Other likely prehistoric remains have been identified as cropmarks, including the scheduled *cursus, Llwyn-Wron* (MG167) and *Dyffryn Lane Ring Ditches & Pit Alignments* (MG157).

4.3.34 There are relatively few records of Roman sites along this section of the route, although records pertaining to several different Roman roads are recorded in the HER, some of which lies in proximity to proposed passing places. The only part of the route which appears to coincide with the route of a Roman road is that part where the passing place on Llanidloes Road is proposed, which lies on the projected route of the Forden-Caersws Roman road.

4.3.35 A number of notable scheduled medieval sites are recorded along this section of the route. These include:

- *Mound and Bailey Castle* (MG043) at Luggy Brook;
- *Bryn-Derwen Mound and Bailey Castle* (MG054), near Abermule;
- *Dolforwyn Castle* (MG114), which is also listed Grade I (7550); and
- *Gro Tump Mound & Bailey Castle* (MG059), in Newtown.

4.3.36 The convoy route passes a number of registered parks and gardens, notably *Glansevern Hall* (PO31), which lies adjacent to the A483 and a little further to the south *Garthmyl Hall* (PO58), which is in relatively close proximity to the passing place at Llifior Bridge.

4.3.37 There are a number of listed buildings along the convoy route, including those associated with the Montgomery Canal, such as Grade II* listed *Brynderwen Bridge and Bridge 147 over the Montgomeryshire Canal* (18513), some 50 m from the potential layover area at Abermule.

4.3.38 Similarly to other sections of the convoy route, the majority of recorded archaeological sites are those relating to post medieval settlement, agriculture and (mostly extractive) industry, particularly the locations of built features.

Newtown to SSA B (South) (sTMP Section 5)

4.3.39 There are some records pertaining to prehistoric activity along the route from Newtown to SSA B, although the notable theme is of the potential for remains of the Caersws-Carno-Pennal Roman road, which follows the route of the A470 and has been recorded in various locations. Large areas either side of the A470 in Caersws are also scheduled as *Caersws Roman Site* (MG001), comprising the remains of the Roman fort and vicus.

4.3.40 Some 6.5 km of the route into SSA B (South), either side of Caersws, lies within the Caersws Basis designated Historic Landscape Area.

4.3.41 There are a number of listed buildings along this section of the route, including milestones along the A470, listed at Grade II. In addition, the convoy route passes over Caersws Bridge; a Grade II listed masonry bridge (17546). As this is part of the existing highway there are no proposals which directly affect this structure, although it will be assessed for loading capacity, and will be strengthened if found to be inadequate. This will require listed building consent.

4.3.42 Similarly to other sections of the convoy route, the majority of recorded archaeological sites are those relating to post medieval settlement, agriculture and (mostly extractive) industry, particularly the locations of built features.

Newtown to SSA C (sTMP Section 6)

4.3.43 There are relatively few recorded sites of archaeological interest along this section of the route, although some prehistoric sites including burial mounds, which include the scheduled *Glog Round Barrows* (MG121) and *Bryn Cwmyrhiwdre Round Barrow* (MG280) either side of the A483. A number of non-designated sites are in general recorded along the A483, usually at some distance from it, although similarly to other sections of the convoy route, the majority of these relate to post medieval settlement, agriculture and (mostly extractive) industry.

4.3.44 There are few listed buildings along the route to SSA C. These include the Grade II listed Church of St Paul (17285) in Dolfor, in relatively close proximity to the route.

Conclusion

4.3.45 The baseline indicates some general potential for prehistoric, medieval and later archaeological remains to be encountered by proposed highway improvement works, notably passing places. Moreover, the routes into SSA B (North and South) follow the routes of Roman roads. Consequently, further baseline review and assessment has been undertaken and is presented in Chapter 5.

Landscape and Visual

Landscape Character: LANDMAP

4.3.46 Sections of the route from Welshpool onwards (sTMP Sections 3-6) are located within Powys and therefore landscape character is represented by the five LANDMAP aspect layers, with a particular emphasis being placed upon the visual and sensory aspect layer as well as the Landscape Character Areas defined using LANDMAP data in the Powys Landscape Character Assessment[6].

4.3.47 Based upon experience in using all five LANDMAP aspect areas in undertaking landscape assessments for major development proposals in Wales, it was determined that given the type, scale and temporary nature of the landscape changes that could arise from the sTMP proposals, the landscape assessment would scope out four LANDMAP aspect layers (geological landscape, landscape habitats, cultural landscape and historic landscape) and would concentrate upon the visual and sensory aspect layer (VSAA). This decision reflects the fact that an effects pathway could not be identified whereby the proposed changes could possibly generate a magnitude of change sufficiently strong that either individually or cumulatively they could result in likely significant effects upon any individual aspect areas of any of these four aspect layers.

4.3.48 The VSAAs through which the routes pass were identified and these are listed in Table 4.1 below for each sTMP route section. Each of these VSAAs and their attributes as recorded in the LANDMAP data base[7] were reviewed to determine their principal attributes and to determine their sensitivity to landscape change, in line with Table 3.1. With regard to the sensitivity particular emphasis was paid to perceptual and other sensory qualities (VS24), scenic quality and character (VS46) and overall evaluation (VS50) as listed in the LANDMAP database for each individual VSAA.

[6] Powys Landscape Character Assessment. Prepared by John Campion Associates for Powys County Council. March 2008.

[7] For each LANDMAP VSAA 53 attributes have been derived, listed and checked under the quality assurance that was applied to the LANDMAP project.

Table 4.1 LANDMAP Visual and Sensory Aspect Areas along Route Sections from Welshpool (sTMP Sections 3-6)

LANDMAP Visual and Sensory Aspect Area	Sensitivity	Key Attributes
Welshpool To SSA B (north)		
MNTGMVS762 Welshpool	High	Individual market town character largely preserved with distinct town centre.
MNTGMVS612 Guilsfield Rolling Fields	High	Well defined traditional farming landscape with high aesthetic qualities and limited intrusion by modern development.
MNTGMVS819 Castle Caereinion Farmlands	Medium	Typical mid-Montgomeryshire landscape somewhat lacking in field boundary and tree cover diversity.
MNTGMVS714 Vrynwy Rolling Lowlands	Medium	Rolling lowland farmland requiring strengthening through hedgerow and tree cover planting.
MNTGMVS119 Banwy Floodplain	Medium	Narrow river corridor with regularly spaced small settlements with A458 locally prominent and at times detractive.
MNTGMVS177 Caereinion Plateau Grazing	Medium	Traditional farming landscape requiring strengthening through hedgerow and tree cover planting.
MNTGMVS422 Llanerfyl Mosaic Farmlands	High	Traditionally farmed landscape with stronger field boundary pattern and higher tree cover levels than many other VSAAs in Montgomeryshire hence high aesthetic qualities and limited intrusion by modern development.
MNTGMVS827 Llanerfyl	Medium	Small settlement with weak sense of place with vehicle movement and noise from A458 prominent but settlement benefits from attractive setting of rolling farmland.
MNTGMVS278 Pont Llogel Farmlands	High	Good example of the dominant hill and scarp, agricultural landscape type in mid-Montgomeryshire.
Welshpool to Newtown		
MNTGMVS762 Welshpool	High	Individual market town character largely preserved with distinct town centre.
MNTGMVS650 River Severn Floodplain	Medium	Open valley containing medium-large fields but qualities lessened by association with urban areas (Newtown & Welshpool) and A483 road corridor.
MNTGMVS745 Garthmyl	Medium	Small settlement with few distinctive buildings but degraded by presence of A483.
MNTGMVS722 Garthmyl Rolling Farmland	Medium	Some parkland characteristics but dominated by Severn Floodplain. Transitional landscape.
MNTGMVS899 Tregynon Rolling Hills	High	Well defined traditional farming landscape with high aesthetic qualities and limited intrusion by modern development.
MNTGMVS541 Newtown	Low	Original market town character has been degraded by bland, characterless modern and housing developments.
Newtown to SSA B (South)		
MNTGMVS541 Newtown	Low	Original market town character has been degraded by bland, characterless modern and housing developments.
MNTGMVS212 Llandinam Hill and Scarp Slope	High	Contains fine examples of the small wooded and mosaic field patterns that is an integral part of Montgomeryshire's landscape character.
MNTGMVS575 Caersws	Medium	Settlement with some good vernacular buildings but degraded by presence of busy A470.

Table 4.1 (continued) LANDMAP Visual and Sensory Aspect Areas along Route Sections from Welshpool (sTMP Sections 3-6)

LANDMAP Visual and Sensory Aspect Area	Sensitivity	Key Attributes
Newtown to SSA B (South) (continued)		
MNTGMVS865 Caersws River Bowl	Medium	Unusual topography of bowl surrounded by higher ground but the landscape within this bowl contains only average scenic quality and aesthetic attributes.
MNTGMVS695 Trannon Uplands Bryn Crugog	Medium	Traditional farming landscape with relatively strong sense of place but this landscape type is extensive in Montgomeryshire.
MNTGMVS733 Esgair Cwmowen Uplands	High	Good example of patchwork upland grazing and strong links with topography.
MNTGMVS556 Carno	Low	Settlement has no distinct character and is visually degraded by poor screening and industrial units.
MNTGMVS235 Carno Mosaic	Medium	Typical traditional farming landscape for region although some degradation partly due to presence of A470 corridor.
MNTGMVS696 Carno Grazing	Medium	Typical traditional farming landscape for region although some degradation partly due to presence of A470 corridor.
MNTGMVS264 Banwy Uplands	Medium	Upland plateau requiring visual diversity due to prominence of existing coniferous forestry blocks but is exposed and remote.
MNTGMVS276 Dyfi Valley Catchment	High	Overall LANDMAP evaluation based upon VSAA's role in providing foreground for views to Snowdonia and River Dovey.
Newtown to SSA C		
MNTGMVS946 Llandysill Hill and Scarp Grazing	Medium	Good example of mixed farming landscape in Montgomeryshire but some key landscape features gradually degrading to weaken character.
MNTGMVS254 Kerry Ridgeway	High	Grazed upland farmland forming distinct transitional area lending it distinct character.

Landscape Character: Powys LCAs

4.3.49 The Powys LCAs through which the proposed route would pass are listed in Table 4.2.

Table 4.2 Powys Landscape Character Areas along Route Sections from Welshpool (sTMP Sections 3-6)

LANDMAP Visual and Sensory Aspect Area	Sensitivity	Key Attributes
Welshpool To SSA B (north)		
M19 Welshpool	High	Links to Powys Castle to the south and gateway to Wales.
M10 Guilsfield	High	Well defined traditional farming landscape with high aesthetic qualities and limited intrusion by modern development.
M12 Banwy Valley	Medium	Dominated by major river (Banwy) and its well-developed, agriculturally productive floodplain that contains settlements and the A458. Strong sense of place.
M13 Tregynon/Llanerfyl	Medium	Rolling, traditionally farmed landscape that mostly surrounds LCA M12 described as "*settled, safe and relatively intimate*".
M5 Dyfnant Forest	Medium	Extensive upland LCA with land-use mainly open upland heath and blanket bog alternating with large-scale coniferous forestry.
Welshpool to Newtown		
M9 Severn Farmlands	Medium	Very extensive LCA extending along most river valleys in north-eastern Montgomeryshire. Settled and domestic character influenced by the presence of the settlements and transportation corridors.
Newtown to SSA B (South)		
M26 Caersws Valleys	Medium	Broad basin formed by meeting of three rivers encircled by higher ground. Lowland agricultural landscape with no strong sense of place characterised by presence of transportation corridors.
M23 Carno Valley	Medium	Upland valley containing road (A470) and rail corridors and moderate settlement. Well-defined field pattern associated with stock grazing. Tree cover relatively high.
M15 Dyfi Valley Catchment	High	Flat, lowland farming land alongside River Dovey providing contrast with steeply rising ground to the north and south.
Newtown to SSA C		
M31 Llandinam to Llandyssil Hillsides	Medium	Typical example of mixed arable and livestock farming that is typical of Montgomeryshire with strong sense of "*settled domesticity*".
M29 Kerry Hill	High	Open upland grazing with pockets of mixed woodland. Transitional area parts of which are relatively wild and expansive.

Conclusion

Landscape Designations

4.3.50 As already noted the sTMP route and the proposed works do not pass through or close to any national or local landscape designations. Consequently landscape designations do not form part of the landscape baseline and are therefore scoped out of the landscape assessment.

Landscape Elements

4.3.51 In addition to the LANDMAP data review, the landscape resources at each of the locations where modifications and amendments would be required have been visited or else use has been made of aerial photography and 'Google Street View' to gain an

understanding of the landscape resources that would be lost or translocated. In addition this baseline review allows an understanding to be gained of the landscape context within which any modification or amendment would be undertaken.

4.3.52 Following this baseline review the sites that are included in Table 5.3 were identified as being sites where a combination of the sensitivity of the landscape elements to be lost or translocated and/or the sensitivity of the host LANDMAP VSAA together with the nature of the proposed impacts could result in the likely significant landscape effects arising. These sites along the sections of the proposed sTMP route have therefore been taken forward for more detailed assessment.

Visual

4.3.53 The previously mentioned site visits and use of Google Street View allied with a review of the relevant 1:25 000 scale OS maps were used to gain an understanding of the category and approximate numbers of visual receptors within 1 km of each passing place or layover locations. Further consideration was then applied as to the potential for these visual receptors to have views of the sites and their construction activities. Factors that were taken into account include intervening topography, whether or not the visual receptor would be moving or static, the presence of intervening or nearby screening elements and for residential visual receptors the orientation and distribution of windows in a property as well as the type and scale of the construction works that would be required at each proposed site.

4.3.54 The sites that are included in Table 5.4 were identified as being the sites where the presence of nearby potential visual receptors accorded high visual sensitivity under the prevailing guidelines[8] are considered likely to sustain some magnitude of visual change as a consequence of the construction works required at any site and therefore there would be some potential for likely significant visual effects to arise. These sites along those parts of the route covered by Sections 3-6 of the sTMP have therefore been taken forward for more detailed assessment.

Hydrology

4.3.55 The hydrological baseline environment varies considerably along the route of the sTMP.

4.3.56 The route travels between two Environment Agency River Basin Management Plan (RBMP) areas, the Dee RBMP and the Severn RBMP. RBMPs aim to protect and improve the water environment and have been developed in consultation with relevant parties. They set out the main issues and environmental pressures on the water environment and the actions needed to deal with them. The RBMPs are the primary mechanism by which the UK is addressing the requirements of the Water Framework Directive (WFD).

4.3.57 The route crosses between multiple WFD 'waterbody' catchments. As an example the Common Section (Ellesmere Port to Welshpool) includes 25 existing crossing points of WFD surface waterbodies, each of which have individual chemical, ecological and morphological status classes associated with them, as well as numerous additional

[8] The Guidelines for Landscape and Visual Impact Assessment (GLVIA) second edition (2002) and latterly the third edition (2013).

crossing points of small tributary streams that contribute to downstream classified waterbodies.

4.3.58 It is not feasible to describe the baseline environment associated with these surface water features until the full hydrology scoping exercise (see 4.3.59, below) has determined if there is a mechanism by which any of them may be impacted by the proposed upgrades and improvement works. Where there are no road upgrades or construction works in the vicinity of a watercourse, it is assumed that the construction phase of the scheme will have no adverse effect on the surface water environment and that the operational phase (i.e. the movement of convoys along the route) will have no effect in consideration of the existing baseline use of the road network.

4.3.59 Thus, a further detailed scoping exercise was undertaken to consider each individual project component (each individual passing place, layover area and swept path-related development) in the context of the local baseline surface water environment and the considerations listed in Section 4.4. A summary of this detailed/secondary hydrology scoping exercise is provided at Table A1, Appendix A.

4.3.60 In summary, the majority of scheme components that involve construction works – passing places and layover areas – will have little potential to affect the quantity or quality or surface water run-off. The small footprint of individual works, which are largely contained within the drainage area of the existing highways drainage will result in negligible increases in run-off as a result of increased impermeable areas (consistent with a SuDS – Sustainable Drainage System – type approach), particularly given the use of hard surfaces which are free draining (such as grasscrete). Thus all scheme components are deemed to have a negligible effect on flood risk (with the potential exception of the Black Hall Brook culvert – see Flood Risk discussions below at Section 4.3.67). With regard to the Mile End Layover Area (NE option) and specifically on account of its proposed change of land use from an agricultural grazing land use type, it is possible that a Flood Risk Assessment (FRA) will be required by the LPA in support of a planning application. Review of flood zone maps[9] confirms that the Mile End Layover Area (NE option) is located in Flood Zone 1 which is defined as Low Probability i.e. less than 1 in 1 000 annual probability of river or sea flooding. Thus, presentation of appropriate layout maps and the sustainable drainage design elements (predominantly free draining hard surfaces) that are already incorporated into the proposed site design are assumed to be sufficient to meet the potential FRA requirements as per Environment Agency guidance[10]. A separate FRA document will be produced if deemed necessary by the LPA and could be secured by Planning Condition.

4.3.61 The isolation (located at distance) of the majority of construction works relative to any local watercourse (regardless of size or WFD status) means that there are no direct pathways for water quality effects to propagate. In addition, appropriate construction methodologies and best practice guidance including SuDS techniques (collectively termed 'best practice measures'), which are deemed to be compulsory as part of this scheme include measures to protect against poor water quality run-off. Measures

[9] http://maps.environment-agency.gov.uk/wiyby/

[10] Relevant Environment Agency guidance note accessible at: http://www.environment-agency.gov.uk/static/documents/Utility/FRAGuidanceNote1_v3.1.pdf

include those to protect against sediment laden runoff in particular, which if not controlled has the potential to arise from earthworks such as embankments and minor cuttings, for example PPG6, Ciria reports C532 and C650 (see Section 4.3). Best practice sediment containment measures include the appropriate use of silt fencing, which has been identified as an appropriate design measure to be used at the Swept Path Analysis A470 Tirymynach (sTMP Figure 5-4h) location. Due to the proximity of the Afon laen and the retaining parapet wall it is appropriate to install silt fencing along the entire southern perimeter of this specific site, to offer a best practice design measure which will mitigate against any sediment laden runoff, should it occur. Care needs to be applied in removal of silt fencing because it should not be removed until upslope soils have been stabilised or re-vegetated.

4.3.62 Where there is a necessity to utilise concrete on site, this will be conducted to ensure that no c oncrete/cementitious laden run-off water is generated, according to best practice guidance. Where it is possible to do so, quick setting formulas will be utilised in order to reduce the potential for leaching. There will be no requirement for on-site batching of concrete or washing of concrete vehicles on site.

4.3.63 Any chemicals or fuels will be stored in bunded areas and there will be no refuelling of vehicles along the route of the sTMP, other than at sites (that may be) agreed later with the Environment Agency (and in line with PPG7). Best practice guidelines also dictate that (due to the proximity to the watercourse) biodegradable lubricants will be utilised for machinery utilised at the Swept Path Analysis A470 Tirymynach (sTMP Figure 5-4h) location.

4.3.64 Where welfare facilities are proposed (e.g. Potential Layover Area, Abermule) there will be no associated discharge of grey or black water to the surface water environment i.e. they will be sealed units (as provided by an appropriate welfare facility contractor) which will be removed and emptied (or emptied by an effluent tank contractor) at appropriately licensed offsite locations. It is usual for a welfare facility contractor to have consent to discharge to the local sewer network ('right to discharge'). The arrangements in place for subcontractor disposal of effluent will be checked prior to award of any waste collection/welfare contract.[11]

4.3.65 The operational phase of the scheme (i.e. the transportation of wind farm components along the route) will have no perceptible effects on the surface water environment relative to the baseline use of the road network.

Conclusion

4.3.66 Following the secondary scoping exercise that considered individual scheme elements in the context of the local surface water environment and best practice measures (see Table A1 in Appendix A), it is deemed unnecessary to carry the hydrology assessment forward into further detailed impact assessment stages.

Flood Risk

4.3.67 The Mochdre Option includes for a culverted crossing of Black Hall Brook, a tributary of the River Severn which has a catchment of 1.08 km^2 [12]. This enters the site through

[11] Each sewerage operator e.g. Dwr Cymru Welsh Water, has a 'Trade Effluent Officer' for each area who may be consulted if in doubt regarding disposal methods of trade effluent to a public sewer and locations to do so.

[12] FEH CD-ROM NGR SO 100500 902500.

a 1 000 mm culvert which runs beneath two buildings in the industrial estate and flows in a north easterly direction into the Severn adjacent to Newtown town centre. The site is valleyed around Black Hall Brook with the high point being a forested area on Garth Owen hill at 152 m AOD, adjacent to Maes yr Handir Residential Estate. Both sides of the valley fall steeply down towards Back Hall Brook and all land within the Mochdre Option drains to this watercourse. The end of the industrial estate lies on flat land at the bottom of the valley at 134 m AOD. The proposed haul road runs from the bottom of the valley at the edge of the industrial estate, up to 142 m AOD at the A483 Dolfor Road.

4.3.68 The area is underlain by glacial Till with Fan deposits of undifferentiated silt and clay. These deposits are not classified as aquifers by the Environment Agency. British Geological Survey mapping indicates that the site has suffered from land slips; this is due to the steeply inclined fields surrounding Black Hall Brook, which is located within Flood Zone B (areas known to have flooded in the past). In accordance with TAN 15, the flood risk vulnerability classification of land encompassed by the Mochdre Option is currently 'Less Vulnerable', owing to its use as commercial and agricultural land.

4.3.69 A site visit has been conducted to gain a thorough understanding for the local topography and hydrology. Two main receptors to flood risk from Black Hall Brook have been identified:

- Cambrian Marketing & Avenue Commercial Furniture Ltd;
- Garth Owen residential estate; and
- Adjacent agricultural land.

4.3.70 The proposed crossing point on the Black Hall Brook is 50 m downstream of a commercial property owned by Cambrian Marketing & Avenue Commercial Furniture Ltd. The potential risk, borne out by observations made during the site visit, is that the culverting of Black Hall Brook could cause floodwaters to back up at the culvert inlet and cause an increased flood risk to this property and adjoining car-park.

4.3.71 Garth Owen residential estate is 100 m east of the proposed crossing point. This has an established flood defence (1.5 m embankment protecting the left bank of the watercourse). The potential risk to this receptor is that an increase in flow conveyance due to the culverting of the watercourse could increase the magnitude of peak flows so that they are not containable within the current embankment.

4.3.72 NRW hold no detailed flood data, nor have they conducted any modelling on the Black Hall Brook. As any Flood Consequence Assessment (FCA)[13], and the detailed design of the culvert to avoid flood risk, will require peak flow data, a study has been undertaken of the suitability of different methods to achieve this, which is presented at Appendix B as a technical appendix. NRW initially specified that a detailed hydraulic model would be required, using either ISIS or HEC-RAS 1d river models to determine peak river flows for 1 in 100 year and 1 in 1 000 year events. However, it was subsequently agreed that using higher level hydrological calculations would be more suitable to a watercourse of this size. To calculate the catchment inflow hydrograph to

[13] Referred to in England as FRA.

be used in any future modelling, the Flood Estimation Handbook (FEH) statistical method and Revitalised Flood Hydrograph (ReFH) methods have both been assessed to determine their suitability for estimating the catchment inflow. F ollowing assessment, the Black Hall Brook watercourse catchment was deemed unsuitable for the FEH statistical approach as this is a small watercourse and there are very few catchments that are similar in terms of catchment area, average annual rainfall, flood attenuation, and floodplain extent in the Newtown area. Using ReFH is therefore the preferred approach. T he ReFH model is based on r obust hydrological modelling techniques. D esign flood hydrographs can be generated for specified soil moisture (obtained from the FEH CD-ROM) and a design rainfall event. Peak flows of 1.8 m^3s^{-1} and 3.2 m^3s^{-1} were calculated at the site for the 1% and 0.1% AEP (Annual Exceedance Probability) events respectively. The ReFH method has therefore been established as the most suitable for land within the Mochdre Option.

Noise

4.3.73 In terms of construction, noise assessments are normally based upon 'Method 1 – The ABC method' of Annex E (informative) of BS5228-1:2009 which presents an example of the determination of significance due to construction noise by considering the change in ambient noise levels up to a stated threshold level.

4.3.74 The appropriate threshold levels to be used are based upon the existing measured ambient noise levels (rounded to the nearest 5dB) and the period during which construction is to take place. The appropriate threshold levels to be used within this construction assessment are outlined in Table 4.3, below.

Table 4.3 Example Threshold of Significant Effect at Dwellings from Annex E of BS5228:2009

Assessment Category and Threshold Value Period (L_{Aeq})	Threshold Value, dB		
	Category A [A]	Category B [B]	Category C [C]
Night-time (2300-0700)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (0700-1900) and Saturdays (0700-1300)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

D) 1900-2300hrs weekdays, 1300-2300 Saturday and 0700-2300 Sundays.

Note 1. A significant effect has been deemed to occur if the total LAeq noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.
Note 2. If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total LAeq noise level for the period increases by more than 3dB due to construction activity.

4.3.75 Since there is no background or ambient noise data available for the areas associated with the proposed routes or the laying up a reas it is necessary to choose the appropriate criteria from BS5228-1:2009, based on local topography and environment and AMEC's experience of monitoring noise in similar situations.

4.3.76 The Common Section of the route (Ellesmere Port to Welshpool) (sTMP Section 2); Welshpool to SSA B (North) (sTMP Section 3); Route from Welshpool to Newtown (sTMP Section 4); and Newtown to SSA B (South) (sTMP Section 5) all involve major trunk roads including the A5, A483, A458 and the A470. Noise levels adjacent to all these major trunk roads are likely to be high, depending upon how close to the roads any individual receptors are located. A s an example, typical noise levels immediately adjacent to busy highways are in the region of 70-80 dB(A) measured as an instantaneous noise level. Therefore, for receptors (such as houses, businesses) which are adjacent to these major trunk roads (and these roads are themselves significant sources of existing noise), a suitable construction noise criterion would be 70-75 dB $L_{Aeq, 12h}$.

4.3.77 For the section between Newtown to SSA C (sTMP Section 6) the vast majority of the route again uses the A483, with a small portion of the route (approximately 1.5 km) on the A489 Llanidloes Road through the western part of Newtown. The route also uses Heol Ashley through Mochdre Industrial Estate, over a distance of some 1.3 km, although no construction is required along this part of the route. The construction of the Mochdre Link is approximately 150-160 m away from the closest residential receptors in Glyndwr, Garth Owen to the north east. Assuming a point source, at this location a ridge line would acoustically screen any construction activities from the properties. Since preconstruction ambient noise levels at Glyndwr are likely to be below 60 dB LAeq, 1h a criterion of 65 dB LAeq, 1h would be applicable at this residential location. At 150 m the distance attenuation is 51.5 dB(A) and if one assumes 10 dB(A) for the screening properties of the ridge line (which is a conservative assumption) then the total attenuation would be 61.5 dB(A). To meet the 65 dB LAeq, 1h criterion at Glyndwr the combined sound power level of all the construction plant would need to be in the region of 126-127 dB(A). This is highly unlikely to be the case in practice, for example, a hydraulic hammer piling rig driving 240 mm diameter tubular steel piles has a sound power level of 116 dB(A) derived from Table C.3 Item 3 of BS5228-1:2009. In order for the 65 dB criterion to be exceeded at Glyndwr there would need to be the equivalent of 10 No. such rigs operating simultaneously which is highly unlikely in practice. The road construction plant is likely to be much quieter than the piling plant given in the above example.

4.3.78 There are some properties to the east that are approximately 300 m away that have direct line of sight to the potential construction plant. The distance attenuation at 300 m is 57.5 dB(A) which would mean that the sound power level of the construction plant would need to be 122-123 dB(A) in order for the 65 dB criterion to be exceeded. This would be the equivalent of 4-5 piling rigs operating simultaneously, which again is highly unlikely.

4.3.79 Commercial and industrial receptors are considered to be less sensitive to noise than residential receptors since often they contain their own sources of noise.

4.3.80 Considering the type of relatively low-key construction activities associated with the sTMP and assuming the implementation of good practice measures described in

Section 4.4 below, it is considered that the relevant construction noise criteria will be met for all receptors along the route. Since the receptor sensitivity is not high and potential construction noise impacts are not severe it is concluded that construction noise would not result in likely significant effects that need further consideration. However, noise remains a consideration until the best practice methods described in Section 4.4 have been implemented.

4.3.81 With respect to changes in road traffic noise levels, the documents 'Calculation of Road Traffic Noise' (CRTN, 1988) and the 'Design Manual for Roads and Bridges (DMRB): Volume 11 Environmental Assessment' (1994), which was updated in November 2011, are relevant. Both of these documents contain guidance on predicting and assessing changes in road traffic noise, due to, e.g. increasing traffic volumes, changes to the local road network, etc.

4.3.82 Guidance and a methodology for calculating changes in road traffic noise are detailed in the DfT publication CRTN. This methodology combines data on road traffic flows, mean traffic speeds and traffic composition in terms of percentage of HGV, road and site layouts in order to calculate and predict road traffic noise at a selected location. Traffic noise predictions are undertaken using either the parameter $L_{A10\ 1h}$, in accordance with the CRTN methodology, for the AM and PM peak periods for $L_{A10,\ 18h}$ using traffic data between the 06:00-24:00 hours.

4.3.83 DMRB is accepted as the standard methodology within the United Kingdom for evaluating the noise impacts of road traffic resulting from road projects. Although DMRB does not provide any definitive methodology for assessing potential noise and vibration impacts from traffic, according to the guidance, a 25% increase in traffic flows will result in only a 1 dB (A) increase in road traffic noise levels. Conversely, a 20% reduction in traffic flows will result in a decrease of 1dB (A) in road traffic noise levels.

4.3.84 The guidance also provides a classification of magnitude, in terms of changes in road traffic noise for both the short and long term impacts. Table 3.1 of DMRB, reproduced below as Table 4.4, classifies the short term noise impacts which are used for road projects on opening and for construction traffic since it is the more restrictive of the two classifications.

Table 4.4 DMRB Classification of Magnitude of Noise Impacts in the Short Term

Change in Noise Level dB(A)	Magnitude of Noise Impact
0	No Change
0.1-0.9	Negligible
1.0-2.9	Minor
3.0-4.9	Moderate
>5	Major

4.3.85 An increase in traffic noise of less than 1 dB(A) is classified as negligible and an increase of less than 3 dB(A) is classified as a minor increase according to DMRB.

4.3.86 The sTMP indicates that a typical convoy is likely to be made up of two abnormal load-carrying vehicles, two civilian convoy escort vehicles, one police convoy escort vehicle (plus possible motorcycle escorts), a t emporary traffic signal team (in a separate vehicle) and a dedicated vehicle repair support service vehicle. This is a total of eight vehicles plus possibly some additional police motorcycle support.

4.3.87 The major trunk roads are likely to carry traffic volumes measured in many thousands of vehicles per day (or even several thousand in any one hour). Thus a frequency of even two or three convoys in any day is highly unlikely to increase traffic levels on any of the major trunk roads by more than 25%. Therefore traffic noise increases on all the major trunk road routes will be well below 1 dB(A) and would therefore be described as "negligible" using DMRB.

Conclusion

4.3.88 The baseline conditions along the route are likely to be at such levels that the potential traffic noise impacts are not severe. It is concluded that traffic noise along the major routes would not result in any likely EIA significant effects that require further consideration. Provided that best practice measures outlined below are adopted, it is therefore deemed unnecessary to carry the noise assessment forward into further detailed impact assessment stages.

4.4 Best Practice Measures

4.4.1 Development will take place within the context of best practice, such that the mitigation of environmental effects is inherent within the development description. These best practice measures will include those outlined in this section. Specific mitigation measures are also included at relevant parts of the assessment of potential effects on individual topics at Section 6.

General Working Measures Outlined in sTMP

- Restricted working hours:
  - Convoys to be moved in daylight;
  - Convoys through Welshpool prior to 7am or between peak times;
  - Convoys through Newtown prior to 7am; and
  - No more than one convoy per day.
- Limit of delay to the travelling public to 10 minutes;
- Good practice as set out in BS5228-1:2009.

Pollution Prevention Control Measures

- Environment Agency Pollution Prevention Guidance Notes (PPG), in particular:
  - PPG 1 General guide to the prevention of water pollution[14];
  - PPG 3 Use and design of oil separators in surface water drainage systems[14];

[14] Available at http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx

- PPG 4 Treatment and disposal of sewage where no foul sewer is available[14];
- PPG 5 Works and maintenance in or near water[14];
- PPG 7 Refuelling facilities – good practice guidelines[14];
- PPG 21 Pollution incident response planning[14];

- Construction Industry Research and Information Association (CIRIA) Report C532: Control of Water Pollution from Construction Sites, Guidance for consultants and contractors;
- Construction Industry Research and Information Association (CIRIA) Report C650: Environmental good practice on site (second edition);
- British Standards Institution. BS6031:1981 Code of Practice for Earth Works;
- Defra Construction Code of Practice for the Sustainable Use of Soils (Defra, 2009)[15].

Flood Risk Measures –Mochdre Option Only

4.4.2 In the event that a planning application is submitted for the Mochdre Option, a FCA in accordance with TAN15 will be required.

4.4.3 As a minimum the design proposals for the road crossing will need to include a culvert of a design and sufficient capacity to be able to contain 1 in 100 year peak flows identified by the ReFH method. It is expected that these measures will be secured by way of a Planning Condition, requiring the submission and approval of a construction environmental management plan (CEMP).

Culvert Design and Construction

4.4.4 The primary environmental consideration with regards the works is the potential for increased risk of flooding as a result of culvert blockage or inappropriate design. Given the direct proximity of the Black Hall Brook there is the potential during installation of the culvert and construction of the road embankment, for generation of runoff with elevated suspended solids, thus potentially affecting the water quality status of the downstream watercourse. However the appropriate use of best practice construction methodologies will suitably mitigate against water quality impacts. Discussion is provided here for completeness.

4.4.5 Particular care would be taken to ensure construction works adhere to best practice culvert installation and pollution prevention guidelines, specifically PPG5. The Black Hall Brook is not an NRW main river and therefore the works are not anticipated to require a Flood Defence Consent (FDC).

4.4.6 Culvert type will be chosen to ensure minimal disturbance of bed sediments, particularly at the culvert outlet, which will discharge at the existing channel bottom. Disturbance of the channel bottom, sides and adjacent land will be kept to a minimum during installation. Culvert installation should take place during a dry period with low

[15] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf

flows and should be installed prior to overlying earthworks in order to allow isolation of the watercourse.

4.4.7 For the duration of construction works several silt mats (e.g. sedimat™) will be installed downstream of the proposed culvert location (in the channel), in order to capture and minimise the propagation of any sediment that does enter the stream. The presence of culverts further downstream make silt mats more appropriate than silt fencing, given that they do not impede flows.

4.4.8 The Black Hall Brook discharges into the River Severn (R Severn – conf Afon Dulas to conf R Camlad WFD waterbody) which at the point of discharge has a WFD Ecological Potential of Poor, on the basis of the status of its Fish and Phytobenthos populations. The local water quality status would therefore not be defined as highly sensitive with regards potential sediment effects; however this would not preclude the necessity for good construction practices.

4.4.9 The d/s WFD waterbody is also found to be at less than Good Ecological Potential for Copper, Zinc and Cadmium which may all be associated with road runoff. There will be no direct discharges from the new section of carriageway into the Black Hall Brook. Management of surface drainage water from the new carriageway will be presented fully in the associated FCA.

4.4.10 With appropriate culvert design following a detailed FCA, no residual effects would be expected.

Construction Noise Measures

4.4.11 The successful construction contractor for the scheme in consultation with key stakeholders should produce a CEMP which would include measures to mitigate the potential noise impact of construction works on nearby sensitive receptors. A typical "noise management plan" is likely to include the following which can be characterised as "good practice" to minimise noise disturbance at receptors:

- Use of plant fitted with effective silencers and noise insulation;
- Use of SMART reversing alarms where practicable to reduce the effect of reversing bleepers on site vehicles;
- All plant to be regularly serviced, maintained and operated in accordance with manufacturer's instructions. Machines that are intermittently used should be shut down in the intervening periods between work or throttled down to a minimum;
- Appointment of a site contact to whom complaints/ queries about construction activity can be directed. Any complaints to be investigated and action taken where appropriate;
- All construction activity to be undertaken in accordance with good practice as described in BS 5228-1:2009;
- Local residents should be kept informed of general site activities, including working hours;
- Where possible noisier construction working to be limited to 08:00-18:00hrs (Monday-Friday);

- There should be adequate planning to ensure that lengthy operations e.g. any concrete pours (or similar) can be completed within the agreed working hours;
- All reasonable steps should be taken to limit the number of vehicles waiting to deliver to the site(s);
- Activities closest to receptors should be undertaken as efficiently and as quickly as reasonably possible; and
- With the exception of enhanced generators, pumps and electric plant, all plant and equipment should be shut down when not in use.

4.4.12 The normal screening and maximising of separation distances between construction plant and the nearest receptors may not be viable options in all instances however where these can be utilised they will be.

4.5 Topics Not Requiring Detailed Assessment

4.5.1 Further to best practice measures outlined above, it is concluded that proposed measures incorporated into scheme design (and assumptions as stated), will be sufficient to avoid likely EIA significant effects on hydrology, flood risk and noise, which are therefore scoped from any further assessment.

5. Assessment of Potential Effects

5.1 Introduction

5.1.1 This section draws on the description of proposed works as set out in the sTMP and summarised in Chapter 2 and the baseline overview set out in Section 4.2 in order to identify potential topic-specific environmental effects.

5.1.2 The potential for environmental effects which need further consideration in light of detailed design, and for which mitigation and/or enhancement measures may be appropriate, has been identified for Ecology/Ornithology, the Historic Environment and Landscape and Visual.

5.1.3 Given the similarity in both the impacts and effects of works entailed as part of the sTMP, a general account of the results of the assessment, proposed mitigation and residual effects is given below for each topic, with individual measures and considerations given for individual sections of the route, as presented in the sTMP, where this is appropriate. The assessment of specific locations of highway works is given for these topics in Tables 5.1 to 5.4. The passing place and swept path analysis locations have been cross-referenced within the tables below to the corresponding sTMP figure.

5.2 Ecology/Ornithology

Assessment of Effects

5.2.1 The assessment of effects on ecological and ornithological receptors is discussed within this section. In summary, the potential for significant effects is ruled out due to the much localised nature of the works at each of the working areas. Furthermore, no legally protected or otherwise notable species/ habitats were found at any of the areas and it is concluded that the 'receptor importance' (see Table 3.1) based on the evidence found would be negligible at most in respect of protected and notable species. Notwithstanding this, there is still a legal requirement to ensure the protection of certain fauna which could potentially utilise habitats within the working areas in very low numbers. Although such an occurrence is unlikely, measures to ensure that legal requirements are adhered to are set out in Table 5.1.

5.2.2 Numerous designated sites, including SACs and SSSIs are present within the 1 km study area used around proposed highway works, as set out in Section 4.2.1. Other sites of ecological importance such as sites of ancient semi-natural woodland are also noted in these areas. As designated sites, they are considered to be of medium to high importance (see Table 3.1). However, due to the overall low scale of the potential construction activities and/or distance from these sites, it is considered that the magnitude of any impacts would be negligible and therefore no significant ecological impacts (see Table 3.1) on these sites would occur. Accordingly, these receptors are scoped out of further assessment.

5.2.3 The habitat types present within the work areas are common throughout England and Wales and with the exception of hedgerows, are not notable and are of low value (as defined in Box 4.1). In most locations, effects on hedgerows will be very limited, mostly as a result of swept path analysis and the need for vertical realignment of the road in specific locations. The hedgerows potentially affected are of limited intrinsic value due to:

- The closely-flailed management and consequent lack of structural diversity of the hedgerows;
- The general lack of hedgerow trees;
- The species-poor nature of the hedgerows; and
- The general lack of a field layer and/or other associated habitats/species that add to ecological value.

5.2.4 In addition, mitigation measures proposed (Table 5.1) include the replacement and improvement of hedgerows. Therefore, the effects resulting from habitat loss in relation to this low value hedgerow and the other habitat types present are not significant.

5.2.5 Where the potential presence of legally protected species (namely breeding birds, badger, reptiles, great crested newts and bats) has been identified there is potential for contravention of the legislation relating to these species as a result of the works. This could occur through habitat loss, disturbance to breeding or resting places or harm to individual animals during site establishment, construction and/or operation of the sites. However, due to the limited size and low value of the works areas, these activities would not be of sufficient magnitude nor would the species populations affected be of sufficient size for the effect to be significant.

5.2.6 It is therefore assessed that significant effects on ecology or ornithology would not be expected to occur as a result of the development. Nonetheless, there is a requirement to ensure compliance with the legislation relating to protected species.

Mitigation

5.2.7 Recommendations are made in Table 5.1 for further survey work and/or mitigation measures that may be appropriate prior to and/ or during works in specific locations in light of detailed design. It is imperative that these measures are followed to ensure legal compliance.

5.2.8 General mitigation measures proposed in Table 5.1 include the planting of new hedgerows, where possible behind the existing hedgerows in advance of construction works to enable them to establish prior to construction. The use of a more diverse mix of appropriate native species, including hedgerow trees, would in the longer term provide a feature of enhanced biodiversity value to those lost as a result of the scheme. Any such planting would be subject to a short and long term management regime.

5.2.9 Dormice would not be expected to occur in any of the habitats affected, as the hedgerows do not offer habitat of a suitable quality. However they are mentioned in the section below primarily to state that in the unlikely event that any dormice are found, then works would need to immediately cease and NRW must be consulted for advice on how to proceed.

Great Crested Newts, Reptiles (and Dormice)

5.2.10 Based on the habitat types present and scale of works proposed at each of the development locations it is assessed that where there is the potential for great crested newts and reptiles, contravention of the legislation can be avoided through the adoption of the following best practice work activities at those sites within 250 m [16]of a pond or with the potential to support reptiles (Table 5.1):

- Site specific Ecological Method Statements should be developed for each site/suite of sites which provides a detailed scope for the works' mitigation, ensuring that risk and effects are maintained at a less that low level of effect and in compliance with legislation;
- The ground flora would be reduced in height to ~15-20 cm above ground level between April and mid October under appropriate weather conditions;
- Where works are due to affect hedgerows, the hedge vegetation should be reduced to approximately 0.3 m between October and April, and if required, the remaining hedgerow base/roots should be grubbed out (under ecologist supervision) between May and September;
- At any sites that contain habitats which could be used (even at a low risk level) by reptiles or great crested newts, works will only be undertaken between April and mid October, and only when night-time temperatures are regularly above 5˚C.

5.2.11 In the event that a great crested newt or dormouse is found during the ecologists' destructive search or any other phases of the work, activities must cease immediately and NRW should be contacted for advice on proceeding.

Breeding Birds

5.2.12 For those sites where disturbance to/removal of nesting habitats will occur, this would be undertaken between mid September and the end of February to avoid the bird breeding season. If this timing is not possible, an ecologist may undertake a check for active nests prior to construction. In this case works may only proceed where breeding birds are found not to be present.

Badgers, Otters and Bats

5.2.13 The oak tree to be felled along the Newtown to SSA C: Mochdre Option (Figure 6-4e) will be felled under the terms of an agreed method statement. Should any bats be found then works would stop and advice sought from the ecologist.

5.2.14 Based on the walkover survey and the details of the proposed works, impacts on these species are not otherwise anticipated, as no locations used for rest or shelter were found. However, these animals are mobile species, and may utilise new areas of habitat at any time. If any of these fauna were to utilise habitats which may be affected, any works may require a NRW derogation licence to proceed. Therefore further checks approximately 3 months prior to the commencement of activities, to

[16] The distance of 250 m has been chosen based upon advice provided by Langton et al (Great Crested Newt Conservation Handbook, Froglife 2001). The Handbook states that the majority of GCN adults probably stay within 250 m of a breeding pond unless there are high quality habitats set within an area of sub-optimal habitat (the example given being a disused railway line within an intensively farmed arable landscape). Given the type and condition of the surrounding habitats in relation to this assessment and the small areas of landtake involved it is considered that 250 m is an appropriate distance.

allow for the development of any mitigation measures and procurement of any required licences should setts, roosts, resting places or other protected habitat be identified and affected will be undertaken.

Constraints to the Surveys

5.2.15 Site visits were undertaken to publicly accessible land. Land in private ownership which may be required to accommodate the works proposed or which would fall within a study area was not accessed. However it was possible to view the land to be affected from publicly accessible areas and supplemented by aerial photography this was considered sufficient to enable an understanding of site conditions relative to ecology.

Residual Effects

5.2.16 No significant effects on ecology or ornithology receptors have been identified as likely to occur as a result of the development proposal. Therefore, there are no residual effects to be assessed. Implementation of the mitigation measures described above and detailed below in Table 5.1 for each work location, would ensure legal compliance (under the Wildlife and Countryside Act 1981, the Conservation (Natural Habitats etc) Regulations 1994 and other appropriate legislation) in relation to legally protected species.

Table 5.1 Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations within 1 km	Other Ecological Designations within 1 km	Protected/Notable Species within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Common Section						
Potential Layover Area at Mile End Roundabout (A483/A5) – Shropshire Council Site (NE option) (sTMP Figure 1-2a)	None	None	Three European Protected Species (EPS) (two types of bat and great crested newt [GCN]), nine UK BAP species, 60 Local BAP species (primarily plants and invertebrates).	Hedgerows, grassland (likely poor semi-improved), trees. One waterbody present ~120 m to the north. Several other waterbodies within 250 m.	Breeding birds may utilise the trees and hedgerows. GCN may be present within the hedgerows, scrub, ruderal and grassland. Several mature trees in the vicinity of the site. Badgers may construct setts in other habitats within 30 m of the site.	Implementation of breeding bird and GCN/reptile mitigation measures. Pre-construction check for badgers within 30 m. Avoid disturbance to nearby trees through agreed standoff distances.
Potential Layover Area at Mile End Roundabout (A483/A5) – Oswestry Livestock Market Lorry Park(SW Option) (sTMP Figure 1-2a)	None	None	Three EPS (two bat and GCN), nine UK BAP species, 60 Local BAP species (primarily plants and invertebrates).	Grassland (likely poor semi-improved), ruderal vegetation, scrub, trees. No waterbodies within 250 m.	Breeding birds may utilise the trees. Reptiles may be present within the scrub, ruderal and grassland. Badgers may construct setts in other habitats within 3 0m of the site.	Implementation of breeding bird and GCN/reptile mitigation measures. Pre-construction check for badgers within 30 m.
Passing Place Llynclys Cross Roads (sTMP Figure 2-3c)	Llanymynech & Llynclys Hills SSSI at 495 m to SW	None	One record of a priority species.	Tall ruderal and semi-improved grassland (although these are surrounded by urban and short-grazed poor semi-improved grassland).	None.	None.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Common Section (continued)						
Passing Place Four Crosses Bypass (sTMP Figure 2-3d)	Montgomery Canal SAC and SSSI at 205 m to west	None	63 records of priority species, 4 records of species of conservation concern and 5 records of locally important species. Most of these are associated with the canal.	Recently disturbed earth/grassland.	None.	None.
Passing Place Arddleen (sTMP Figure 2-3e)	Montgomery Canal SAC and SSSI ~75 m to east	None	16 records of priority species, 15 records of species of conservation concern and 4 records of locally important species.	Semi-improved grassland (mown). Some mature trees, hedgerow and ditch immediately adjacent to the area. 2 ponds located approximately 200 m away.	Badgers may construct setts at hedgerow bases. Bird breeding potential in the trees and hedgerow adjacent to the site.	Avoid disturbance to the nearby mature trees and hedgerow: through agreed stand off. Pre-construction check for badgers within 30 m.
Potential Layover Area, Pool Quay (sTMP Figure 1-2b)	Montgomery Canal SAC and SSSI <80 m to SW	None	19 records of priority species, 6 records of species of conservation concern and 8 records of locally important species.	Hardstanding, with small areas of scrub and ruderal (although these are isolated from other good quality habitats).	None.	None.
Passing Place Pool Quay (sTMP Figure 2-3f)	Montgomery Canal SAC and SSSI <80 m to SW	None	19 records of priority species, 6 records of species of conservation concern and 8 records of locally important species.	Semi-improved grassland (mown), scrub, fence, hardstanding. Two waterbodies located ~200 m away.	Breeding birds and badgers may utilise the scrub. Reptiles and GCN could be present within the scrub (spring/summer only).	Implementation of breeding bird and GCN/reptile mitigation measures Pre-construction check for badgers within 30 m.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Common Section (continued)						
Passing Place Rhallt Lane/The Moors (sTMP Figure 2-3g)	Montgomery Canal SAC and SSSI at 205 m to west	None	45 records of priority species, 8 records of species of conservation concern and 9 records of locally important species.	Semi-improved grassland, immature trees and tall ruderal. No waterbodies within 250 m.	Breeding birds may utilise the immature trees (albeit low risk).	Implementation of breeding bird mitigation measures.
Route from Welshpool to SSA B North						
Passing Place Middle Sylfaen (sTMP Figure 3-3c)	None	Two designated sites of ancient semi-natural woodland and one site of ancient replanted woodland.	94 records for priority species;; 17 records for species of conservation concern and 49 locally important species. These are mostly birds, dragonflies and butterflies, although there are 3 records of badger close to the site.	Semi-improved grassland. No waterbodies within 250 m.	Reptiles may be present within grassland. Badgers may construct setts in other habitats within 30m of the site.	Implementation of reptile mitigation measures. Pre-construction check for badgers within 30 m of proposed working area.
Passing Place Gelli Lane (sTMP Figure 3-3d)	None	One site of ancient replanted woodland.	38 records of priority species, 7 mobile species, 17 species of conservation concern and 49 locally important species. There are 14 records of badger, 1 otter and 1 record of dormouse from 1959.	Poor semi-improved grassland and hardstanding. Hedgerows lie adjacent to the site. No ponds or lakes within 250 m. Small river to the west of the site (~60 m at its closest).	Reptiles could be present within the semi-improved grassland during the hibernation season (winter) and the active season. Badgers may construct setts in other habitats within 30m of the site.	Avoid disturbance to the nearby hedgerows: through agreed stand off. Implementation of reptile mitigation measures. Pre-construction check for badgers within 30 m.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/ Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Route from Welshpool to SSA B North (continued)						
Passing Place Glascoed (sTMP Figure 3-3e)	None	Three sites of ancient semi-natural woodland.	31 records of priority species; 16 mobile species; 1 species of conservation concern and 3 locally important species. These include 11 records of badger, 7 records of white clawed crayfish and 1 of otter.	Poor semi-improved grassland, fence and species poor hedgerow. No ponds or lakes within 250 m.	Breeding birds may utilise the hedgerow.	Implementation of breeding bird mitigation measures. Pre-construction check for badgers within 30 m.
Passing Place Llanfair Caereinion (sTMP Figure 3-3f)	None	Three sites of ancient semi-natural woodland and one site of ancient replanted woodland.	44 records of priority species; 55 of mobile species; 18 of species of conservation concern and 18 locally important species. This includes 4 records of badger, 3 of white clawed crayfish and 4 of otter.	Hardstanding. Adjacent trees may require trimming. No ponds or lakes within 250 m. A river lies within 50 m of proposed works.	Birds may use the overhanging branches to site nests.	If trimming of trees is required, implementation of breeding bird mitigation measures.
Passing Place Einion (sTMP Figure 3-3g)	Berwyn a Mynyddoedd De Clwyd/Berwyn and South Clwyd Mountains SAC; Berwyn SPA/SSSI at 830 m to NW	Two sites of ancient semi-natural woodland and 2 sites of ancient replanted woodland.	12 records of priority species, including three of badger; 18 mobile species; 1 record of a species of conservation concern (Mute Swan) and 1 of a locally important species (Wood Millet).	Semi-improved grassland. Species poor hedgerows. No ponds or lakes within 250 m.	Breeding birds may utilise the hedgerows. Badgers may construct setts in other habitats within 30 m of the site.	Implementation of breeding bird and reptile mitigation measures. Pre-construction check for badgers within 30 m.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Route from Welshpool to SSA B North (continued)						
Passing Place Gylfylchau (sTMP Figure 3-3h)	None	Four sites of ancient semi-natural woodland and 2 sites replanted ancient woodland.	22 records of priority species; including 1 record of white clawed crayfish and 8 records of badger. There are 29 records of mobile species including 4 otter records, 3 species of conservation concern and 8 records of locally important species.	Poor semi-improved grassland. No ponds or lakes within 250 m.	Reptiles could be present within the grassland (spring/summer only). Badgers may construct setts in other habitats within 30 m of the site.	Implementation of reptile mitigation measures. Pre-construction check for badgers within 30 m.
Passing Place Foel (sTMP Figure 3-3i)	None	None.	145 priority species including 4 records of otter and 2 of badger. 27 records of mobile species including 1 record of otter. 45 species of conservation concern and 66 locally important species.	Semi-improved neutral grassland and poor semi-improved grassland. No ponds or lakes within 250 m.	Reptiles could be present within the grassland.	Implementation of reptile mitigation measures.
Passing Place Dol-y-Maen (sTMP Figure 3-3j)	Berwyn SSSI/ SPA and Berwyn and South Clwyd Mountains lie 1 km away to the NW.	None.	None identified.	Semi-improved neutral grassland verge and hedgerow.	Breeding birds may utilise hedgerows. Reptiles could be present within the semi-improved grassland.	Implementation of breeding bird and reptile mitigation measures.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Welshpool to Newtown						
Passing Place A483/A490 Roundabout (sTMP Figure 4-3b)	Montgomery Canal SAC and SSSI at 460 m to NW	One wildlife trust reserve located adjacent and to the north of the roundabout. The reserve comprises interlinked lakes/wetland.	~68 records of priority species, 4 records of species of conservation concern and 7 records of locally important species.	Semi-improved grassland (mown). No waterbodies within 250 m.	Badgers may construct setts in other habitats within 30 m of the site.	Pre-construction check for badgers within 30 m.
Passing Place Luggy Brook (sTMP Figure 4-3c)	Montgomery Canal SAC and SSSI at 100 m to NW	Two areas of ancient semi natural woodland located to the SW.	41 records of priority species, 4 records of species of conservation concern and 4 records of locally important species.	Semi-improved grassland and species-poor hedgerow. Two waterbodies located ~150 m away from the site	Breeding birds may utilise hedgerows. Reptiles and GCN could be present within the grassland and hedgerow bases. These animals could be present during the active season but there are no habitats suitable for hibernation. Badgers may construct setts at hedgerow bases.	Implementation of breeding bird and GCN/reptile mitigation measures. Pre-construction check for badgers within 30 m is recommended.
Passing Place Llifior Bridge (sTMP Figure 4-3d)	Montgomery Canal SAC and SSSI at 125 m to SE.	None.	One record of a mobile species, 21 records of priority species, 7 records of species of conservation concern and 8 records of locally important species.	Semi-improved grassland. A farm pond is located at ~180 m away. Trees present outside of the working area but in the general vicinity.	Reptiles and GCN could be present within the grassland. These animals could be present during the active season but there are no habitats suitable for hibernation. Badgers may construct setts in other habitats within 30m of the site.	Implementation of GCN/reptile mitigation measures. Pre-construction check for badgers within 30 m. Avoid disturbance to nearby trees through agreed stand off distances.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Welshpool to Newtown (continued)						
Potential Layover Area, Abermule (sTMP Figure 1-2c) (existing Abermule Highways Depot)	Montgomery Canal SAC and SSSI <20 m to east. Hollybush Pastures SSSI ~800 m to WNW.	One wildlife trust reserve and four areas of ancient semi-natural woodland.	54 records of priority species, 7 records of species of conservation concern and 9 records of locally important species.	Hardstanding, hedgerow/scrub and semi-improved grassland.	Breeding birds may utilise hedgerows. Reptiles may be present within the scrub and grassland. Badgers may construct setts in other habitats within 30 m of the site.	Implementation of breeding bird and reptile mitigation measures. Pre-construction check for badgers within 30 m.
Passing Place Newtown East (sTMP Figure 4-3f)	None.	Three areas of ancient semi-natural woodland.	10 records of priority species, 2 records of species of conservation concern and four records of locally important species.	Amenity grassland, species-poor hedgerow. No ponds or lakes within 250 m.	Breeding birds may utilise hedgerows.	If hedgerow will be disturbed, implementation of breeding bird mitigation measures.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Newtown to SSA B South						
Passing Place Llanidloes Road (sTMP Figure 5-3b)	None	Ancient replanted woodland to the south of the proposed works.	980 priority species, including 3 records for otter; 24 mobile species, which includes 1 record of badger from 2010; 24 species of conservation concern and 215 locally important species.	Not surveyed on site but photography indicates hedgerow and semi-improved grassland. No ponds or lakes within 250 m.	Breeding birds may utilise the hedgerows. Reptiles and GCN could be present within the grassland and hedgerow bases.	Implementation of breeding bird and GCN/reptile mitigation measures. Pre-construction check for badgers within 30 m.
Passing Place Caersws/ Swept Path Analysis A489/A470 Junction Caersws (sTMP Figures 5-3c/ 5-4d)	None	None.	11 records of priority species; 18 records of mobile species, including 1 report of otter; 21 species of conservation concern; 4 species of local importance.	Poor semi-improved grassland. Ponds ~100 m to the north, associated with the Afon Hafren (River Severn).	Breeding birds may utilise the hedgerows and scrub. Reptiles and GCN could be present within the grassland and hedgerow bases. Badgers may construct setts at hedgerow bases.	Implementation of breeding bird and GCN/reptile mitigation measures. Pre-construction check for badgers within 30 m.
Passing Place Pontddlgoch (sTMP Figure 5-3d)	None	Two sites of ancient semi-natural woodland and 1 site of replanted ancient woodland.	30 records of priority species, which include 6 reports of slow worm and 1 of grass snake; 4 reports of badger; species of local importance. No species of conservation concern.	Semi improved grassland with some planted woodland and scrub. No ponds or lakes within 250 m.	Breeding birds may utilise the trees and scrub. Reptiles could be present within the grassland. Badgers may construct setts within scrub/woodland.	Implementation of breeding bird and reptile mitigation measures. Pre-construction check for badgers within 30 m.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Newtown to SSA B South (continued)						
Swept Path Analysis A470 Plas Llysyn (sTMP Figure 5-4f)	None	Four areas of ancient semi-natural woodland and one area of ancient replanted woodland.	Seven priority species, 4 mobile species, 6 species of conservation concern and 14 locally important species.	Not surveyed on site but photography indicates Scrub and semi-improved grassland verge. No ponds or lakes within 250 m.	Breeding birds may utilise the scrub. Reptiles could be present within the grassland. Badgers may construct setts in other habitats within 30m of the site.	Implementation of breeding bird and reptile mitigation measures. Pre-construction check for badgers within 30 m.
Passing Place Talerddig (sTMP Figure 5-3e)	None	None	Ten records of priority species; ten mobile species; 1 species of conservation concern and 3 locally important species.	Semi-improved grassland with species poor hedgerow. No ponds or lakes within 250 m.	Breeding birds may utilise the hedgerows. Reptiles could be present within the grassland and hedgerow bases.	Implementation of breeding bird and reptile mitigation measures.
Swept Path Analysis A470 Tirymynach (sTMP Figure 5-4h)	None	None	Twelve priority species, 5 species of conservation concern and 6 locally important species.	Semi-natural broadleaved woodland. River (Afon Laen) present adjacent to the site.	Breeding birds may utilise the trees. Reptiles could be present within the woodland and at the woodland edge. Badgers may construct setts in the area. Otter may be present in the river area	Implementation of breeding bird and reptile mitigation measures. Pre-construction check for badgers within 30 m.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Newtown to SSA B South (continued)						
Passing Place Dolfach (sTMP Figure 5-3f)	None	Four sites of ancient semi-natural woodland and 2 sites of replanted ancient woodland, north of the railway.	Eighteen priority species, including 2 records of dormouse from 1998; 36 records of mobile species -all barn owl.	Poor semi-improved grassland. No ponds or lakes within 250 m.	Reptiles could be present within the grassland.	Implementation of breeding bird and reptile mitigation measures.
Newtown to SSA C: Mochdre Option						
Passing Place Holly Bank (sTMP Figure 6-3b)	Mochdre Dingle SSSI located ~575m west	Two ancient semi-natural woodland and one replanted ancient woodland	Four priority species and one locally important record	Poor semi-improved grassland. Species poor hedgerow. No ponds or lakes within ~250 m.	Reptiles could be present within the grassland. Breeding birds may be utilising the hedgerow.	Implementation of breeding bird and reptile mitigation measures.
Passing Place Garreg View (STMP Figure 6-3c)	Mochdre Dingle SSSI located ~465m south-west	Four ancient semi-natural woodland	Two priority species and one locally important record	Poor semi-improved grassland. Species poor hedgerow with a couple of semi. No ponds or lakes within ~250 m.	Reptiles could be present within the grassland. Breeding birds may be utilising the hedgerow.	Implementation of breeding bird and reptile mitigation measures.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Passing Place Willow Bank (STMP Figure 6-3d)	Mochdre Dingle SSSI located ~800m south-west	Three areas of ancient semi-natural woodland.	Three priority species and one locally important record.	Species poor intact hedge and semi-mature sycamore trees No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow and trees.	Implementation of breeding bird mitigation measures.
Passing Place Gwynant (sTMP Figure 6-3e)	None	One site of ancient semi-natural woodland.	Five priority species, including one record of nearby badger and one of polecat; 3 locally important species.	Species poor semi-improved grassland and scrub on embankment. No ponds or lakes within 250 m.	Breeding birds may utilise the scrub.	Implementation of breeding bird mitigation measures. Pre-construction check for badgers within 30 m.
Swept Path Analysis Mochdre Link (sTMP Figure 6-4c)	None	Three areas or ancient semi-natural woodland and two areas of ancient re-planted woodland.	4 records of priority species including bat and badger; 20 species of conservation concern; no species of local importance.	Semi-improved neutral grassland, improved grassland and with species poor hedgerows. Scattered trees, scattered scrub and tall ruderal. The scattered trees have high potential to support roosting bats. No ponds or lakes within 250 m.	Breeding birds may utilise the hedgerows and woodland and bats the woodland/ mature tree. Bats could be present within the scattered trees. Potential for badger to have setts within the woodland, although no signs were recorded. Reptiles could be present within the grassland and hedgerow bases.	Implementation of breeding bird and reptile mitigation measures. Avoid tree with bat potential with agreed stand off. Should works be required to trees, assessment for bat potential required and discussion held with NRW if activity is identified. Pre-construction check for badgers within 30 m.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6-4d)	None	One area of ancient semi-natural woodland and two areas of ancient replanted woodland	4 records of priority species including bat and badger; 20 species of conservation concern; no species of local importance.	Species poor intact hedge. No ponds or lakes within 250 m.	Breeding birds may utilise the hedgerow.	Implementation of breeding bird mitigation measures.
Swept Path Analysis A483 (sTMP Figure 6-4e)	None	Two areas of ancient semi-natural woodland and two areas of ancient replanted woodland	4 records of priority species and six species of conservation importance.	Hardstanding, species poor intact hedgerow with a mature oak tree. No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow and mature tree. Bats could be present within the mature oak tree.	Implementation of breeding bird mitigation measures. Mature oak tree will be removed. No further works required. Assessed as a category 2 tree in the Bat Conservation Trust Good Practice Guidelines. The tree will therefore be felled taking reasonable avoidance measures. A replacement broadleaf tree will be planted.
Swept Path Analysis A483 (sTMP Figure 6-4f)	None	Two areas of ancient semi-natural woodland and. two areas of ancient replanted woodland. One area of restored ancient semi-natural woodland.	One record of priority species and four species of conservation importance.	Species poor intact hedge/ No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow.	Implementation of breeding bird mitigation measures.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6-4g)	None	Two areas of ancient semi-natural woodland and. two areas of ancient replanted woodland. One area of restored ancient semi-natural woodland.	One record of priority species and four species of conservation importance.	Species poor intact hedge. No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow.	Implementation of breeding bird mitigation measures.
Swept Path Analysis A483 (sTMP Figure 6-4h)	Mochdre Dingle SSSI located ~800m south-west	Four areas of ancient semi-natural woodland	Four priority species and one locally important record.	Species poor intact hedge. No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow.	Implementation of breeding bird mitigation measures.
Swept Path Analysis A483 (sTMP Figure 6-4i)	Mochdre Dingle SSSI located ~800m south-west	Three areas of ancient semi-natural woodland	Three priority species and one locally important record.	Species poor intact hedge and semi-mature sycamore trees. No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow and trees.	Implementation of breeding bird mitigation measures.
Swept Path Analysis A483 (sTMP Figure 6-4j)	Mochdre Dingle SSSI located ~465m south-west	Four areas of ancient semi-natural woodland	Two priority species and one locally important record.	Poor semi-improved grassland. No ponds or lakes within ~250m	Breeding birds may be utilising the hedgerow.	Implementation of breeding bird mitigation measures.

Table 5.1 (continued) Overview of Ecological Assessment

Site Name/ Reference	National Ecological Designations Within 1 km	Other Ecological Designations Within 1 km	Protected/Notable Species Within 1 km (Summary)	Habitats Present	Potential for Protected Species	Ecological Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6-4k)	None	Two areas of ancient semi-natural woodland.	Three priority species and one locally important species.	Improved grassland. Species poor intact hedgerow. No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow.	Implementation of breeding bird mitigation measures.
Swept Path Analysis A483 (sTMP Figure 6-4l)	None	Three areas of ancient semi-natural woodland.	Three priority species and one locally important species.	Improved grassland. Species poor intact hedgerow. No ponds or lakes within 250 m.	Breeding birds may be utilising the hedgerow.	Implementation of breeding bird mitigation measures.

5.3 The Historic Environment

Assessment of Effects

5.3.1 A summary of the assessment of potential effects on the historic environment is given in Table 5.2, which sets out those features or sites which may be affected, together with observations made during site visits and consideration of the potential for likely significant effects.

5.3.2 No direct effects on known heritage assets have been identified.

5.3.3 Along most sections of the route little or no previous archaeological investigation is known to have been undertaken and works outside the existing highway and in areas which have not previously been disturbed by landscaping will always have some general potential to encounter archaeological remains. The potential for effects on buried archaeological remains, particularly in sections of the route which follow trunk roads is generally substantially reduced by the existing situation and ground conditions of the sites identified, where these mostly incorporate land on or incorporating existing road infrastructure, or areas which have been landscaped as a result of road infrastructure. There is some potential, in a number of proposed passing place locations, for the structural remains of Roman roads, underlying the current road surface and/or roadside, to be encountered by ground works, although no known remains have been identified which will be affected. In particular, remains could possibly be encountered at some locations along the Welshpool to SSA B North route, such as Middle Sylfaen, Einion and Gylfylchau. Incorporated measures outlined below (from 5.3.8) would provide the opportunity to test the postulated routes of the Roman roads.

5.3.4 The level of works required for the Mochdre Link between the industrial estate and the A483 is more extensive and the general potential for this to encounter archaeological remains is therefore greater, although no specific effects have been identified.

5.3.5 A larger area of disturbance is also likely at Option 1 location for the potential Layover Area at Mile End Roundabout (A483/A5) and therefore there is generally greater potential for currently unrecorded archaeological remains to be encountered. No specific receptor has been identified, although the general potential for remains of prehistoric and Roman dates has been noted in the vicinity of this site.

5.3.6 It is apparent (as at April 2013) that land within the proposed Layover Area Option 2, at Oswestry Livestock Market Lorry Park site (south-west option) was undergoing initial development groundworks. It is therefore assumed that appropriate archaeological evaluation and/or mitigation measures in this location will already have been established and further to this development the potential for archaeological remains to survive is low.

5.3.7 The historic environment assessment has identified the potential for adverse effects on the setting of designated heritage assets in the following two locations:

- Luggy Brook: The Four Horseshoes Public House, listed Grade II and Mound and Bailey Castle scheduled monument; and
- Llifior Bridge: Garthmyl Historic Park and Garden.

5.3.8 An assessment of the nature of the likely effects on these assets is given in Table 5.2.

5.3.9 Where an assessment of minor works has not been included in the table, it is judged that there is insufficient scope for any effect on the historic environment. For example, works indicated on Figures 6-4/f/g/h/k as a result of he Swept Path Analysis of locations on the A483 show minimum vehicle over-run construction at these locations, within the existing highway or disturbed highway verge. This level of works will cause no harm to the setting of designated heritage assets and no potential for buried archaeological remains is predicted.

Mitigation

5.3.10 Recommendations are made in Table 5.2 where further survey work and/or mitigation measures that may be appropriate in specific locations in light of detailed design.

5.3.11 Given the lack of any recorded features and the linear nature of proposals, field evaluation would in most cases be unlikely to be an effective method of establishing the potential for archaeological remains to be encountered and mitigation could most appropriately be undertaken during construction in order to allow the best chance of the identification and recording of any archaeological remains that may be present. The exception to this is Option 1 potential Layover Area at Mile End Roundabout (A483/A5), where a larger area of disturbance may be proposed: depending on detailed proposals, some archaeological evaluation, perhaps through trial trenching, may be appropriate. This would inform any further mitigation which may be required, which may involve the preservation of any important remains identified through scheme design, although would be more likely to the excavation and recording of any such remains identified. Archaeological works are expected to be secured by way of a Planning Condition, requiring the submission and approval of a CEMP. Compliance with the approved CEMP would be an obligation within the principal contract awarded to the successful contractor.

5.3.12 For the majority of proposed highway works whose impact may have an effect on buried archaeological remains, the archaeological risk is sufficiently low given the lack of recorded remains and the limited ground disturbance proposed that mitigation measures will be most appropriately incorporated into the construction programme. It is envisaged that in these instances archaeological mitigation may take the form of a watching brief on initial ground disturbance as part of construction. This assumes that the initial ground disturbance, namely the stripping of topsoil and any other overburden to be removed, will be effected using archaeologically appropriate methods, normally using a machine equipped with a toothless bucket.

5.3.13 No mitigation of the identified indirect effects on designated heritage assets is proposed (see rationale below).

Residual Effects

5.3.14 No direct effects on known heritage assets have been identified. Mitigation measures set out above will be sufficient to ensure the appropriate recording of any unrecorded buried archaeological remains which may be present and encountered by proposed highway works. The only specific potential for archaeological remains identified by the assessment is the potential for remains associated with the known or postulated routes of Roman roads, which may be considered to be of medium importance. Were

such remains encountered during construction, this would entail the loss of a small section of the overall length of the linear feature, equating to a low magnitude of effect. The opportunity for recording the remains of any surviving section of road, in an area where confirmed and investigated remains are scant, is an important factor in the judgement of effects. As such this loss, with appropriate record, would not be EIA significant.

5.3.15 In other areas there is always the potential for the discovery of archaeological remains in any areas where undisturbed ground survives. It is unlikely that any remains of more than medium importance will be encountered and given the relatively small spatial extent of proposed works, effects are likely to be of a low magnitude. Given the lack of identified or recorded remains, the low probability of encountering archaeological remains within this narrow footprint should also be considered. The proposed mitigation will allow the recording of any remains encountered, which will represent sufficient compensation of their loss. Any effects will therefore not be significant in EIA terms.

5.3.16 The historic environment assessment has identified the potential for adverse effects on the setting of three designated heritage assets in two locations, at Luggy Brook and Llifior Bridge. Given the nature and location of the proposed works, the existing setting and landscape context of the adjoining highway, proposed works will present no more than a low magnitude of change and no EIA significant effects are predicted to occur.

5.3.17 Effects on the historic landscape will generally be of a negligible level, given that works on route sections generally involve works within or adjacent to the carriageway and the re-alignment of small sections of hedgerow. The level of works required for the Mochdre Link (Section 6) would give rise to a greater magnitude of effect, although proposals are in a sheltered location adjacent to an existing industrial estate and would have a low level of effect on the historic landscape, which would not give rise to EIA significant effects.

Table 5.2 Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Common Section			
Potential Layover Area at Mile End Roundabout (A483/A5) –Shropshire Council Site (NE Option) (sTMP Figure 1-2a)	5x Grade II listed buildings. The nearest designated heritage assets are 3x Grade II listed buildings at Middleton Farm and Pool Farm, over 400 m to the east of the site. Scheduled parts of Wat's Dyke (see below) lie within 1km to the west.	The waterbodies at the margins of the site are thought to represent post medieval clay pits. The nearest HER entries relate to built features some distance from the site, which constitute the bulk of HER entries within the 1 km study area. However, HER entries also include prehistoric and Roman finds, including cropmarks indicating an Iron Age or Roman enclosure to the west of the A5.	No direct effects on designated assets. No harm to the setting of designated heritage assets anticipated owing to a lack of intervisibility: listed farm buildings to the west of the site are quite well screened. No specific potential to impact on archaeological remains identified, although there is some potential for unrecorded archaeological remains as the site covers a relatively large area of apparently undisturbed land. It is expected that some archaeological evaluation/mitigation measures may be required.
Potential Layover Area at Mile End Roundabout (A483/A5) –Oswestry Livestock Market Lorry Park (SW Option) (sTMP Figure 1-2a)	The line of Wat's Dyke passes along the approximate line of the western edge of Oswestry Livestock Market land, although over 400 m west of the identified layover area. To the NW and SE of the livestock market land sections of the dyke are scheduled: *Wat's Dyke: 365 m long section, extending from 45 m north east of Gate House on Shrewsbury Road* (1020618); *Wat's Dyke: section 350 m long, 540 m east of Weston Farm* (1020562). 19x Grade II listed buildings. The nearest of these is Weston Cotton, some 620 m to the west of the site. There is a cluster of buildings further to the west at Plas Wilmot; otherwise these are in built-up locations in Oswestry.	The majority of HER entries in the 1 km study area relate to built features, although there are a number of entries relating to prehistoric and Roman features. The site of a possible standing stone is recorded in the southern part of the livestock market land, although this is now built over; it is equally plausible that this could have been a much later boundary marker. The site of another possible standing stone, a Bronze Age burnt mound and an Iron Age or Roman enclosure identified from cropmarks are recorded to the north of Shrewsbury Road (the B4679).	No direct effect on designated assets. No harm to the setting of designated heritage assets. The character of the area will be unaffected, as surrounding land is already in light industrial use. No specific potential to impact on archaeological remains identified. There is some potential for unrecorded archaeological remains to survive in undisturbed areas, given a number of recorded features, particularly of prehistoric and Roman dates, in relatively close proximity. However, at the time of the most recent site visit (April 2013) the site is apparently under development. The status of the site and need for any archaeological evaluation/mitigation measures will need to be determined in light of baseline conditions when detailed proposals are drawn up.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Common Section (continued)			
Passing Place Llynclys Cross Roads (sTMP Figure 2-3c)	Grade II listed limekilns at 615 m and 915 m respectively. No further designated heritage assets within 1 km study area.	HER entries are all some 200 m or more from the proposed passing place. These include built heritage features and industrial remains relating to railways, canals, mining and limestone quarrying. A number of areas of potential prehistoric and/or Roman archaeological remains are indicated within the study area from artefact finds and cropmarks, including those indicating enclosures, ring ditches and a potential pit alignment. Some medieval features also recorded including extant ridge and furrow earthworks; Llynclys was a medieval settlement.	No direct effect on designated assets. No effect on setting anticipated. No specific potential to impact on archaeological remains identified. Some general archaeological potential given the lack of obvious disturbance/landscaping.
Passing Place Arddleen (sTMP Figure 2-3e)	7x Grade II listed buildings, the nearest being a listed milestone some 160 m away on the opposite side of the Shropshire Union Canal. Grade II* listed *Trederwen House* at 380 m to SW.	An Iron Age double-ditched enclosure (PRN 4627) is recorded in the immediate vicinity of the proposed passing place. The enclosure is recorded as 'damaged' and was partly excavated by CPAT in 1979, in advance of road building and then in 2002-3, in advance of the residential development to the west. The enclosure was truncated by medieval ridge and furrow earthworks (not now surviving in this location). In the wider area there is further evidence of prehistoric and medieval activity, in addition to records relating to post-medieval and industrial features.	No direct effect on designated assets. Effects on setting of listed buildings unlikely given intervening distance and urban nature of surroundings. No harm to the setting of designated heritage assets anticipated owing factors of distance and the existing character of the roadway/roadside. There is relatively high potential for archaeological remains related to those previous excavated to the west to be present within the footprint of the proposed passing bay, provided these have survived road construction. Given the relatively small area of disturbance entailed, it is envisaged that any archaeological mitigation required could be achieved during construction.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Common Section (continued)			
Potential Layover Area, Pool Quay (sTMP Figure 1-2b) and Passing Place Pool Quay (sTMP Figure 2-3f)	7x Grade II listed buildings, the nearest being *Bridge 109 over the Montgomeryshire Canal* at 250 m.	The layout of land in this area is due to the former Pool Quay railway station in this location, of which no above ground remains survive. Other records further afield in the study area relate mostly to medieval and later remains.	No direct effect on designated assets. Given the nature of the potential works, the character of the listed buildings and surrounding area, no effects on setting are anticipated. No specific potential to impact on archaeological remains identified. The potential for archaeological remains to survive in this location low given the existing hardstanding. A small area of disturbance is proposed to the existing roadside verge.
Passing Place Rhallt Lane/The Moors (sTMP Figure 2-3g)	7x Grade II listed buildings, the nearest being *Buttington Bridge* at some 700 m. 1x Grade I listed *Church of All Saints*. Scheduled monument of *Strata Marcella Abbey* (MG120), 700 m to NE.	Records of earthworks and field systems on land to the west of the proposed passing place may be related to the landholding and activities of Strata Marcella Abbey, to the north. The Moors milestone (unlisted), recorded at SJ 24604 09702, within the area earmarked for the passing place. This could not be located during the site visit and may have been lost. A possible location for Buttington Battle site, a battle in the late 9th century between the English and the Danes, lies some 500 m to the south. Other records in the study area relate mostly to features of medieval and later dates, none within close proximity of proposals.	No direct effect on designated assets. Given the nature of the potential works, the character of the designated assets and surrounding area, no effects on setting are anticipated. No specific potential to impact on archaeological remains identified; although a milestone was present in this location on the OS 1st Edition map, this could not be located. Some potential for works to encounter archaeological remains, although this is reduced as proposed works are limited to the existing highway verge. It is envisaged that any archaeological mitigation required could be achieved during construction.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Route from Welshpool to SSA B North			
Passing Place Middle Sylfaen (sTMP Figure 3-3c)	*Middle Sylfaen Farmhouse*, some 440 m to the west, is a Grade II listed building. The scheduled monuments of *Y Golfa Camp* and *Pen y Foel Camp* lie some 340 m to the north and 500 m to the south respectively.	The course of the road in this location follows the route of the Long Mountain to Mallwyd Roman road; earthwork remains consistent with a Roman road are recorded some 100 m to the west. Cropmarks identified as two defended Iron Age enclosures –Sylfaen Enclosures I and II are recorded some 170 m to the WSW.	No direct effect on designated assets. No harm to the setting of designated heritage assets are anticipated as the works will largely retain the existing character of roadway: the proposed passing place is located within the existing roadside verge, separated from farm land and designated heritage assets by a hedge to the north and the Welshpool and Llanfair Light Railway, Sylfaen Halt, to the south. There is some potential for intrusive works to encounter remains of Roman (and later) road construction. Other remains are unlikely to be encountered as the existing verge appears to be terraced into the slope. It is envisaged that any archaeological mitigation required could be achieved during construction.
Passing Place Gelli Lane (sTMP Figure 3-3d)	*Pen y Coed Hillfort, Cyfronydd* scheduled monument, nearly 900 m to the SW, is the only designated heritage asset identified within the 1 km study area.	No records in close proximity. A number of enclosures, mostly of Iron Age date, and several buildings or their locations are recorded in the wider area.	No direct effect on designated assets. No harm to the setting of designated heritage assets anticipated owing factors of distance and the existing character of the roadway/roadside. No specific potential to impact on archaeological remains identified. Some general archaeological potential given the lack of obvious disturbance/landscaping.
Passing Place Glascoed (sTMP Figure 3-3e)	*Heniarth Mill*, listed Grade II, lies some 300 m to the west. *Melin Dol-rhyd*, also listed Grade II, lies ~560 m to the SW.	Heniarth Bridge lies some 30 m to the north. A number of HER entries are recorded in the wider area, although none which has implications for the works.	No direct effect on designated assets. No harm to the setting of designated heritage assets anticipated owing to a lack of intervisibility and the existing character of the roadway/roadside. No specific potential to impact on archaeological remains identified. Low potential for unrecorded archaeological remains as roadside is likely to have been disturbed to some extent by road construction.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Route from Welshpool to SSA B North (continued)			
Swept Path Analysis A458 near Melin-y-Ddol (sTMP Figure 3-4e)	There are a number of listed buildings in Llanfair Caereinion, the nearest of which is ~180 m away.	No records in close proximity. HER entries recorded in the wider area have no implications for the works.	No direct effect on designated assets. No harm to the setting of designated heritage assets anticipated owing to a lack of intervisibility and the existing character of the roadway/roadside. Potential for works to encounter archaeological remains very low as the works will involve limited changes to a location which is an existing cutting.
Passing Place Einion (sTMP Figure 3-3g)	*Henefail*, ~125 m to the west and *Pentyrch Smithy*, adjacent to the road ~300 m to the east, are listed Grade II. A further two Grade II listed buildings are recorded in the 1 km study area.	The existing road is on the proposed line of the Long Mountain to Mallwyd Roman road, although it is uncertain whether earthworks identified in close proximity to the works are of Roman or later origin. HER entries recorded in the wider area, which mostly relate to medieval and post medieval settlement, have no implications for the works.	No direct effect on designated assets. No harm to the setting of designated heritage assets anticipated owing to a lack of intervisibility and the existing character of the roadway/roadside. Some potential for works to encounter remains of the Roman road. Some general potential for remains of other dates owing to lack of obvious ground disturbance. It is envisaged that any archaeological mitigation required could be achieved during construction.
Passing Place Gylfylchau (sTMP Figure 3-3h)	The only designated heritage assets within the 1 km study area are Grade II listed buildings in Llanerfyl, nearly 900 m to the west.	The existing road is on the general proposed line of the Long Mountain to Mallwyd Roman road, although no remains have been identified in the vicinity of the works. Other records in close proximity relate to medieval and post medieval activity, including a hollow way ~60 m to the west and ridge and furrow cultivation.	No direct or indirect effects on designated assets. No specific potential to impact on archaeological remains identified. Some potential for works to encounter remains of the Roman road. Some general potential for remains of other dates owing to lack of obvious ground disturbance. It is envisaged that any archaeological mitigation required could be achieved during construction.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Route from Welshpool to SSA B North (continued)			
Passing Place Foel (sTMP Figure 3-3i)	The nearest designated heritage asset is the Grade II listed Lletypiod and Tynewydd, on the roadside ~250 m to the WNW. A few other Grade II listed buildings are recorded in the wider area. *Gogerddan Camp* scheduled monument is nearly 500 m to the north.	No records in close proximity. A number of records in the wider area relate to Bronze Age activity, including several burial mounds and a standing stone. There are also records pertaining to medieval and post-medieval settlement.	No direct effect on designated assets. No harm to the setting of designated heritage assets anticipated owing to a lack of intervisibility and the existing character of the roadway/roadside. No specific potential to impact on archaeological remains identified. The potential for works to encounter archaeological remains is low owing to existing disturbance and landscaping.
Passing Place Dol-y-Maen (sTMP Figure 3-3j)	Two roadside milestones along the A458 are listed Grade II, although the nearest of these is nearly 500 m away. *Cae'r Lloi round barrow* scheduled monument is ~880 m to the SE.	No records in close proximity. A number of records in the vicinity relate to Bronze Age activity and the place name Dol-y-Maen suggests a standing stone. Foel Fach, nearly 200 m to the south, was a small monastic grange of Strata Marcella Abbey.	No direct effect on designated assets. No harm to the setting of designated heritage assets anticipated owing to a lack of intervisibility. No specific potential to impact on archaeological remains identified. The works encompass an existing layby, but also areas which appear to be undisturbed and therefore there is some general potential to encounter unrecorded archaeological remains.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Welshpool to Newtown			
Passing Place A483/ A490 Roundabout (sTMP Figure 4-3b)	Scheduled *cursus, Llwyn-Wron* (MG167, revealed by aerial photography) at 130 m. 21x Grade II listed buildings from 120 m. 2x Grade II* listed buildings from 940 m.	There are a relatively large number of recorded features in close proximity to the proposed passing place, in addition to the scheduled cursus. These include features excavated in 1998-9 (Cambrian Archaeological Projects, 2002/3) in advance of the construction of the Sarn-y-Bryn-Caled roundabout. Features and finds during this excavation included Neolithic, Romano-British and early medieval activity. Other features, mostly likely to be prehistoric or Romano-British, are also recorded nearby, mostly from cropmarks. The nearer of these include a possible pit circle - Sarn-y-bryn-caled pit circle -some 50m south of the proposed passing place; ring ditches (one excavated) some 150 m to the SW, either side of the A483, with a further ring ditch, Llyn Wron, a similar distance to the west. Further similar features are recorded in the wider area along with those of other dates, many relating to post medieval built features.	No direct effect on designated assets. No effects on setting anticipated owing to existing character of the area and screening. The potential for effects on non-designated archaeological remains is substantially reduced by landscaping associated with the construction of the road: the ground surface has been artificially raised by up to 1 m in this area, with the surface of much of the area of the passing place formed of stone chippings. Therefore, while the potential for archaeological remains to be present in any underlying undisturbed ground would be expected to be high, to encounter archaeological remains as a result of the proposed works is judged to be low.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Welshpool to Newtown (continued)			
Passing Place Luggy Brook (sTMP Figure 4-3c)	The boundary of *Mound and Bailey Castle* scheduled monument (MG043) lies some 25 m to the SW of the proposed passing place. 14x Grade II LBs, with the nearest, *Horseshoes Public House*, at 40 m. Scheduled monument of *Dyffryn Lane Ring Ditches & Pit Alignments (Formerly Dyffryn Lane Round Barrow)* (MG157) at 680 m to SW. 2x further scheduled monuments at 870 m and 970 m respectively.	There are a few HER entries related to medieval and post medieval settlement in the vicinity of the *Mound and Bailey Castle* scheduled monument and in and around the existing settlement to the north. Further records relating to post medieval activity are recorded in the wider 1 km study area. An Iron Age enclosure, identified as a cropmark, lies some 250 m to the NE. An area of activity encompassing numerous features of mostly prehistoric date, with some early medieval and post medieval activity, lies some 250 m and more to the south. A further area of prehistoric activity lies further to the south/SE, in the vicinity of *Dyffryn Lane Ring Ditches & Pit Alignments*.	No direct effect on designated assets. *Mound and Bailey Castle* lies in close proximity to the southern end of the passing place on the opposite side of the A483. It is likely that, the new hardened verge will be intervisible with the monument to some degree and therefore will cause some change to its setting, although there is considerable screening along Luggy Brook which will reduce the visual impact. The road is both at odds with, and contributes little to, the setting of the monument and in the context of the existing road the degree of change will not represent a significant effect. The *Horseshoes Public House* was, in the 19th century, set in a semi- industrial area with a smithy and limekiln adjacent to the Montgomery Canal. Its current setting is defined by the adjacent road and tarmac hardstanding of the surrounding car parking and existing laybys. Some effect on its setting as a result of the loss of some of the adjacent verge is anticipated, although this will not be significant. No specific effect on archaeological remains identified, although there is little obvious disturbance to the existing verge and therefore some potential for archaeological remains to be encountered by intrusive groundworks.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Welshpool to Newtown (continued)			
Passing Place Llifior Bridge (sTMP Figure 4-3d)	Proposed passing place within the 'Essential Setting' to *Garthmyl Hall* registered park and garden, as drawn by Cadw, although some 160 m from the designated park boundary and some 450 m from *Garthmyl Hall*, listed Grade II, and associated buildings. Nearest listed building is *Bridge 133 over the Montgomeryshire Canal, Trwst Llywelyn*, listed Grade II, some 150 m to the east. A further 18x Grade II listed buildings within the study area.	A medieval field system is recorded, from placename evidence only, to the east of the A483. Other HER entries within the vicinity of the passing place are those relating to the Montgomery Canal and further afield mostly relating to post medieval built features.	No direct effect on designated assets. Although the proposed layby is located within a defined 'key view' and within the 'Essential Setting' of the historic park to *Garthmyl Hall* the highways context, separation and screening afforded by the tree belt surrounding the house will reduce the magnitude of any effect. Taking into account the existing highway, effects could be judged to be adverse, but will be of a low level and not significant. No other effects on the setting of designated heritage assets are expected. No specific potential to impact on archaeological remains identified. Some general archaeological potential, although reduced as ground to be affected is likely to have been disturbed to some extent by road construction.
Potential Layover Area, Abermule (sTMP Figure 1-2c) (existing Abermule Highways Depot)	Grade II* listed *Brynderwen Bridge and Bridge 147 over the Montgomeryshire Canal* lies in close proximity – within 50 m – to the existing depot. Scheduled monument of *Bryn-Derwen Mound and Bailey Castle* (MG054) within 100 m of the existing depot to the east. *Dolforwyn Castle*, listed Grade I and a scheduled monument (MG114), lies some 820 m to the WSW. A number of further Grade II listed buildings from 195 m.	Other than designated heritage assets, there are few recorded sites on the HER in close proximity to the Layover Area, the nearest being artefact finds from an island in the River Severn/Afon Hafren some 130 m to the north. Records relating to post medieval or later built features and those noted from historic maps. There are also a few entries relating to Roman roads, although none is known in the vicinity of the proposed Layover Area (or the passing place, below).	No direct effect on designated assets. Archaeological potential reduced by the current use of the site as a highways depot. The potential for indirect effects on designated heritage assets is reduced by the character of the site, which is not anticipated to change. The potential is further reduced by the substantial screening afforded by the tree belts along the River Severn to the east and topography and woodland to the west. Consequently, no indirect effects are anticipated. No potential for direct effects on non-designated features anticipated, as a result of the existing highways depot.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Welshpool to Newtown (continued)			
Passing Place Newtown East (sTMP Figure 4-3f)	*Gro Tump Mound & Bailey Castle* scheduled monument within ~100 m. Grade II listed buildings from 340 m.	A general record for the Wroxeter - Trefeglwys Roman Road lies some 120 m to the west, although no remains are known within the vicinity of the passing place. An HER entry for the Forden - Caersws Roman Road lies some 235 m to the SW. No further records lie in close proximity. In the wider area records relating to post medieval or later built features and those noted from historic maps predominate.	No direct effect on designated assets. No harm to setting are anticipated owing to the existing character of the area; the passing place is well screened from *Gro Tump Mound & Bailey Castle* to the north. No specific potential to impact on archaeological remains identified. Some general archaeological potential, although substantially reduced by the developed nature of the area and roadside location.
Passing Place Llanidloes Road (sTMP Figure 5-3b)	*Glanhafren Hall gateway, listed Grade II, 415 m to east. Glanhafren Hall and Glandulais Farmhouse, both listed Grade II, at some 420 m to the NE.*	The nearest recorded features are artefact finds of Neolithic flint and a medieval coin, within close proximity to the proposed passing place. The passing place lies on the projected route of the Forden-Caersws Roman road, although no remains are recorded in this precise location with the nearest record 160 m to the east. Other records in the wider area include a number of prehistoric and medieval finds.	No direct effect on designated assets. No harm to the setting of designated heritage assets are anticipated owing to a lack of intervisibility and the existing roadside location. No specific potential to impact on archaeological remains identified. Some general archaeological potential, particularly as road construction has caused no evident disturbance to adjacent land.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Newtown to SSA B South			
Passing Place Caersws/ Swept Path Analysis A489/A470 Junction Caersws (sTMP Figures 5-3c/ 5-4d)	Caersws Roman fort and vicus, protected under 5 scheduled monuments, over 550 m to the NW. Listed buildings from ~400 m, the nearest being the Grade II listed Caersws Bridge. Maesmawr Hall Hotel, listed Grade II*, some 550 m to the NE. All in the Caersws Basin HLA.	No records in close proximity. Medieval and numerous records of Roman activity in Caersws. Other finds in the wider area include evidence of Bronze Age activity.	No direct effect on designated assets. No harm to the setting of designated heritage assets are anticipated as the works will largely retain the existing character of this site and will have a very narrow visual influence: the proposed passing place is located within the existing roadside verge, adjacent to a major road junction, separated from designed receptors by a hedge to the north. Works required as a result of swept path analysis will involve the widening of the verge around the corner to the north, although 'grasscrete' to be used, which will have a negligible effect at the distances involved. No specific potential to impact on archaeological remains identified. Some general archaeological potential, although reduced as ground to be affected is likely to have been disturbed to some extent by road construction.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Newtown to SSA B South (continued)			
Passing Place Pontddlgoch (sTMP Figure 5-3d)	Nearest listed building is *Capel Saron MC with Caretaker's House, and enclosing railings*, listed Grade II, ~280 m to south. Also *Pont-dol-goch Station and Stationmaster's House* and *Perth-eiryn*, both listed Grade II, in Pont Dol-goch. These lie within the Caersws Basin HLA, some 170 m south of the passing place.	No records in close proximity. Those within the wider area mostly relate to built features and records of former locations of built features. Potential remains of the Caersws-Carno-Pennal Roman road are recorded adjacent to the A470 some 970 m to the NW.	No direct effect on designated assets. No harm to the setting of designated heritage assets are anticipated owing to a lack of intervisibility: the passing place is located on a gentle bend in the road, on a grass verge planted with woodland and supporting some scrub. No specific potential to impact on archaeological remains identified. Some general archaeological potential, although the area appears to have been landscaped as part of road construction, which reduces this potential. Likelihood of remains of Roman road in this location low: the projected route (unproven) passes to the NE.
Swept Path Analysis A470 Plas Llysyn (sTMP Figure 5-4f)	Nearest designated heritage assets are the Grade II listed milestone and Sarn Farmhouse, ~35-40 m to the SW. Other designations in Carno to the SE.	Sarn Bridge lies some 20 m to the NW. The projected course of the Caersws-Carno-Pennal Roman road follows the original course of the A470 immediately to the SW. No other HER entries in the vicinity suggest archaeological potential within the swept path area.	No direct effect on designated assets. No harm to the setting of designated heritage assets are anticipated owing to a lack of intervisibility – the assets are on the opposite side of the Machynlleth to Newtown Railway – and the existing infrastructure in this location. Assets in Carno will not be affected. No specific potential to impact on archaeological remains identified. Some potential for effects on any archaeological remains which may survive in apparently undisturbed ground to the north of the current highway, where groundworks are proposed. It is envisaged that any archaeological mitigation required could be achieved during construction.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Newtown to SSA B South (continued)			
Passing Place Talerddig (sTMP Figure 5-3e)	The only heritage designation within 1 km study area is a Grade II listed milestone, ~550 m to the SE.	The projected course of the Caersws-Carno-Pennant Roman road follows the A470 road in this location. Little recorded in the vicinity, although some (undated) cropmarks are known in the wider area.	No direct or indirect effect on designated heritage assets. No specific potential to impact on archaeological remains identified. The wide mown grass verge, where works are proposed, forms part of the raised earthwork of the current highway, with land the other side of the hedged boundary dropping to a pasture field. Possibility that the road earthwork encompasses remains of the Caersws-Carno-Pennant Roman road, although there is no firm evidence for this. It is envisaged that any archaeological mitigation required could be achieved during construction.
Swept Path Analysis A470 Tirymynach (sTMP Figure 5-4h)	No designated heritage assets within 1 km study area used.	HER records in the vicinity predominantly relate to built assets. None in close proximity.	No direct or indirect effect on designated heritage assets. No specific potential to impact on archaeological remains identified. Some general potential for any works within pasture to south of existing road to encounter archaeological remains.
Passing Place Dolfach (sTMP Figure 5-3f)	Nearest designated heritage asset is a Grade II listed milestone ~180 m to the SE, although this was not apparent during the site survey. Other listed buildings lie in excess of 400 m away.	Bronze Age ring ditch excavated in 1992 in advance of gravel quarrying adjacent to the passing place on the access track to Dol-lydan The nearby Cae y Garreg placename suggests stones (possible prehistoric connotations). In general the projected course of the Caersws-Carno-Pennal Roman road follows the A470, although there are no records in the vicinity of the passing place.	No direct effect on designated assets and no effects on the setting of other designated heritage assets anticipated. No specific potential to impact on archaeological remains identified. Some general archaeological potential, particularly as road construction has caused no evident disturbance to adjacent land.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Newtown to SSA C: Mochdre Option			
Passing Place Gwynant (sTMP Figure 6-3e)	The scheduled monuments of *Glog Round Barrows* and *Bryn Cwmyrhiwdre Round Barrow* both lie within the study area, 639m to the north and NE and 735 m to the SW respectively.	No HER records in the immediate vicinity of proposed works, with the nearest record at some 300 m. HER records in the area predominantly relate to built heritage assets, or their former locations.	No direct effect on designated assets. No effects on setting are anticipated owing to the distances involved and the nature of the proposed development. No archaeological potential anticipated as a result of landscaping as part of the construction of the existing road (this is terraced into a slope).
Swept Path Analysis Mochdre Link (sTMP Figure 6.4c)	Black Hall Farmhouse, attached farm range and associated agricultural buildings listed Grade II, lie some 400 m south of any proposed works. These are the nearest designated heritage assets. Other than these there is a further listed building more than 700 m to the SW; other designated heritage assets are in Newtown, almost 1 km from proposals.	There are no records of non-designated assets or features of interest in proximity to proposals, nor any indication of any specific potential for archaeological potential in the area where works are proposed. The non-listed buildings of a Methodist Chapel and House are recorded on the southern side of Mochdre Industrial Estate on the HER, although this is an error.	No direct effect on designated assets. No harm to the setting of designated heritage assets is anticipated owing to a lack of intervisibility between proposals and any sensitive receptor. No specific potential to impact on archaeological remains identified. However, this is an area where no previous archaeological investigation is known (and is unlikely to have been undertaken) and works outside the existing highway and in areas which have not previously been disturbed by landscaping will always have some general potential to encounter archaeological remains. Given the comparatively extensive nature of works in this area, the potential for these to encounter archaeological remains is medium, although the spatial extent of disturbance is still at a level that investigative works could most appropriately be undertaken during construction and therefore could be achieved during construction. It is considered that the area of disturbance, given the lack of recorded features of interest, is insufficient to warrant field evaluation prior to construction.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6.4d)	Black Hall Farmhouse, attached farm range and associated agricultural buildings listed Grade II lie some 200 m south of any proposed works. These are the nearest designated heritage assets. There is a further listed building more than 700m to the W, otherwise no designated heritage assets within 1 km from proposals.	There are no records of non-designated assets or features of interest in proximity to proposals, nor any indication of any specific potential for archaeological potential in the area where works are proposed.	No direct effect on designated assets. No harm to the setting of designated heritage assets is anticipated owing to a lack of intervisibility. No specific potential to impact on archaeological remains identified. Some general archaeological potential, where land outside the highway does not appear to have previously been disturbed, although the area entailed in proposals is very small, which reduces the potential for any finds.
Swept Path Analysis A483 (sTMP Figure 6.4e)	Black Hall Farmhouse and associated listed buildings, as described above, lie in excess of 100 m north of proposals. There is a further listed building more than 700 m to the W, otherwise no designated heritage assets within 1 km from proposals.	There are no records of non-designated assets or features of interest in proximity to proposals, nor any indication of any specific potential for archaeological potential in the area where works are proposed.	No direct effect on designated assets. No harm to the setting of designated heritage assets as although Black Hall Farmhouse is visible from this location, it lies in a localised dip and the road is not visible from it. No specific potential to impact on archaeological remains identified. Some general archaeological potential, where land outside the highway does not appear to have previously been disturbed, although part of the area affected by proposals appears to have been landscaped as part of road construction, which reduces this potential to some extent.

Table 5.2 (continued) Overview of Heritage Assessment

Site Name/Reference	National Heritage Designations Within 1 km (Summary)	HER Records Within 1 km (Summary)	Heritage Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6.4i)	A Grade II listed milestone lies on the A483 just over 200 m from proposals. There are no other designated heritage assets within 1 km from proposals.	The site of a quarry is recorded a short distance to the east of proposals. Other post medieval built features are recorded in the wider area.	No direct effect on designated assets. No harm to the setting of designated heritage assets is anticipated owing to a lack of intervisibility. No specific potential to impact on archaeological remains identified. Some general archaeological potential, particularly as land outside the highway and beyond the current low hedge does not appear to have previously been disturbed.
Swept Path Analysis A483 (sTMP Figure 6.4j)	The Grade II listed milestone as above lies some 420 m north of proposals. Otherwise there are no other designated heritage assets within 1 km.	An area of post medieval ridge and furrow ploughing is recorded some 350 m south of proposals. Other post medieval built features are recorded in the wider area.	No direct effect on designated assets. No harm to the setting of designated heritage assets is anticipated owing to a lack of intervisibility. No specific potential to impact on archaeological remains identified. Some general archaeological potential, particularly as land outside the highway and beyond the current low hedge does not appear to have previously been disturbed.
Swept Path Analysis A483 (sTMP Figure 6.4l)	The Grade II listed *Church of St Paul, Dolfor*, lies ~45 m from proposals. Two further Grade II listed buildings, both farmsteads, lie in excess of 900 m to the south and are the only other designated heritage assets within the 1 km study area.	The HER records the settlement of Dolfor and the church. Court Farm, some 250 m to the east of proposals, has medieval origins. A cropmark which may pertain to Bronze Age remains lies beyond this, some 450 m from proposals.	No specific potential to impact on archaeological remains identified. Some general archaeological potential, particularly as land outside the highway and beyond the current low hedge does not appear to have previously been disturbed.

5.4 Landscape

Assessment of Effects

5.4.1 A summary of the assessment of potential effects on landscape receptors is given in Table 5.3. This provides a brief description of the landscape associated with the site locations, particularly any landscape elements such as trees or hedges, as well as which LANDMAP VSAA the site is located within together with a consideration of the potential for significant landscape effects to arise as a co nsequence of the construction works and any permanent land take.

5.4.2 Along parts of the route covered by sTMP Sections 3-6 direct effects are predicted on landscape features, notably verges and hedgerows, although these are extensive landscape features, of which some small sections will be affected. However, within the context of the local area and road network these changes are likely to be minor and not significant.

Mitigation

5.4.3 Recommendations are made in Table 5.3 for further mitigation measures that may be appropriate in specific locations in light of detailed design. Owing to the generally low magnitude of effects and in light of the re-vegetation of grass verges through the use of grasscrete or similar, these are limited to consultation with an arboriculturalist in areas where trees or their roots may be disturbed and new hedge planting (with detail and specification to be agreed with ecologists).

Residual Effects

General

5.4.4 The replacement of grass verges with cellular grassed reinforced paving is likely to enable the hardened verges to re-vegetate, reducing landscape effects in the medium term and removing landscape effects in the long term. Consequently landscape effects arising from the replacement of existing grass verges with grasscrete or similar has been assessed as a t emporary landscape effect. Where removal of sections of hedgerows and trees would be unavoidable mitigation measures including consideration of hedgerow translocation or the replacement planting of hedgerows and trees (see ecological recommendations, Section 5.2) and their subsequent establishment and management should again reduce landscape effects in the medium term and remove landscape effects in the long term.

5.4.5 Landscape character effects as a result of the proposed works are likely to be localised and of a negligible level at the individual locations and would again reduce with time as mitigation planting establishes until they are removed altogether. C umulative landscape effects, which take into consideration all the assessed highway works would not be significant for route sections in sTMP Sections 2-5. This is as a result of the separation distances between those locations likely to experience landscape effects along these routes and the minor nature of those individual effects. All the proposed works are likely to be experienced in context of the adjoining highway and its associated infrastructure where it is reasonable to expect that periodic highway related works will take place.

Common Section of theRroute (Ellesmere Port to Welshpool) (sTMP Section 2)

5.4.6 There are only a limited number of locations along this route section where works would be required and at only two of these locations: close to Mile End Roundabout near Oswestry and Pool Quay, could there be any potential for the proposed changes to result in more than a negligible magnitude of landscape change. At the latter the site visit confirmed that the laydown area is already used as a highway department depot which under the baseline is a detrimental landscape element. Hence the changes that would be required for it to become a laydown area would represent less of a landscape change and one that could be readily accommodated in the context of the A483 and would not alter the local landscape character.

5.4.7 With regard to the two options close to Mile End at Oswestry the option of locating the layover area to the south-west of the A483/Mile End roundabout has been assessed as being likely to generate a low magnitude of landscape change as opposed to the north-east site option which has been assessed as being likely to generate a medium magnitude of landscape change. The south-west option has been assessed as resulting in a lower magnitude of landscape change because it would be located within an area that is already characterised by industrial and business developments where as the eastern option would be on the opposite side of the A483 corridor from the fringes of Oswestry and as such is a location where rural landscape characteristics presently have a stronger role.

5.4.8 In conclusion, the Common Section of route would pass through an undesignated landscape which is considered to be of low sensitivity, particularly in its context, adjacent to the trunk road network. The predicted magnitude of change is at most medium (north-east option, Mile End Roundabout) and in conclusion, effects along this route will be not significant in EIA terms.

Welshpool to SSA B (North) (sTMP Section 3)

5.4.9 The assessment in Table 5.3 concludes that individually at none of the eight sites assessed would the magnitude of landscape change exceed low and would often be negligible; consequently, no significant landscape effects are predicted to arise because the sensitivity of the LANDMAP VSAAs and the Powys landscape character areas (LCAs) that have been defined alongside the A458, rarely exceeds medium. The localised and temporary nature of the landscape changes and consequent effects at these sites could not undermine any of the LANDMAP Visual and Sensory Aspect Areas or Powys Landscape Character Areas through which this route passes. This is due to the small-scale and abundance of the landscape elements that would be lost and introduced and the fact that the presence of the relatively busy A458 corridor is already a factor in the determination of these VSAAs' key characteristics.

5.4.10 The potential for cumulative landscape effects has been assessed. Relevant factors include that this route section is 35km long and that the works and hence the potential, temporary landscape effects are concentrated at only eight locations distributed amongst nine VSAAs and four Powys LCAs and that the scale of the individual highway works is small-scale and in terms of cumulative magnitude, low. Consequently it is assessed that there would be no potential for cumulative landscape effects to be sustained by any of these VSAAs or Powys LCAs which are considered to have a low or medium receptor sensitivity.

Welshpool to Newtown (sTMP Section 4)

5.4.11 The assessment in Table 5.3 concludes that individually at none of the four passing places and single laydown area at Abermule would the magnitude of landscape change exceed low; consequently, no significant landscape effects are predicted to arise given that the sensitivity of the landscape character areas as defined by LANDMAP VSAAs or Powys LCAs alongside this section of the A483 are generally considered to be medium. Although two VSAAs with high sensitivity are located alongside this route section they do not host any of the proposed passing places or the laydown area. The localised and temporary nature of the landscape changes and consequent effects at these sites could not undermine any the LANDMAP Visual and Sensory Aspect Areas or the Severn Farmlands Powys Landscape Character Area through which this route passes. Once again the fact that all the proposed works would be closely connected in spatial and landscape terms with the existing busy A483 would serve to reduce the magnitude of landscape change.

5.4.12 With regard to the potential for cumulative landscape effects it is relevant to note that this route section is 21 km long with only five sites within it. These are distributed amongst six VSAAs although three of the sites are located within MNTGMVS650 - River Severn Floodplain where the scope for cumulative landscape effects would be highest. However when the scale of the works proposed at the three individual sites is assessed in the context of this VSAA which is one of the most spatially extensive VSAAs in Montgomeryshire and is already characterised by the presence of some of the main trunk roads in the region, it is apparent that there would be no potential for cumulative landscape effects to be sustained by MNTGMVS650 or any of the other five VSAAs or the Severn Farmlands Powys LCA.

Newtown to SSA B (South) (sTMP Section 5)

5.4.13 The assessment in Table 5.3 concludes that individually at none of the seven sites assessed would the magnitude of landscape change exceed low consequently no significant landscape effects are predicted to arise upon any of the host LANDMAP VSAAs or the Powys LCAs which have low or medium landscape sensitivity. The only exception is the Dyfi Valley Catchment VSAA which possesses high landscape sensitivity but would only sustain a negligible magnitude of landscape effect from the one site located within it, thereby avoiding any significant landscape effects. The localised and temporary nature of the landscape changes and consequent effects at these sites could not undermine any of the five LANDMAP Visual and Sensory Aspect Areas that are distributed along this route section. In a similar manner there would be no significant effects upon any of the three Powys LCAs that are traversed by the route section. The location of all the proposed works besides the A470 would again be a contributory factor to the negligible and low magnitudes of landscape change that have been assessed.

5.4.14 The distribution of the seven sites at fairly regular intervals along a section of the A470 that is 28 km long and the fact that none of the VSAAs would contain more than two of the sites leads to the assessment concluding that the potential for cumulative landscape effects would be minimal.

Newtown to SSA C: Mochdre Option (sTMP Section 6)

5.4.15 The limited number of landscape elements that would be lost to accommodate the Mochdre Option through Newtown are small-scale and abundant and although they would be permanently removed, this in itself would not generate more than a low

magnitude of landscape change. It is however, the introduction of a (maximum) 6 m high embankment with steeply sided, 1:2 outer slopes that has the greatest potential to modify one of the key characteristics of the host VSAAs; MNTGMVS946 Llandyssil Hill and Scarp Grazing. These concentrate upon its topographical and scenic variation and the role of field patterns and the immediate landscape contains some steep sided natural variations which ensures that the topographical changes proposed are not overly incongruent. This is especially the case given that this involves the introduction of a short section of road merely to connect two existing roads which are present in the vicinity. In this context, the magnitude of landscape change arising from the introduction of this new landscape element would be medium within the Mochdre site itself hence landscape effects would be medium and not significant. Within the wider VSAA, (which possesses medium landscape sensitivity) this option, on land which is visually contained, ensures that the magnitude of landscape change would be negligible and not significant in EIA terms.

Table 5.3 Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Common Section Ellesmere Port to Welshpool (sTMP Section 2)		
Potential Layover Area at Mile End Roundabout (A483/A5) –Shropshire Council Site (NE Option) (sTMP Figure 1-2a)	Pasture field bound by tall dense, hawthorn dominated hedgerow; occasional mature trees in field. The A5 runs along western and southern edges of field with Mile End roundabout located beyond the south western corner of the field. LANDMAP does not apply	Direct impacts on hedge and pasture field. A section of hedge along the western side of the field (the northern section of the A5) would be removed to accommodate convoy access. An area of hard standing would be installed within the field in addition to a security fence. An earth bund may be created to screen views from the proposed eastern Oswestry urban extension on the other side of the A5 to the west. The loss of hedge and area of agricultural field would both give rise to negligible landscape impacts, being small sections of the overall landscape elements. Effects may be mitigated in the long term should the hedge and field be reinstated after the layover area is no longer required. The effect of the security fence on local landscape character will vary with height and design. However such a structure is not out of keeping with the overall urban fringe character of the local area which is strongly affected by presence of the busy traffic island and the large service area on its southern side. Landscape magnitude of change would be low in a location of medium landscape sensitivity hence landscape effects would be low/medium, temporary, reversible and not significant. It is noted that an alternative Layover Area site is presented at Oswestry Livestock Market Lorry Park (SW Option). In landscape terms the lorry park option would be the preferable solution because it would result in less impact on existing landscape features.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Common Section Ellesmere Port to Welshpool (sTMP Section 2) (continued)		
Potential Layover Area at Mile End Roundabout (A483/A5) –Oswestry Livestock Market Lorry Park(SW Option) (sTMP Figure 1-2a)	Pasture fields to the east of livestock market bound by post and wire fences and possibly some fragmented sections of degraded hedge. The B4579 runs along northern boundary but is screened from site by tall conifer hedge. Western, southern and eastern sides are surrounded by buildings associated with modern industrial estate. LANDMAP does not apply.	Access would be via Livestock Market's existing access. An area of hard standing would be installed within the fields in addition to a security fence. The loss of fragmented hedge and area of agricultural field would both give rise to negligible landscape impacts. Effects may be mitigated in the long term should the hedges and field be reinstated after the layover area is no longer required. The effects of the security fence on character will vary with height and design but would not be out of keeping with the overall industrial estate character of the local area which has hosted considerable amount of development in recent years. Magnitude of landscape change would be low in a location of low landscape sensitivity hence landscape effects would be slight, permanent and not significant.
Merseyton Road, Ellesmere Port (sTMP Figure 2-4b)	Existing road junction with footways in industrial area. Embankment on southern side vegetated with scrub. LANDMAP does not apply.	Realignment of footways is minor and will have minimal landscape effect. Loss of vegetation to allow greater visibility will result in a minor change. Potential earthworks to embankment to accommodate footway realignment likely to be minor and have minimal landscape effect given industrial context. Resurfacing of carriageway will be an improvement. Works are minor and located in industrialised area consequently the magnitude of landscape change would be negligible in a location of low landscape sensitivity hence landscape effects would be negligible, permanent and not significant.
Passing Place Llynclys Cross Roads (sTMP Figure 2-3c)	Tall ruderal (to the rear) and semi-improved grassland acting as wide highway verge, including potential visibility splay at the junction. No hedgerows or trees would be affected. Residential properties are opposite but ground floors screened by vegetation. LANDMAP does not apply.	Verge could be hard surfaced to provide passing place. Loss of rough grassed area and its replacement by grasscrete would result in a negligible magnitude of landscape change in a location of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Common Section Ellesmere Port to Welshpool (sTMP Section 2) (continued)		
Passing Place Four Crosses Bypass (sTMP Figure 2-3d)	Site area is formed by verge to recently constructed bypass. No established landscape features exist. LANDMAP does not apply.	Use of land alongside of recently constructed bypass would result in negligible magnitude of landscape change in a location of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Passing Place Arddleen (sTMP Figure 2-3e)	Semi-improved grassland highway verge (mown), hedgerows (partially managed forming rear boundary of private residential gardens). LANDMAP VSAA MNTGMVS650 River Severn Floodplain.	Creation of hardstanding area will remove grassed area. Caution will be required to preserve boundary hedgerow. Assuming that this boundary hedgerow will be retained the magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Potential Layover Area at Pool Quay Highway Depot (existing depot) (sTMP Figure 1-2b)	Semi-improved grassland (mown), scrub, post and wire fence with area of redundant highway immediately to the west now used as a highway department depot. LANDMAP VSAA MNTGMVS650 River Severn Floodplain & LANDMAP VSAA MNTGMVS612 Guilsfield Rolling Farmland.	Replacement of mown grassland with hardstanding would tie into existing, redundant highway. Addition of security fencing would be in keeping with site's current use as a highway depot and supplement/replace existing fencing. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Passing Place, Pool Quay (sTMP Figure 2-3f)	Refer to Figure 1.2b (same location).	As above.
Passing Place Rhalt Lane/ The Moors (sTMP Figure 2-3g)	Existing hardened grass verge and existing non-hardened grassland verge to highway, separated by flood relief culvert. LANDMAP VSAA MNTGMVS650 River Severn Floodplain & LANDMAP VSAA MNTGMVS612 Guilsfield Rolling Farmland.	Use of existing hardened verge will require no landscape changes. Loss of small area of non-hardened highway, which will re-vegetate within short to medium term, reducing effects over time. No landscape effects, therefore not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Route from Welshpool to SSA B North (sTMP Section 3)		
Passing Place Middle Sylfaen (sTMP Figure 3-3c)	Rough grass verge to highway with dense mixed hedge. Westernmost two-thirds of verge banks up to hedge; easternmost third broadly level with road. LANDMAP VSAA MNTGMVS819 Castle Caereinion Farmlands	Direct Impacts on landscape features. Replacement of rough grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. Western two-thirds of hedge and bank may require removal should retaining structure be required, dependent on retaining structure detail. Re-grading works in root zone of hedge may be necessary to accommodate blade vehicle with potential for damage to or loss of hedge. Should hedge be removed there will be some minor effect on the character of the immediate area which may be mitigated with translocation of original hedge or new hedge planting; detail and specification to be determined at later stage in conjunction with ecologists. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant
Passing Place Gelli Lane (sTMP Figure 3-3d)	Rough grass verge to highway, broad towards centre, with dense mixed hedge set back from road. Two field gates and short, unsealed access tracks, close to each other and opposite Gelli Lane. LANDMAP VSAA MNTGMVS714 Vrynwy Rolling Lowlands	Direct landscape impacts on grass verge although these impacts would be small-scale and insubstantial. Partial replacement of rough grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Route from Welshpool to SSA B North (sTMP Section 3) (continued)		
Passing Place Glascoed (sTMP Figure 3-3e)	Rough grass verge to highway. Northern third of boundary defined by patchy and insubstantial mixed hedge with post and wire fence behind, field gate access separates from southern two thirds which consist of post and wire fence with no hedge. LANDMAP VSAA MNTGMVS714 Vrynwy Rolling Lowlands.	Direct landscape impacts on grass verge although these impacts would be small-scale and insubstantial. Replacement of rough grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.
Passing Place Llanfair Caereinion (sTMP Figure 3-3f)	Rough grass verge separated from wooded cutting behind by post and wire fence with hedge. LANDMAP VSAA MNTGMVS119 Banwy Floodplain.	Direct landscape impacts on grass verge although these impacts would be small-scale and insubstantial. Replacement of rough grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing impacts over time. The root zone of trees may be affected in a minor way by hardened verge construction and consultation with a suitably qualified arboriculturalist is advised. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.
Passing Place Einion (sTMP Figure 3-3g)	Rough grass verges and hedges on both sides of road. LANDMAP VSAA MNTGMVS119 Banwy Floodplain & LANDMAP VSAA MNTGMVS177 Caereinion Plateau Grazing.	Direct impacts on grass verges due to widening of bituminous surfaced carriageway by ~0.5 m. Minor and insubstantial effects at most. Hedgerow trimming to allow widening of bituminous carriageway and required passing width will have no landscape effect. The magnitude of landscape change would be negligible in VSAAs of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Route from Welshpool to SSA B North (sTMP Section 3) (continued)		
Passing Place Gylfylchau (sTMP Figure 3-3h)	Broad rough grass verge with hedge. There is a private access road with asphalt surface located towards western end of the proposed passing place, splitting it in two. LANDMAP VSAA MNTGMVS422 Llanerfyl Mosaic Farmlands.	Direct landscape impacts on grass verge although these impacts would be small-scale and insubstantial. Replacement of rough grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be negligible in a VSAA of high landscape sensitivity hence landscape effects would be slight, permanent and not significant.
Passing Place Foel (sTMP Figure 3-3i)	Section of former road, separated from carriageway by grass verge. Eastern and central part of former road is currently asphalt; western end has been grassed over. Entrance to Foel Farm bisects passing bay. LANDMAP VSAA MNTGMVS422 Llanerfyl Mosaic Farmlands & LANDMAP VSAA MNTGMVS119 Banwy Valley.	Direct landscape impacts on grass verge although these impacts would be small-scale and insubstantial. Replacement of grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be negligible in VSAAs of high and medium landscape sensitivity hence landscape effects would be slight, permanent and not significant
Passing Place Dol-y-Maen (sTMP Figure 3-3j)	Northern part is existing lay-by bordered by post and wire stock fence with row of trees (defunct hedgerow) behind. Central and southern parts consist of rough grass verge with hedgerow. LANDMAP VSAA MNTGMVS422 Llanerfyl Mosaic Farmlands.	Direct impacts on central and southern parts where grass verge although these impacts would be small-scale and insubstantial. Replacement of grass verge section with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be negligible in a VSAA of high landscape sensitivity hence landscape effects would be slight, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Route from Welshpool to Newtown (sTMP 4)		
Passing Place A483/A490 Roundabout (sTMP Figure 4-3b)	Semi-improved grassland (mown), species-poor hedgerow, immature broadleaved trees to the rear. Also includes an area of gravel (French drain) alongside carriageway. LANDMAP VSAA MNTGMVS650 River Severn Floodplain.	Loss of gravelled area and mown highway verge to be replaced with hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Passing Place Luggy Brook (sTMP Figure 4-3c)	Broad semi-improved grassland bordered by species-poor hedgerow which is managed/unmanaged in places. LANDMAP VSAA MNTGMVS650 River Severn Floodplain.	Proposals will lead to the hardsurfacing of the highway verge with existing hedge retained. Minor re-grading of verge may be required but this is unlikely to affect nearby hedge given width of overall verge. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium permanent and not significant.
Passing Place Llifior Bridge (sTMP Figure 4-3d)	Semi-improved grassland and species-poor hedgerow. LANDMAP VSAA MNTGMVS745 Garthmyl.	Proposals will lead to the hardsurfacing of the highway verge with existing hedge retained, although trimming may be required. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Potential Layover Area – Abermule Highway Depot (existing depot) (sTMP Figure 1-2c)	Existing depot. Hardstanding bordered by grassland verge and low hedgerow which screens an area used for the placement of arisings and storage of aggregate in connection with the depot. Existing chain link fence borders site on inside of hedge boundary. Under present usage the site has a slightly unkempt appearance. LANDMAP VSAA MNTGMVS650 River Severn Floodplain.	Hardstanding would replace the highway verge and part of the low hedge may be lost due to regrading on the southern side. Hedge along southern boundary does not provide a prominent landscape element and its loss would result in a minor landscape effect. Addition of security fencing would be in keeping with site's current use as a highway depot and supplement/replace existing fencing. Addition of temporary welfare facility would not be untypical for such a site. Existing hedge on western boundary could be managed to a taller height to increase screening of site. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Welshpool to Newtown (sTMP 4) (continued)		
Passing Place Newtown East (sTMP Figure 4-3f)	Located within the town of Newtown. Site is presently highway verge/amenity grassland, with species-poor hedgerow. Business/industrial units either side of carriageway. LANDMAP VSAA MNTGMVS541 Newtown.	Replacement of grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. Unmanaged hedgerow partially overhangs the verge and may need to be cut back. Two sections of hedgerow may be affected by potential installation of retaining wall at either end of the proposed passing place. Should sections of hedge be removed there will be some minor effects on the townscape character of the immediate area which may be mitigated with translocation of original hedge or new hedge planting. Detail and specification to be determined at later stage in conjunction with ecologists. The magnitude of landscape change would be low in a VSAA of low landscape sensitivity hence landscape effects would be slight, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Newtown to SSA B South (sTMP 5)		
Passing Place Llanidloes Road (sTMP Figure 5-3b)	Narrow rough grass verge with short mixed hedge. LANDMAP VSAA MNTGMVS865 Caersws River Bowl.	Direct impacts on grass verge and hedge with loss of both to accommodate passing place partially on 3rd party land with minor effects on local landscape character. Replacement of amenity grass verge with hardened verge consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. Loss of hedge to be mitigated with translocation of original hedge or new planting of replacement hedge, likely to establish to similar condition as existing within medium to long term, reducing effects over time. Detail and specification to be determined at later stage in conjunction with ecologists. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.
Passing Place Caesws/ Swept Path Analysis A489/A470 Junction Caersws (sTMP Figures 5-3c/5-4d)	Broad rough grass verge and dense mixed hedge with field gate and small area of hard standing at western end. Level crossing and road junction to west. LANDMAP VSAA MNTGMVS865 Caersws River Bowl.	Direct impacts on grass verge, loss of short section of hedge and relocation of field gate to accommodate swept path. Where short section of hedge is removed there will be some minor effects on the character of the immediate area which may be mitigated with translocation of original hedge or new hedge planting. Detail and specification to be determined at later stage in conjunction with ecologists. Replacement of rough grass verge with hardened verge. Hardened verge, consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Newtown to SSA B South (sTMP 5) (continued)		
Passing Place Pontddlgoch (sTMP Figure 5-3d)	Broad rough grass verge with narrow band of trees and scrub. LANDMAP VSAA MNTGMVS235 Carno Mosaic.	Direct small-scale impacts on grass verge which will be replaced with a hardened verge consisting of cellular grassed reinforced paving that is likely to re-vegetate within short to medium term thereby further reducing landscape impacts. Hardened verge likely to be located outside tree canopy and as such no direct effects are predicted for adjacent trees other than potential pruning. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.
Passing Place Talerddig (sTMP Figure 5-3e)	Rough grass verge to highway with mixed hedgerow. LANDMAP VSAA MNTGMVS696 Carno Grazing.	Direct small-scale impacts on grass verge which will be replaced with a hardened verge consisting of cellular grassed reinforced paving that is likely to re-vegetate within short to medium term thereby further reducing landscape impacts. Hedgerow may require pruning but this will not result in landscape effects. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium, permanent and not significant.
Swept Path Analysis A470 Plas Llysyn (sTMP Figure 5-4f)	Sharp bend in road west of bridge over rail line, road on embankment with crash barrier, hedge and scrub with pasture beyond. LANDMAP VSAA MNTGMVS556 Carno.	Direct impacts on vegetation to be removed, including hedge. Direct impacts on landform built up to accommodate road re-alignment resulting in loss of some pasture, although these changes are likely to be insignificant in terms of landscape character as they are essentially a realignment of an existing embankment. New embankment and area of road removed should be graded and vegetated, details of translocation of original hedge or new planting to be determined at later stage in conjunction with ecologists. The magnitude of landscape change would be low in a VSAA of low landscape sensitivity hence landscape effects would be slight, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Newtown to SSA B South (sTMP 5) (continued)		
Swept Path Analysis A470 Tirymynach (sTMP Figure 5-4h)	West of narrow stone bridge carrying railway above road. Crash barrier with post and rail fence and mixed hedge with scrub and trees behind on slope falling to watercourse. LANDMAP VSAA MNTGMVS696 Carno Grazing.	Direct impacts on vegetation to be removed to allow construction of retaining wall with parapet. Root zone of trees beyond retaining structure may be affected by construction and consultation with a suitably qualified arboriculturalist is advised. Although scrub, hedge and some trees may be removed it is likely that enough vegetation will remain to retain integrity of lightly wooded appearance, resulting in overall medium effects on the character of immediate area. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be slight/medium, permanent and not significant
Passing Place Dolfach (sTMP Figure 5-3f)	Broad rough grass verge with post and wire fence. LANDMAP VSAA MNTGMVS276 Dyfi Valley Catchment.	Direct impacts on grass verge. Replacement of rough grass verge with hardened verge consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be negligible in a VSAA of high landscape sensitivity hence landscape effects would be slight, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Newtown to SSA C: Mochdre Option		
Passing Place Holly Bank (sTMP Figure 6-3b)	Grass verge with steeply rising bank which is grass covered on northern section and brambles on southern section. Limited scrub on the bank which is topped by low trimmed hedge. LANDMAP VSAA MNTGMVS946 Llandssil Hill and Scarp Grazing.	Direct impacts on grass verge but bottom section of the bank should remain unaffected. Replacement of rough grass verge with hardened verge consisting of cellular grassed reinforced paving is likely to re-vegetate within short to medium term, reducing effects over time. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Passing Place Garreg View (STMP Figure 6-3c)	Grass verge within an elongated, central traffic island built to allow access to Garreg View. No trees or scrub. LANDMAP VSAA MNTGMVS946 Llandssil Hill and Scarp Grazing.	Temporary direct impacts of the roadside edge of the elongated, central traffic island with loss of some grass verge. This will be re-sown upon completion of construction traffic movement and the sward re-established. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, temporary and not significant.
Passing Place Willow Bank (STMP Figure 6-3d)	Mown grass verge with steeply rising bank that is mostly covered by scrub and some semi-mature deciduous trees. LANDMAP VSAA MNTGMVS254 Kerry Ridgeway.	Direct but temporary impacts on grass verge but bottom section of the bank should remain unaffected. The magnitude of landscape change would be negligible in a VSAA of high landscape sensitivity hence landscape effects would be slight temporary and not significant.
Passing Place Gwynant (sTMP Figure 6-3e)	Area of grass verge bordered by vegetated bank to the east consisting of bramble scrub, willow and other immature tree species. LANDMAP VSAA MNTGMVS254 Kerry Ridgeway.	Direct impacts on grass verge only are anticipated with only small scale loss of abundant landscape elements. The magnitude of landscape change would be negligible in a VSAA of high landscape sensitivity hence landscape effects would be slight, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Swept Path Analysis Mochdre Link (sTMP Figure 6.4c)	Loss of ~40 m of hedgerow alongside southern side of A483 to create the junction between the A483 Dolfor Road and newly created road. Additional removal of the far western end of a line of large bushes/small trees (possible grown out hedgerow) which runs on a northeast-southwest alignment through the site and area of rough grassland to accommodate the new road alignment and associated embankment. The mature oak tree between the route and adjacent industrial buildings would be retained although the toe of the western embankment may affect the tree's root system. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct effects upon a number of abundant landscape elements (specifically a short section hedgerow, rough grassland and small number of large bushes) due to their permanent removal. Root zone of the oak tree located beyond the toe of the embankment may be affected by construction and consultation with a suitably qualified arboriculturalist is advised. Modifications to existing topography through the creation of an embankment (maximum 6 m high) with steep 1:2 outer slopes. The proposed seed mix to be applied to this embankment should be agreed with an ecologist. The magnitude of landscape change arising from the introduction of this new landscape element would be medium in a VSAA of medium landscape sensitivity hence landscape effects would be medium, permanent and locally significant although not significant at the VSAA level.
Swept Path Analysis A483 (sTMP Figure 6.4d)	Loss of approximately 35 m length of low embankment topped by relatively new but laid length of hedgerow. Possible need to incorporate low retaining structure at rear of realigned section. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct landscape effects from need to cut back into low embankment to maximum depth of 3.5 m with resultant removal of section of hedgerow that can be replanted along rear (eastern) side of realigned section behind retaining structure. No trees or scrub to be lost. Widened section to be treated with grasscrete and seeding mix to ensure that a grass verge is recreated within short term. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6.4e)	Works on this tight curve will affect ~100 m length of hedgerow, low embankments, gates and telegraph poles on southern side. This will include ~80 m length of trimmed hedgerow (mainly hazel) on the top of a steep-sided embankment that varies in height from 1-3 m. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct landscape effects from loss of ~80 m length of hedgerow and reconfiguring of slopes on outer side of the curve. New retaining structure will be briefly prominent when driving along this section as will the grasscrete treated overrun area given its maximum width will be 10.8 m. The mature oak tree will be removed. A new or transplanted hedgerow should be re-established behind the retaining structure and the reprofiled section of the embankment resown and new trees planted. The grasscrete will be sown with an appropriate grass seed mixture to encourage the re-establishment of a grass sward as quickly as possible. The magnitude of landscape change would be low in a VSAA of medium landscape sensitivity hence landscape effects would be low/medium and not significant.
Swept Path Analysis A483 (sTMP Figure 6.4f)	Loss of ~40 m length of low, immature hedgerow in woodland setting. No loss of mature trees as long as BS applied. To allow swept path movement it may only be necessary to cut existing hedgerow to the ground allowing later quick regrowth. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct but temporary landscape effects at highly localised scale with hedgerow either allowed to regrow or replacement planting provided. Should be no residual effects within a growing season. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Swept Path Analysis A483 (sTMP Figure 6.4g)	Pruning back of ~30 m length of medium height hedgerow, mostly consisting of hazel. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct but temporary landscape effects at highly localised scale with hedgerow allowed to regrow. No permanent loss of vegetation required. Should be no residual effects within a couple of growing seasons. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Swept Path Analysis A483 (sTMP Figure 6.4h)	Pruning back of ~15 m length of medium height mature mixed hedgerow. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct but temporary landscape effects at highly localised scale with hedgerow to be replaced. No permanent loss of vegetation required. Should be no residual effects within a couple of growing seasons. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.

Table 5.3 (continued) Overview of Landscape Assessment

Site Name/Reference	Landscape Features Present and LANDMAP VSAA	Landscape Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6.4i)	The works required at this tight curve will require the loss of no lengths of hedgerow as the affected boundary consists of only a post and wire fence which can be realigned. There will be the permanent loss of a strip of improved pasture on the inside of the curve to be replaced by grasscrete to a maximum width of 7.8 m. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct landscape effects from loss of small amount of improved grazing on field edge and pruning back of short section of hedgerow and handful of mature trees on opposite side of A483. Grasscrete apron on the inside of the curve should be assimilated into local landscape in the medium term. Post and wire fence realigned. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Swept Path Analysis A483 (sTMP Figure 6.4j)	The works required would be the removal of ~35 m length of a mature, mixed, trimmed section of hedgerow containing no hedgerow trees. A small area of grasscrete would be introduced on the inside of the curve. LANDMAP VSAA MNTGMVS946 Llandysill Hill and Scarp Grazing.	Direct permanent landscape effects would be limited to small loss of a widespread landscape element and its potential replacement on a slightly revised alignment. The small area of grasscrete would be re-absorbed into the local landscape within in the medium term. The magnitude of landscape change would be negligible in a VSAA of medium landscape sensitivity hence landscape effects would be slight/negligible, permanent and not significant.
Swept Path Analysis A483 (sTMP Figure 6.4k)	Site visit indicates that the overrun at this location should be accommodated without the need to prune back or remove any section of the low hedgerow to the immediate east. LANDMAP VSAA MNTGMVS254 Kerry Ridgeway.	Making the required allowance for the 0.8 m width overrun in this location should not necessitate the loss of any landscape elements as the hedgerow line is slightly set back. Hence there would be no landscape effects.
Swept Path Analysis A483 (sTMP Figure 6.4l)	Works will require the loss of two sections of hedgerow: ~30 m opposite Dolfor road junction and ~50 m opposite B4355 junction. No tree losses but latter hedgerow is mature and broad. Assumed that new hedgerows can be planted on revised alignment. Two small areas of grasscrete will be required to extend hard surface around inner curve. LANDMAP VSAA MNTGMVS254 Kerry Ridgeway.	Loss of total length of hedgerow of ~80 m length and introduction of to grasscrete areas would represent a direct and permanent landscape change that would be visible to a small number of people living in Dolfor. The loss of a short section of a common landscape element would represent a negligible magnitude of landscape change which when combined with a high sensitivity VSAA would generate a slight level of landscape effect which would be permanent and not significant.

5.5 Visual

Assessment of Effects

5.5.1 A summary of the assessment of potential visual considerations, principally the nearby presence of any sensitive visual receptors, is given in Table 5.4.

5.5.2 There are several properties and groups of properties that are located within close distance of the proposed works (nominally less than 100 m). During the construction phase, vehicles, machines, material stockpiles and supporting elements such as fencing and facilities may be visible in some views available to the residents of these properties. However, the construction phase at each location is considered likely to be short enough for the effects on upon residents' views to be limited and as such these short-lived visual effects would be of the type that could reasonably be expected to take place occasionally along any adopted road; as such these would be insignificant. During the operational phase the wind turbine delivery convoy's use of the passing places is likely to be infrequent and short-lived and therefore visual effects associated with the operation of the convoy itself are considered to be minimal and not significant.

Mitigation

5.5.3 Recommendations are made in Table 5.4 for further mitigation measures that may be appropriate in specific locations in light of detailed design, which comprise measures for the translocation or replanting of hedgerows whose loss is inherent in the scheme. These should be implemented as so on as possible after the construction works are completed and where required a management programme implemented to maximise the establishment of areas to be seeded and sections of hedgerow that are to be translocated or newly planted. It is expected that these measures will be secured by way of a Planning Condition, requiring the submission and approval of a CEMP.

Residual Effects

General

5.5.4 Where visual receptors' views would not be screened by retained vegetation the construction works themselves will be brief and of a s cale and appearance characteristic of the sort of occasional road maintenance works that can reasonably be expected to take place, especially with regard to 'A' roads. Most of the works close to residential properties will consist of verge hardening that will likely re-vegetate within the medium term and until this is complete the hardened verges would be likely to be perceived appearing as m inor and insignificant visual changes. Where carriageway widening would be required, it will likely appear as a minor extension to the existing road with some loss of verge resulting in minor and insignificant visual changes. There are no locations where the requisite hedgerow removal would be likely to provide any of the limited number of local residents with a clear view of the road where they did not previously have any such views.

sTMP Sections 2-5 Inclusive

5.5.5 Along those parts of the route covered by sTMP Sections 2-5 residential and recreational visual receptors will experience no cumulative visual effects when all of the assessed works are considered. This is because of the separation distances

between those locations where works occur. However, road users may experience the works in a sequential manner as they move along the routes. In this scenario the sensitivity of the road users is assessed as being low whilst the magnitude of cumulative visual change would be negligible due to the separation distances between the individual works, which are generally in excess of 2 km(and hence the time delay between visual effects being sustained), the minor visual change as a result of the individual works, the temporary nature of any construction period and the context of any changes within an existing road infrastructure that is being generally experienced at vehicle speeds of between 30mph and 60mph. No EIA significant effects would occur.

Newtown to SSA C: Mochdre Option (sTMP Section 6)

5.5.6 The Mochdre Option involves the creation of a short, new stretch of haul road linking Heol Ashley, which passes through the Mochdre Industrial Estate, with the A483 Dolfor Road and across land which is visually contained. As well as the rising ground to the south beyond the A483 to a local high point of 178 m AOD, to the immediate north the site is separated from a school and residential estate by the 152 m high, tree topped, elongated hill of Garth Owen. Views into the site from the Mochdre Industrial Estate are partially screened and filtered by the large units at the eastern end of the Estate and by the relatively high levels of established tree cover within the eastern part of the Estate located around the units and their car parking areas.

5.5.7 Given the difference in elevation between the two roads (from 134 m AOD at the end of the existing industrial estate road to 142 m AOD at Dolfor Road), an embankment, with 1:2 outer slopes would be created on land to the east of the industrial unit occupied by Cambrian Marketing & Avenue Commercial Furniture. The detailed assessment of the site identified a collection of seven properties within 300 m to the east of the proposed link road whose residents are likely to experience a change to their westerly views as a consequence. The group includes three detached properties which occupy an elevated location to the east of Upper Dolfor Road and two detached and two semi-detached properties sited at a slightly lower elevation along the western side of the road. Westerly views towards the proposed link road from the majority of the properties or the ground floor windows of properties are filtered by vegetation to varying degrees and it is assessed that residents would be unlikely to sustain more than low magnitudes of visual change during and following construction. The likely low magnitudes of visual change are largely a consequence of the short-lived construction works, (construction of the haul road, followed by its use during the construction phase of the wind farms) the resultant embankment and the movement of vehicles along a short link road occupying a small proportion of the middle ground and sited well below the distant horizon. Furthermore, the gradual greening of the 1:2 outer slopes of the embankment with grass cover would reduce any initial contrast of the embankment with the surrounding colours within the adjoining landscape.

5.5.8 The only other visual receptors identified as likely to sustain a change to their views are vehicular visual receptors travelling along the Dolfor Road who would have close distance views of the minor changes associated with the removal of ~40 m stretch of roadside hedgerow. The sensitivity of the road users is assessed as being low whilst the magnitude of visual change would be negligible due to the temporary nature of any construction period and the context of any changes within an existing road infrastructure that is being generally experienced at vehicle speeds of around 60mph.

Close distance views of the embankment's eastern outer slopes and new road may be possible for drivers and their passengers travelling southbound along just less than 100 m stretch of road although this is dependent on the seasonal height of the roadside hedge. Given the brevity of the view, the magnitude of change would not be greater than medium. In conclusion, potential visual effects for vehicular receptors would be not significant in EIA terms.

Table 5.4 Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Common Section		
Potential Layover Area at Mile End Roundabout (A483/A5) (sTMP Figure 1-2a)	Proposed eastern Oswestry Urban extension.	Considered, although the urban area extension is only proposed at this stage. Views are only potentially likely through the gap in the tall and dense hedgerow created to allow convoy access, although they may be screened by similarly tall and dense hedges on the eastern side of the A5. Proposed bunding, depending on design, may further screen views of the layover site such that all but the access point would not be discernible. The access point would appear as part of the general road infrastructure. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity could only result in a slight level of visual effect that would be not significant.
Potential Layover Area – Abermule Highway Depot (existing depot) (sTMP Figure 1-2c)	Glandwr two-storey house	Views to depot are currently partly screened by existing hedge although upper parts of parked vehicles and stored materials within the depot are likely to be visible above it. Upper part of proposed security fencing and proposed welfare facilities are likely to be partially visible above retained hedge. Upper parts of convoy vehicles are also likely to be partially visible when within depot. The loss of hedge to make northern access is unlikely to be visible from the property due to screening by retained sections of hedge. Although change as a result of the proposed works and proposed use will be discernible from the property it would be in keeping with the site's current use as a highway depot. Given the existing depot, retained level of screening and the temporary use by convoy vehicles the changes as a result of the proposals would be insignificant in overall views. Existing hedge could be grown taller and supplemented to increase screening of site. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity could only result in a slight level of visual effect that would be not significant.

Table 5.4 (continued) Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Common Section		
Passing Place Llynclys Cross Roads (sTMP Figure 2-3c)	Residential properties located close by in Llynclys, on opposite side of road.	Close distance views but no change likely to be perceptible other than during short construction period and change of verge from rough grass to hardened verge, which will appear as part of road infrastructure and will likely vegetate to become imperceptible in medium to long term. Use of bay by turbine delivery convoy will be occasional and temporary and thus be insignificant in overall views. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity could only result in a slight level of visual effect that would be not significant.
Passing Place Arddleen (sTMP Figure 2-3e)	Residential properties located close by in Ardleen on same side of road.	As above.
Route from Welshpool to SSA B North		
Passing Place Middle Sylfaen (sTMP Figure 3-3c)	Residential properties located close by to east at Lower Sylfaen.	Close distance views but no change likely to be perceptible other than during short construction period and change of verge from rough grass to hardened verge, which will appear as part of road infrastructure and will likely vegetate to become imperceptible in medium to long term. Use of bay by turbine delivery convoy will be occasional and temporary and thus be insignificant in overall views. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity could only result in a slight level of visual effect that would be not significant.
Passing Place Glascoed (sTMP Figure 3-3e)	Residential properties located close by to north at Heniarth.	As above.
Passing Place Llanfair Caereinion (sTMP Figure 3-3f)	Residential property close to eastern end.	As above.
Passing Place Foel (sTMP Figure 3-3i)	Adjacent to Foel Farm and eastern properties of Foel.	As above.

Table 5.4 (continued) Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Welshpool to Newtown		
Passing Place Luggy Brook (sTMP Figure 4-3c)	Public house (The Horseshoes Inn) and nearby residential properties.	As above.
Passing Place Llifior Bridge (sTMP Figure 4-3d)	Stone Cottage close to western end, on same side of road.	As above.
Welshpool to Newtown (continued)		
Passing Place Newtown East (sTMP Figure 4-3f)	Several residential properties at Eastern edge of Newtown located on opposite side of road to east of proposed passing bay.	As above except for potential loss of sections of hedge will be perceptible and may allow residents oblique glimpses of low industrial buildings beyond but due to the angle of view and industrial context effects on visual amenity would be negligible. Replacement hedge planting will likely mitigate changes within the medium to long term.

Table 5.4 (continued) Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Newtown to SSA B South		
Passing Place Llanidloes Road (sTMP Figure 5-3b)	Gwyndy located in elevated position to west of passing place.	Close distance views but no change likely to be perceptible other than during short construction period and change of verge from rough grass to hardened verge, which will appear as part of road infrastructure and will likely vegetate to become imperceptible in medium to long term. Use of bay by turbine delivery convoy will be occasional and temporary and thus be insignificant in overall views. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity could only result in a slight level of visual effect that would be not significant.
Passing Place Caesws/ Swept Path Analysis A489/A470 Junction Caersws (sTMP Figures 5-3c/5-4d)	Crossing Cottage located on other side of A470 beyond western end.	As per Llanidloes Road passing place above.
Swept Path Analysis A470 Plas Llysyn (sTMP Figure 5-4f)	Farm and residential properties (Sarn and Pen Sarn) close to SW of proposals but separated from it by railway line and few readily available direct views.	Although works are likely to take longer due to embankment creation and realignment of road, although still be short-term. Hedge removal is unlikely to affect views from the property as none is located between front of property and the works. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity could only result in a slight level of visual effect that would be not significant.

Table 5.4 (continued) Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Newtown to SSA B South (continued)		
Passing Place Dolfach (sTMP Figure 5-3f)	Dol-lydan and Swn yr located on same side of road as passing place.	Close distance views but no change likely to be perceptible other than during short construction period and change of verge from rough grass to hardened verge, which will appear as part of road infrastructure and will likely vegetate to become imperceptible in the medium to long term. Use of bay by turbine delivery convoy will be occasional and temporary and thus be insignificant in overall views. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity could only result in a slight level of visual effect that would be not significant
Newtown to SSA C: Mochdre Option		
Passing Place Holly Bank (sTMP Figure 6-3b)	Hollybank residential property is located on the opposite side of the A483 to the passing place. Views available from 5 medium and small windows and part of the garden.	Close distance views but no change likely to be perceptible other than during short construction period and change of verge from rough grass to hardened verge, which will appear as part of road infrastructure and will likely vegetate to become imperceptible in the medium to long term. Use of bay by turbine delivery convoy will be occasional and temporary and thus be insignificant in overall views. The magnitude of visual change that these visual receptors could sustain would be low which when combined with their high sensitivity would result in a medium level of visual effect that would be not significant.
Passing Place Garreg View (STMP Figure 6-3c)	Garreg View lies ~50 m to the north-east. It is a single storey bungalow arranged at an angle to the A483 so that only views from inside would be from two winds in the south-western gable end. These views and those from garden will be heavily filtered by an intervening row of mature conifers.	Limited views available but no change likely to be perceptible other than during short construction period. Use of area by turbine delivery convoy will be heavily filtered, occasional and temporary and thus be insignificant in overall views. The magnitude of visual change that these visual receptors could sustain would be negligible which when combined with their high sensitivity would result in a slight level of visual effect that would be not significant.

Table 5.4 (continued) Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Passing Place Willow Bank (STMP Figure 6.3d)	Although the Cefn Lee Park for camping and caravans is located to the immediate north of the affected section of the A483 residents would have no views as the roadside frontage of the Park is at a slightly lower elevation and is bound by a low embankment and tall mature hedge. Only exception likely to be the western-most bungalow that may act as reception offices as well as being residential. This is opposite entrance so does not benefit from full screening.	The strength of intervening screening would result in no visual changes for the Park's residents despite their proximity. Sole exception will be any residents in the western-most bungalow who would temporarily sustain a negligible magnitude of visual change. Combined with their high visual sensitivity this would lead to a temporary, slight, adverse visual effect that would be not significant.
Passing Place Gwynant (sTMP Figure 6-3e)	There are no residential properties whose residents could have a clear view of the relatively minor works required at this junction. There would be a considerable number of low sensitivity vehicular receptors whose views would be fleeting.	This part of Newtown has seen considerable changes in recent years so that small-scale reconfigurations around one side of a busy traffic island removing and introducing common visual elements would represent a negligible magnitude of visual change in the views of all potential visual receptors which would be not significant.
Swept Path Analysis Mochdre Link (sTMP Figure 6.4c)	Collection of seven properties (five detached and two semi-detached) lining either side of Upper Dolfor Road which lie ~300 m to the east of the proposed link road.	Residents in the red brick detached bungalow which forms the northern most property on the eastern side of Upper Dolfor Road and those using first floor rooms in the four properties along the western side of the road are likely to have the clearest views of the new section of road and associated embankment from west facing windows. Residents' views would be modified through the introduction of the embankment occupying a small proportion of the middle-ground and sited well below the distant horizon. The gradual greening of the embankment slopes would help assimilate the new feature into the surrounding colours and textures of the adjacent landscape. The westerly views of residents in the remaining two elevated properties along the eastern side of the road are screened by tall coniferous trees sited within their front gardens. Similarly ground floor views of residents in those properties which line the western side of the road are filtered to varying degrees by deciduous garden and roadside vegetation. The A483 is located close to these residential properties and consequently vehicular movement along this road is likely to already be an important factor in residents' western views. It is assessed that the changes would be likely to generate a low magnitude of visual change for residents residing within this group of properties once the construction is completed resulting in medium levels of visual effect that would be significant.

Table 5.4 (continued) Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6.4d)	No residential properties provide their residents with views over this location.	Absence of visual receptors aside from vehicular visual receptors would have result that the small scale works would have no visual effects.
Swept Path Analysis A483 (sTMP Figure 6.4e)	Black Hall, a large period farmhouse with extensive timber barns on its northern side lies at an oblique angle at least 100 m to the north of the proposed works. It is at a slightly lower elevation and the intervening field contains a good number of semi-mature trees that provide at least partial screening for residents in views from southern gable end windows.	The combination of the low key nature of the proposed works with the separation distance, variation in elevation and good intervening tree cover would result in residents sustaining no more than a negligible magnitude of visual change in any southern views. Combined with their high visual sensitivity this would lead to slight, adverse visual effect that would be not significant.
Swept Path Analysis A483 (sTMP Figure 6.4f)	No residential properties provide their residents with views over this location.	Absence of visual receptors aside from vehicular visual receptors would have result that the small scale works would have no visual effects.
Swept Path Analysis A483 (sTMP Figure 6.4g)	No residential properties provide their residents with views over this location.	Absence of visual receptors aside from vehicular visual receptors would have result that the small scale works would have no visual effects.
Swept Path Analysis A483 (sTMP Figure 6.4h)	Although Glascoed Hallis located approximately 100 m to the east on the same side of A483 there is a dense line of tall, mature cupressus trees in the line of sight. There are no other nearby residential properties.	Glascoed Hall's residents would be unlikely to see any aspect of the limited works at this location due to orientation, the small scale of the works and primarily due to the high level of screening provided by the intervening coniferous belt of mature trees. This would result in residents sustaining no visual effects from the proposed hedgerow relocation.
Swept Path Analysis A483 (sTMP Figure 6.4i)	Glascoed Hall is located a minimum of 140m to the west but its orientation provides residents with only oblique views from front elevation windows to the east and the sharp road curve. No other residential properties in the surrounding area.	Glascoed Hall's residents would sustain a negligible magnitude of visual change as a consequence of short-lived oblique views of the construction works. Views of the final realigned curve would probably show no changes from the present view. Hence the level of visual effect would never exceed slight and would always be not significant.
Swept Path Analysis A483 (sTMP Figure 6.4j)	The isolated two storey residential property of Glascoed Villa is located ~60 m to the north-west on the opposite side of A483. Windows in its front elevation and its front garden will provide residents with views of the hedgerow clearance work.	Glascoed Villa's residents would sustain a negligible magnitude of visual change as a consequence of short-lived hedgerow removal and carriageway overrun works but subsequently the present situation would re-assert itself. Hence the level of visual effect would never exceed slight and would always be not significant.

Table 5.4 (continued) Overview of Visual Assessment

Site Name/Reference	Potential Visual Receptors	Visual Implications for Potential Works
Swept Path Analysis A483 (sTMP Figure 6.4k)	The Old Vicarage; a large red brick two storey property is located a minimum of 80 m to the north-west in a well treed garden. Filtered views may be available from a first floor gable end window.	The changes required at this location are minimal which combined with the filtered nature of the potential view would result in no visual changes for the Old Vicarage's residents.
Swept Path Analysis A483 (sTMP Figure 6.4l)	The hedgerow removal works and the re-alignment of the kerb sections maybe visible in views from four properties: The Old School, the Old Toll Gate, the smithy and the property north-east of St. Paul's Church plus people entering and leaving St. Paul's church and the Dolfor Free Church as well as Dolfor County Primary School.	The Primary School is no longer open whilst effects upon church attendees can be discounted as views would only be available on arriving and leaving once or twice a week. Residents in the four properties will all have clear close distance or relatively close distance views of the hedgerow loss. The new hedgerow sections and slightly realigned stretches of the A483 will represent no more than a low magnitude of visual change. When combined with the residents' high visual sensitivity the result would be a temporary adverse medium level of visual effect that would be not significant.

6. Conclusions

6.1.1 An assessment has been made of the potential environmental effects arising from proposals for highway works to facilitate the delivery of abnormal loads into mid Wales, for the construction of wind farms in TAN 8 Strategic Search Areas (SSAs) B and C. These works include the creation of lay by areas (passing places) lay down areas and works required as a result of swept path and vertical alignment analysis, which are the most likely elements of the scheme to result in environmental effects.

6.1.2 The purpose of the sTMP is to establish a protocol, with associated physical works, to prevent the occurrence of likely EIA significant traffic and transport effects. This will in turn reduce the potential for EIA significant socio-economic effects such that it is considered that there is little or no potential for such effects to arise. Construction of the works necessary to facilitate the sTMP will be undertaken in a staged manner along all sections of the sTMP route with the total number of working areas limited at any one time. Traffic management will be in place during the construction phase, the details of which will have to be agreed with the highways authorities (Powys and Welsh Government). With these project assumptions in place the potential for significant traffic and transport and socio-economic effects arising from the sTMP were scoped out of the assessment. In addition to use by abnormal loads there is the potential for parts of the sTMP highway network to be used by general construction traffic in support of the construction of individual wind farm projects. The appropriate place for effects on traffic and transport and noise effects, arising from the passage of these vehicles along the highway, is considered within the EIA for individual wind farm projects. As such this has therefore not been considered in this assessment.

6.1.3 The hydrology and noise baseline conditions were considered in light of the proposed construction methodology in the sTMP, in addition to informed assumptions as to best practice measures which will be incorporated. For hydrology, the baseline consideration incorporated a secondary scoping exercise to review individual project components (each passing place, layover area and works required as a result of swept path analysis). It is concluded that proposed best practice measures incorporated into scheme design will be sufficient to avoid likely EIA significant effects on hydrology and noise, which are therefore scoped from any further assessment.

6.1.4 The assessment of potential effects on ecology, the historic environment and landscape and visual receptors considered proposed passing places, layover areas and minor highway works required as a result of swept path analysis. Along parts of the route covered by Sections 2-5 of the sTMP, these are generally in land alongside the existing highway network; in most cases within the existing highway verge, while some of the layover areas utilise existing hardstanding. Direct effects upon sensitive ecological receptors, heritage assets, landscape features and visual receptors are unlikely given that in most cases the land to be taken consists of either tarmac surfaces or managed/partially managed grassland, which has commonly been landscaped as part of existing highway provision. In the case of the A483/A490 Roundabout location, the land has been artificially raised in relation to the construction of the roundabout itself. Where trees and hedgerows do exist they tend to be located to the

rear of the verge and in most cases they will not be removed. T here are some locations where it may be necessary to cut back overhanging trees and hedgerows, or more rarely to remove these; where this is necessary, works should be undertaken in consideration of further survey requirements set out in the assessment (and discussed below).

6.1.5 In EIA terms significant effects on ecological receptors are unlikely to occur. Recommendations are made in the assessment (Table 5.1) in respect of potential ecological receptors and as identified a number of pre-construction surveys will be required for great crested newts, bats, badgers and breeding birds to ensure that legal obligations are met and that any potential effects are identified and mitigated for in an appropriate manner; this will be particularly important should any issues arise that require licensing.

6.1.6 No direct effects on known or recorded heritage assets have been identified. The assessment indicates some general potential for prehistoric, medieval and later archaeological remains to be encountered, particularly for the routes into SSA B (North and South, sTMP sections 3 a nd 5) where these partly follow the projected routes of Roman roads. Given the location of the proposed works mostly in the highway verge or in some cases small areas of adjacent land this potential is generally low, and no likely significant EIA effects have been identified. The opportunity for recording the remains of any surviving section of road, in an area where confirmed and investigated remains are scant, is an important factor in the judgement of effects. Mitigation measures are set out (in Section 5.3.9) to ensure the appropriate recording of any unrecorded buried archaeological remains which may be present and encountered by proposed highway works. No EIA significant effects on the setting of heritage assets have been identified.

6.1.7 No EIA significant landscape effects have been identified owing to the relatively small scale of the proposed works, in conjunction with the close connection in spatial and landscape terms between proposed work locations and existing busy trunk roads. The magnitude of cumulative landscape effects is also reduced by the relative spatial infrequency of works over quite extensive routes, where landscape effects will remain localised even when considered cumulatively.

6.1.8 The new haul road entailed in the Mochdre Option comprises a short section of road to connect two existing roads which are present in the vicinity. This therefore introduces a new landscape element which would be of a medium magnitude within the Mochdre site itself hence landscape effects would be medium and not significant. Within the wider VSAA (which possesses medium landscape sensitivity) this option, on land which is visually contained, ensures that the magnitude of landscape change would be negligible and not significant in EIA terms.

6.1.9 No EIA significant visual effects will occur on residential or recreational receptors along parts of the route covered by Sections 2-5 of the sTMP. Users of the road are considered to be of low sensitivity, whilst the magnitude of cumulative visual change would be negligible due to the separation distances between the individual works (and hence the time delay between visual effects being sustained). Individual works will cause a negligible visual effect, while construction will be temporary and seen within the context of the existing road infrastructure.

6.1.10 The visual assessment of the preferred Mochdre option concludes that users of the A483 are unlikely to sustain significant visual effects whilst the occupiers of properties with westerly views towards the proposed link road would have views filtered by vegetation to varying degrees and be unlikely to sustain more than low magnitudes of visual change during construction with the gradual greening of the outer slopes of the embankment with vegetation which would reduce any initial contrast of the embankment with the surrounding colours within the adjoining landscape.

6.1.11 In summary no EIA significant effects have been identified as a result of works set out in the sTMP for the proposed transport of wind turbine components into Mid Wales SSAs.

Appendix A
Secondary Hydrology Scoping Exercise

8 Pages

Table A1 Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA required
Common Section					
Potential Layover Area at Mile End Roundabout (A483/A5) –Shropshire Council Site (NE option) (sTMP Figure 1-2a)	One waterbody present within 250 m, lying ~120 m away to the north.	None.	Soil stripping to create hardstanding; new access infrastructure.	No new surface drainage connections direct to watercourses. Works conducted according to PPGs and best practice which may include for SuDS. Given the size of the area to be created there may be a requirement to submit a Flood Risk Assessment with any application for planning permission.	N
Potential Layover Area at Mile End Roundabout (A483/A5) –Oswestry Livestock Market Lorry Park(SW Option) (sTMP Figure 1-2a)	Several small drainage ditches within 500 m including ditches between industrial units to the south of the livestock market lorry park which ultimately flow into the River Morda.	None.	None.	Use of existing access and hardstanding.	N
Passing Place B5069 south of Oswestry	n/a	n/a	Passing place is on carriageway so no physical works required.	n/a	N
Passing Place Llynclys Cross Roads (sTMP Figure 2-3c)	Llynclys pool to north west (approx 350 m). Ditches to east at 175 m.	None.	Regrading and strengthening of verge.	No new surface drainage. Works conducted according to PPGs and best practice.	N
Passing Place Four Crosses Bypass (sTMP Figure 2-3d)	n/a	n/a	Passing place is on carriageway so no physical works required.	n/a	N

Table A1 (continued) Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA Required
Passing Place Arddleen (sTMP Figure 2-3e)	Montgomery Canal (designated SAC & SSSI) <7 5m to east. Highways drainage ditch located immediately adjacent to west of proposed passing place. 2 ponds located approx 200 m away.	None other than via highways drainage ditch.	Partially off-carriageway passing place.	Proposed development is located between existing highways drainage ditch and highway. All runoff will be captured by existing highways drainage. Hydraulically isolated from canal. Works conducted according to PPGs and best practice.	N
Potential Layover Area, Pool Quay (sTMP Figure 1-2b)	Montgomery Canal (designated SAC & SSSI) <80 m to SW.	None.	None.	No new surface drainage – minimal physical works required. Utilisation of existing highway depot (currently utilised for storage of plant and materials associated with highway maintenance – Powys CC).	N
Passing Place Pool Quay (sTMP Figure 2-3f)	Montgomery Canal (designated SAC & SSSI) <80 m to SW; 2 waterbodies located ~200 m away.	None.	None.	No new surface drainage – minimal physical works required. Utilisation of existing highway depot (currently utilised for storage of materials associated with highway maintenance – Powys CC).	N
Passing Place Rhallt Lane/The Moors (sTMP Figure 2-3g)	Montgomery Canal SAC and SSSI at 205 m to west.	None.	Strengthening of verges.	No new surface drainage. Works conducted according to PPGs and best practice.	N
Passing Place Lion Quay (sTMP Figure 2-3h)	n/a	None.	n/a	Passing place is on existing carriageway.	N

Table A1 (continued) Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA required
Route from Welshpool to SSA B North					
Passing Place Raven Street Roundabout (sTMP Figure 3-3b)	n/a	None.	n/a	Holding place on existing carriageway.	N
Passing Place Middle Sylfaen (sTMP Figure 3-3c)	Sylfaen Brook approx 142 m to S (beyond road and railway). Small agricultural ditches in fields to N.	None.	Regrading of verge.	Regrading of verge that already slopes towards road and contained within highways drainage. Works conducted according to PPGs and best practice.	N
Passing Place Gelli Lane (sTMP Figure 3-3d)	Small tributary to the Afon Banwy 185 m to south. Agricultural field drainage ditch shown on OS 10k in field immediately to the south of development, that flows into the above river.	Potential pathway via the agricultural drainage ditch if PPG were not adhered to.	Verge to be regraded and strengthened to accommodate off-highway passing.	Works conducted according to PPGs and best practice.	N
Passing Place Glascoed (sTMP Figure 3-3e)	Approx 30 m south of a stream crossing on the A458. Approx 300 m to Afon Banwy.	None.	Strengthening and regrading of existing verge.	Use of existing verge cutting. No new surface drainage connections. Works conducted according to PPGs and best practice.	N
Passing Place Llanfair Caereinion (sTMP Figure 3-3f)	Afon Banwy is immediately adjacent to south side of A458 i.e. separated from proposed passing place by road.	None.	Strengthening of existing verge.	No new surface drainage connections. Within the bounds of existing highways drainage. Works conducted according to PPGs and best practice.	N

Table A1 (continued) Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA required
Passing Place Einion (sTMP Figure 3-3g)	Afon Einion approx 60 m from proposed passing place at closest point.	None.	New bituminous surface (widening of existing carriageway).	No new surface drainage connections. Runoff from new surface forms a negligible change to existing runoff regime. Works conducted according to PPGs and best practice.	N
Passing Place Gylfylchau (sTMP Figure 3-3h)	Small tributary stream of Afon Banwy located approx 50 m to S, at its closest point (across grassed field).	None.	Regrading and strengthening of existing verge.	No new surface drainage connections or runoff. Works conducted according to PPGs and best practice.	N
Passing Place Foel (sTMP Figure 3-3i)	Afon Twrch approx 450 m to W.	None.	None.	Use of old road route.	N
Passing Place Dol-y-Maen (sTMP Figure 3-3j)	Tributary streams of Afon Banwy in fields to S.	None.	Strengthening of existing verge and modification of existing roadside drainage.	Upgrade/modification of existing road drainage. Works conducted according to PPGs and best practice.	N
Welshpool to Newtown					
Passing Place A483/A490 Roundabout (sTMP Figure 4-3b)	Tributary stream of River Severn approx 200 m to SE. Standing water >300 m to NE (beyond roundabout).	None.	Strengthening of existing verge and modification of existing roadside drainage (current filter drain not suitable for loadings).	Upgrade/modification of existing road drainage. Works conducted according to PPGs and best practice.	N
Passing Place Luggy Brook (sTMP Figure 4-3c)	Montgomery Canal SAC and SSSI at 100 m to NW. Luggy Brook is culverted beneath A483 >10 m to south of proposed development.	None.	Strengthening and regrading of existing verge.	Best practice to avoid runoff. Works conducted according to PPGs and best practice.	N

Table A1 (continued) Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA required
Passing Place Llifior Bridge (sTMP Figure 4-3d)	Montgomery Canal SAC and SSSI at 125 m to SE. Llifior Brook culverted beneath A483 >10 m to N of development.	None.	Strengthening and regrading of existing layby and verge.	Works conducted according to PPGs and best practice.	N
Potential Layover Area, Abermule (sTMP Figure 1-2c) (existing Abermule Highways Depot)	Montgomery Canal SAC and SSSI immediately adjacent to east. River Severn <40 m to east.	None.	Regrading of one roadside area (away from canal). Welfare facilities. New fencing.	Land currently used as (Abermule highway depot) as a highway depot by Powys County Council for storage of plant and materials associated with highway maintenance. Welfare facilities to be sealed and disposed of appropriately offsite. Works conducted according to PPGs and best practice, which will include silt fencing along length of canal if fencing installation works have potential to generate sediment.	N
Passing Place Newtown East (sTMP Figure 4-3f)	River Severn ~70 m to N.	None.	Strengthening of existing verge.	Works conducted according to PPGs and best practice.	N
Newtown to SSA B South					
Passing Place Llanidloes Road (sTMP Figure 5-3b)	River Severn ~60 m to N.	None.	Earthworks (cutting/removal of earth) and regrading.	Negligible increased runoff. Use of PPGs to minimise sediment generation during earthworks.	N
Passing Place Caersws/ Swept Path Analysis A489/A470 Junction Caersws (sTMP Figures 5-3c/5-4d)	River Severn ~250 m to N. Small standing waters (lakes) ~120 m to N	None.	Strengthened verge. Use of grasscrete.	Works conducted according to PPGs and best practice.	N

Table A1 (continued) Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA required
Passing Place Pontddlgoch (sTMP Figure 5-3d)	River Severn ~130 m to E (at nearest point)	None.	Strengthened verge.	Works conducted according to PPGs and best practice.	N
Swept Path Analysis A470 Plas Llysyn (sTMP Figure 5-4f)	Afon Carno ~120 m to N	None.	Embankment required (extension to existing embankment).	Works conducted according to PPGs and best practice – particularly to prevent sediment laden runoff water.	N
Passing Place Talerddig (sTMP Figure 5-3e)	Small tributary stream of Afon Carno passes beneath this passing place	None - Assuming no upgrades needed to culvert.	Strengthening of verge (within existing hedge line).	Works conducted according to PPGs and best practice.	N
Swept Path Analysis A470 Tirymynach (sTMP Figure 5-4h)	Afon Iaen approx 10-15 m away	Direct to Afon Iaen given proximity.	Retaining wall necessary along S side of new alignment (in close proximity to Afon Iaen).	Works conducted according to PPGs and best practice. In particular, silt fencing to prevent generation of sediment laden runoff.	N
Passing Place Dolfach (sTMP Figure 5-3f)	>40 m to Afon Laen at nearest location. Agricultural drainage ditches in fields immediately to N.	None.	Strengthening of verge (within existing fence line).	Works conducted according to PPGs and best practice.	N
Newtown to SSA C: Mochdre Option					
Passing Place Holly Bank (sTMP Figure 6-3b)	~40 m to isolated drainage ditch to east of A483. ~110 m to nearest point of unnamed tributary of Mochdre brook to west of A483.	None.	Slight widening of carriageway.	Works conducted according to PPGs and best practice.	N

Table A1 (continued) Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA required
Passing Place Garreg View (STMP Figure 6-3c)	Over 240 m to two separate small field ditches, that form tributaries of the Severn.	None.	None.	n/a	N
Passing Place Willow Bank (STMP Figure 6.3d	Ponds at head of a Cwm-y-rhiwdre Brook tributary >250 m to NW. Small tributary of Cwm-y-rhiwdre Brook approx 300 m to NW beyond caravan park.	None.	None.	n/a	N
Passing Place Gwynant (sTMP Figure 6-3e)	Cwm-y-rhiwdre Brook tributary >250 m to N.	None.	Strengthening of existing verge.	Works conducted according to PPGs and best practice.	N
Swept Path Analysis Mochdre Link (sTMP Figure 6.4c)	Existing stream (Black Hall Brook, tributary of the River Severn) flows beneath proposed embankment.	Direct to Black Hall Brook (see below).	Culverting of Black Hall Brook.	Works conducted according to PPGs and best practice and under Flood Defence Consent. D/S silt fencing to mitigate potential sediment laden runoff as indicated in Section 4.4.	N
Swept Path Analysis A483 (sTMP Figure 6.4d)	Black Hall Brook >40 m (also separated by A483 between).	None.	Widening of inside bend.	Works conducted according to PPGs and best practice.	N
Swept Path Analysis A483 (sTMP Figure 6.4e)	Black Hall Brook is culverted (small culvert dimensions) beneath development site.	Direct to watercourse due to proximity. No works to culvert.	Small scale earthworks and widening of carriageway to allow swept path.	No works to culvert. Works conducted according to PPGs and best practice. Areas of residual bare earth to be avoided.	N
Swept Path Analysis A483 (sTMP Figure 6.4f)	Unnamed small tributary of the R Severn approx 75 m to W.	None.	None.	N/A	N

Table A1 (continued) Secondary Hydrology Scoping in Context of Baseline Environment

Site Name/Reference	Water Features within 1 km	Hydrology Impact Pathways	Notable Activities	Relevant Scheme Design/Design Mitigation	Further Hydrology EIA required
Swept Path Analysis A483 (sTMP Figure 6.4g)	Unnamed small tributary (ditch) beneath road at development location.	None.	None.	N/A	N
Swept Path Analysis A483 (sTMP Figure 6.4h)	Small unnamed tributary of Mochdre Brook <50 m to W.	None.	None.	N/A	N
Swept Path Analysis A483 (sTMP Figure 6.4i)	Small unnamed tributary of Mochdre Brook <200 m to W.	None.	Strengthened verges.	Works conducted according to PPGs and best practice.	N
Swept Path Analysis A483 (sTMP Figure 6.4j)	Small unnamed tributary of Mochdre Brook ~150 m to NW.	None.	Minor verge strengthening.	Works conducted according to PPGs and best practice.	N
Swept Path Analysis A483 (sTMP Figure 6.4k)	Small tributary of Cwm-y-rhiwdre Brook ~180 m to S.	None.	None.	N/A	N
Swept Path Analysis A483 (sTMP Figure 6.4l)	Very small tributary of Cwm-y-rhiwdre Brook culverted beneath road at site of development.	Direct to watercourse due to proximity. No works to culvert.	Hedge removal and marginal highways improvements (kerb works etc). No works to culvert.	Works conducted according to PPGs and best practice.	N

Appendix B
FeH Peak Flow Analysis

5 Pages

Hydrology

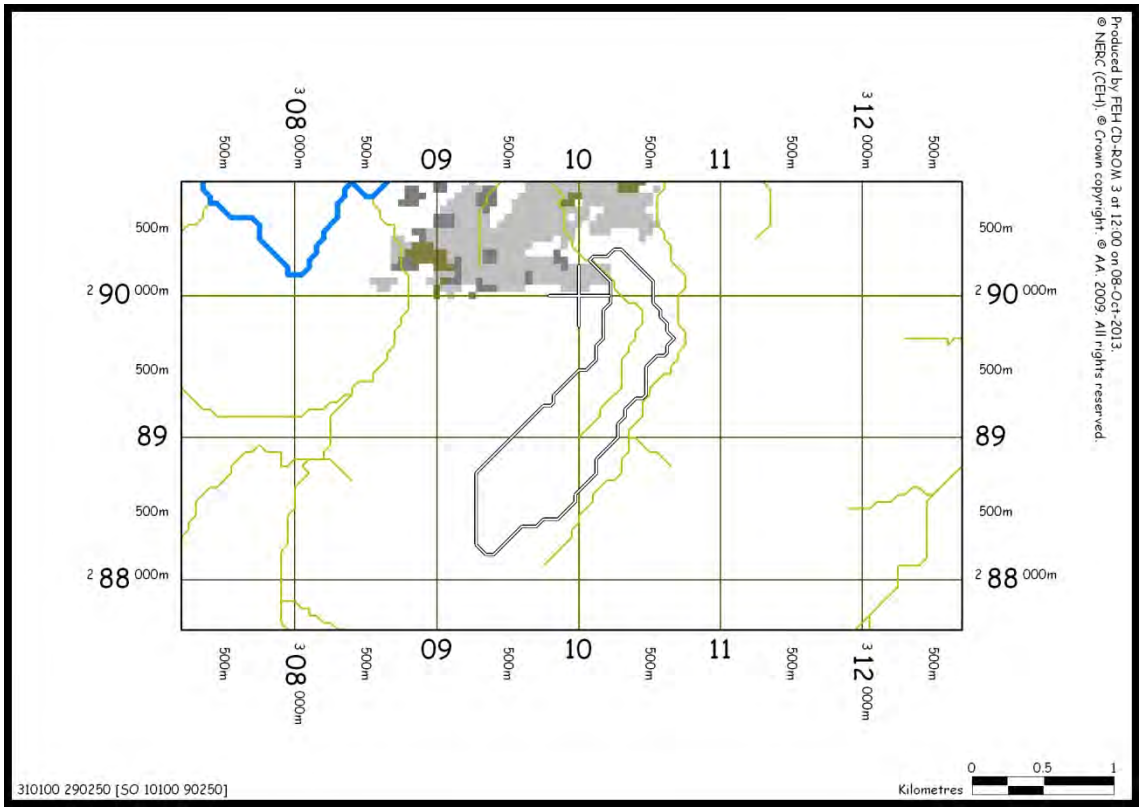
The hydrological assessment will be undertaken using the Flood Estimation Handbook (FEH) methods. F EH catchment characteristics used to inform the hydrological assessment were obtained from FEH CD-ROM Version 3. The catchment descriptors are shown in Table B1.1.

Table B1.1 FEH Catchment Descriptors

Catchment Parameter	Black Hall Brook Watercourse (NGR 310100, 290250)
AREA	1.09
ALTBAR	229
ASPBAR	33
ASPVAR	0.4
BFIHOST	0.484
DPLBAR	1.56
DPSBAR	138.6
FARL	1
LDP	2.77
PROPWET	0.49
RMED-1H	9.4
RMED-1D	36
RMED-2D	45.4
SAAR	931
SAAR4170	945
SPRHOST	35.07
URBCONC1990	-999999
URBEXT1990	0
URBLOC1990	-999999
C	-0.02586
D1	0.41031
D2	0.33714
D3	0.37403
E	0.28688
F	2.36414

The FEH catchment for the Black Hall Brook watercourse to NGR 310100, 290250 is shown on Figure B1.1.

Figure B1.1 Black Hall Brook Watercourse FEH Catchment



FEH Statistical Method

QMED

Consideration was given to using a gauged donor station to adjust the median flood estimate (QMED) from catchment descriptors at the ungauged subject site on the Black Hall Brook watercourse. E nvironment Agency guidance recommends using the distance of catchment centroids to determine suitability. The weighting factor applied to the adjustment falls off for catchments with centroids of more than 10 km distance. The latest guidance on donor sites is that centroid distance should be the key determinant, however, as the nearest gauged catchment centroid is 9.8 km away (Severn at Abermule) a number of additional sites were considered as potential analogue stations as summarised in Table B1.2.

Table B1.2 Donor and Analogue Catchment Data

Parameter	Black Hall Brook Watercourse	Severn at Abermule	Dulas at Rhos-y-pentref	Plynlimon
NRFA Reference	n/a	54014	54025	54022
Area (km^2)	1.09	574.65	53.18	8.67
SAAR (mm/yr)	931	1256	1268	2484
FARL	1	0.97	1	1
BFIHOST	0.484	0.449	0.439	0.323
URBEXT1990	0.000	0.003	0.000	0.000
Years of data	n/a	49	40	58
Distance between centroids (m)	n/a	9.79	16.59	26.75
QMEDcds	0.58	201.70	30.81	17.81
QMEDobs	n/a	191.50	23.20	15.00
Change in QMED	n/a	98.0%	91.1%	95.5%

QMEDcds = QMED from catchment descriptors, QMEDobs = QMED from observed dat.a
Llandewi gauge (55011) was also considered, however, it was not suitable for estimating QMED according to the Hiflows website.

The HiFlows website states all the stations identified in Table B1.2 are suitable for QMED estimation. The Severn at Abermule has the closest centroid to that of the subject site (9.8 km), with the Dulas at Rhos-y-pentref the next closest (16.6 km). The Severn catchment is significantly larger than the subject site (more than 525 times bigger), while the Dulas and Plynlimon catchments are closer in size to the Black Hall Brook watercourse catchment. All the donor/ analogue sites have a higher average annual rainfall. All the stations and subject site are rural (URBEXT of less than 0.003).

Comparing the QMEDcds to QMEDobs for the various gauges suggests that using catchment descriptors is likely to over-estimate the QMED value to that based on gauge data. The median flood for the Severn at Abermule is over-estimated by catchment descriptors by only 2%. It is therefore considered appropriate to adjust the QMED value identified through using catchment descriptors. A QMED value of 0.57 m^3/s will therefore be used in the FEH statistical assessment.

WINFAP FEH

The statistical pooling group approach of the FEH[17] was used to derive flood peak estimates.

Station data were updated with the latest annual maxima data; files were downloaded from the Hiflows website[18]. Only the folder of stations suitable for pooling was used to derive the pooling group.

[17] Flood Estimation Handbook, Institute of Hydrology, 1989.

[18] http://www.environment-agency.gov.uk/hiflows/97503.aspx

The initial pooling group selected by the software was amended by removing one site:

- Short record 32029 Flore @ Experimental Catchment.

This left 515 years of pooled data, which is still more than the 500 year guidance requirement[19] for a 1% AEP event flood estimate. Ideally all catchments used to develop the pooling group would be similar to each other and the subject catchment. Within WINFAP there are several tests of heterogeneity, which have been used to assess this pooling group:

- H2 = 2.7194 indicating the pooling group is heterogeneous and a review is desirable; and
- H1 = 3.9425 indicating the pooling group is heterogenous.

There were no discordant sites, although some had high discordancy values. A review of the station parameters and growth curves identified a few stations with either very high or very low growth curves. The Severn at Hore Flume (54092) was removed as it had a very high growth curve and a high SAAR value. The Hodge Beck at Brasdale Weir (27010) was added to provide sufficient years of pooled data. This reduced the H2 value to 1.5488.

The final pooling group was reviewed, but no further changes were considered necessary to address heterogeneity. However, none of the distribution curve fittings were indicated as giving an acceptable fit to the data. The subject site is a small catchment with large distance values, indicating that most of the sites are not very hydrologically similar to the subject site. The final pooling group considered is listed in Table B1.3.

Table B1.3 Final Pooling Group

Station	Distance	Years of Data	QMED AM<	L-CV	L-SKEW	Discordancy
45817 (Rhb Trib to Haddeo @ Upton (trib))	0.833	16	1.339	0.292	0.304	0.396
76011 (Coal Burn @ Coalburn)	1.004	32	1.822	0.178	0.347	0.837
54091 (Severn @ Hafren Flume)	2.488	34	5.915	0.184	0.27	2.629
45816 (Haddeo @ Upton)	2.61	16	3.539	0.331	0.427	0.971
44009 (Wey @ Broadwey)	2.781	32	1.688	0.34	0.241	1.395
27051 (Crimple @ Burn Bridge)	2.818	37	4.514	0.22	0.133	0.527
28033 (Dove @ Hollinsclough)	2.862	30	4.654	0.257	0.403	0.479
91802 (Allt Leachdach @ Intake)	3.158	34	6.35	0.153	0.257	1.096
44006 (Sydling Water @ Sydling st Nicholas)	3.386	35	0.853	0.227	0.087	0.614
54022 (Severn @ Plynlimon Flume)	3.455	38	14.988	0.156	0.171	0.676
25011 (Langdon Beck @ Langdon)	3.549	23	15.362	0.247	0.399	1.268
25003 (Trout Beck @ Moor House)	3.584	36	15.105	0.173	0.328	0.769

[19] Flood Estimation Guidelines v3, Environment Agency, November 2009.

Table B1.3 (continued) Final Pooling Group

Station	Distance	Years of Data	QMED AM<	L-CV	L-SKEW	Discordancy
25019 (Leven @ Easby)	3.681	31	6.088	0.355	0.396	1.318
206006 (Annalong @ Recorder 1895)	3.731	48	15.33	0.189	0.052	1.298
26802 (Gypsey Race @ Kirby Grindalythe)	3.773	10	0.127	0.233	0.25	0.084
27073 (Brompton Beck @ Snainton Ings)	3.85	29	0.743	0.205	0.011	1.047
27010 (Hodge Beck @ Bransdale Weir)	3.985	41	9.42	0.224	0.293	0.1

Given the difficulty with the distribution curve fitting, it was determined that it was not possible to find a suitable pooling group and therefore the FEH statistical method is not appropriate for this site.

It is therefore recommended that the ReFH method is used to derive flood flow estimates for the site. The ReFH methodology is considered appropriate for catchments larger than 0.5 km^2 with URBEXT values less than 0.125 and therefore is suitable for the Black Hall Brook catchment.

Appendix C
sTMP Figures