M54 to M6 Link Road

TR010054

8.11 Environmental Mitigation Approach

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8.11 Environmental Mitigation Approach

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Table of contents

Chapter **Pages**

List of Tables

List of Appendices

1. Introduction

1.1. Purpose of this Technical Note

1.1.1. This Technical Note (TN) has been produced to explain the approach to the provision of essential environmental mitigation in the design of the M54 to M6 Link Road (the Scheme) as proposed in the Environmental Statement (ES) [APP-040 to 056/6.1, APP-057 to 153/6.2, APP-154 to 210/6.3] as amended by the Environmental Statement Addendum [AS-118/6.1] and revised ES chapters. See Guide to the Application [TR010054/APP/1.5] for a full record of revisions submitted.

1.1.2. This TN discusses the specific essential mitigation proposals as shown on the Environmental Masterplan Figures 2.1 to 2.7 [AS-086 to AS-092/6.2] which accompanies the ES Addendum and revised ES chapters as submitted to the Examining Authority (ExA) on 9 October 2020. These plans have various revision numbers but as a package are referred to in this TN as 'Version 2' of the Environmental Masterplan [AS-086 to 092/6.2]. Where relevant, reference is made to Environmental Masterplan 'Version 1' which was issued as part of the DCO application in January 2020 [APP-057 to 063/6.2].

1.2. The Requirement to Mitigate

1.2.1. The Scheme is 'Environmental Impact Assessment (EIA) development' under the EIA Regulations (Ref 1) which transposes the requirements of EU Directive 2011/92/EU, as amended by 2014/52/EU (the EIA Directive, Ref 2), into UK law.

1.2.2. In accordance with Regulation 8(1)(b) of the EIA Regulations, Highways England notified the Secretary of State for Transport (Secretary of State) in a letter to the Inspectorate dated 11 January 2019 that an ES presenting the findings of the EIA would be submitted with the DCO application. This submission was made to the Planning Inspectorate on 30 January 2020.

1.2.3. The EIA Directive (Article 5, Para 1, part C) requires that EIA report shall include a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment.

1.2.4. Highways England implement the requirements of the EIA Directive through the guidance provided by the Design Manual for Roads and Bridges (DMRB).

1.3. DMRB Mitigation Requirements

1.3.1. The Design Manual for Roads and Bridges (DMRB) LA 104 (Ref 3) outlines a mitigation hierarchy for environmental assessment and design as below:

- **Avoidance and prevention** – incorporation of measures to avoid the effect, for example, alternative design options or modifying the scheme programme to avoid environmentally sensitive periods.
- **Reduction** – where avoidance is not possible, then mitigation is used to lessen the magnitude or significance of effects, for example, fencing off sensitive areas during construction and implementing a Construction Environmental

Management Plan (CEMP) to reduce the potential impacts from construction activities.

- **Remediation** – where it is not possible to avoid or reduce a significant adverse effect then offsetting measures have been considered, for example the provision of new habitat to replace that lost to the scheme or remediation such as the clean-up of contaminated soils.

1.3.2. The ES splits environmental mitigation into the two categories as defined by the DMRB LA 104:

- **embedded mitigation**: project design principles adopted to avoid or prevent adverse environmental effects; and
- **essential mitigation**: measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment.

1.3.3. The EIA and design for the Scheme has been undertaken by Highways England as an iterative process, following the mitigation hierarchy outlined above and through engagement with stakeholders and statutory consultees (see the Consultation Report [APP-024/5.2] and Statement of Common Ground with Natural England [TR010054/APP/8.8P(B)]. Embedded mitigation has been incorporated into the design of the Scheme as it has developed. Embedded mitigation has applied the first and second levels of the mitigation hierarchy, to avoid or prevent environmental impacts. Embedded mitigation is described in the ES Chapter 2: The Scheme [APP-041/6.1].

1.3.4. The Scheme design has then looked to mitigate the remaining adverse effects that could not be avoided or reduced. This TN describes the rationale behind the essential mitigation proposed to reduce or remediate, offset or compensate significant adverse effects of the Scheme. The residual effects are reported in the ES, taking into consideration embedded and essential mitigation.

1.3.5. The individual technical chapters of the ES [APP-044 to 054/6.1], ES Addendum [AS-118/8.6] and revised ES chapters [AS-083 and 084/6.1] identifies the essential mitigation measures required to mitigate significant adverse effects in construction and operation. Essential mitigation incorporated into the Scheme design is shown on the Environmental Masterplan Version 2 Figures 2.1 to 2.7 [AS-086 to 092/6.2].

1.4. Mitigation Principles

1.4.1. The principles of mitigation as set out in policy and other relevant guidance are outlined in Tables 1-1 and 1-2 below. The approach to mitigation which has been formed is explained further in Section 2 of this TN.

General Principles of Mitigation set out in National Policy

1.4.2. The general principles applied in the design of essential mitigation has been as shown in Table 1-1 below. Full policy requirements are explored more fully in the Case for the Scheme [APP-220/7.2 and subsequent revisions] and are not repeated here.

Table 1-1 General Principles of Mitigation from National Policy

Mitigation principle	Source
To minimise impacts on the environment.	National Policy Statement for National Networks (NPSNN) (Ref 4) Para 3.2
To avoid significant harm to biodiversity and geological conservation interests through mitigation.	NPSNN Para 5.25
To mitigate or adapt against climate change for the lifetime of the infrastructure.	NPSNN Para 4.42, 4.43
To take reasonable opportunities to avoid and mitigate environmental and social impacts in line with the principles set out in the National Planning Policy Framework (NPPF, Ref 5) and the Government's planning guidance.	NPSNN Para 3.3
To identify reasonable opportunities to deliver environmental (including biodiversity or geological) and social benefits as part of schemes.	NPSNN Para 3.2 (quality of life), Para 3.3, Para 5.33
Minimise adverse landscape and visual effects through appropriate siting of infrastructure, design and landscaping schemes.	NPSNN Para 5.160
Projects need to be designed carefully, taking account of the potential impact on the landscape. Having regard to siting, operational and other relevant constraints, the aim should be to avoid or minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.	NPSNN Para 5.149
In taking decisions, the Secretary of State should consider whether the project has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to avoid adverse effects on landscape or to minimise harm to the landscape, including by reasonable mitigation.	NPSNN Para 5.157
Adverse landscape and visual effects may be minimised through appropriate siting of infrastructure, design (including choice of materials), and landscaping schemes, depending on the size and type of proposed project. Materials and designs for infrastructure should always be given careful consideration.	NPSNN Para 5.160
Public rights of way, National Trails…. are important recreational facilities for walkers, cyclists and equestrians. Applicants are expected to take appropriate mitigation measures to address adverse effects on such routes where appropriate, to consider what opportunities there may be to improve access. In considering revisions to an existing right of way consideration needs to be given to the use, character, attractiveness and convenience of the right of way.	NPSNN Para 5.185

Mitigation principle	Source
Developments should be visually attractive as a result of good architecture, layout and appropriate and effective landscaping.	NPPF Para 127
Design to minimise the adverse effect on the water environment from discharges to water and effects on ecology from physical modifications to the water environment.	NPSNN Para 5.219
Development should avoid significant harm to biodiversity, including through mitigation and consideration of reasonable alternatives. The applicant (in the instance Highways England) may wish to make use of biodiversity offsetting as part of compensation proposals to counteract any impacts on biodiversity which cannot be avoided or mitigated. Where significant harm cannot be avoided and as a last resort, appropriate compensation measures should be sought.	NPSNN Para 5.25
Planning permission should be refused if significant harm to biodiversity cannot be avoided, adequately mitigated or, as a last resort, compensated for.	NPPF Section 15 Para 175a
Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists.	NPPF Section 15 Para 175c
The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss.	NPSNN Para 5.32
Identify opportunities to conserve, restore or enhance priority habitats, ecological networks (including green corridors and minimising habitat fragmentation where reasonable), and the recovery of priority species; and pursue opportunities for securing measurable net gains for biodiversity.	NPPF Section 15 Para 174
Habitats will, where practicable, be restored after construction works have finished.	NPSNN Para 5.36
Developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where reasonable.	NPSNN Para 5.36
Create new habitats of value within the site landscaping proposals.	NPSNN Para 5.36
Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals, for example through techniques such as the 'greening' of existing network	NPSNN Para 5.36

Mitigation principle	Source
crossing points, the use of green bridges and the habitat improvement of the network verge.	
The Secretary of State will need to take account of what mitigation measures may have been agreed between the applicant and Natural England and whether Natural England has granted or refused, or intends to grant or refuse, any relevant licences, including protected species mitigation licences.	NPSNN Para 5.38
Opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.	NPPF Section 15 Para 175
The project should demonstrate good design through optimisation of scheme layout to minimise noise emissions and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission.	NPSNN Para 5.194
Avoid significant adverse impacts on health and quality of life from noise as a result of the new development. Mitigate and minimise other adverse impacts on health and quality of life from noise from the new development. Contribute to improvements to health and quality of life through the effective management and control of noise, where possible.	NPSNN Para 5.195
Mitigation measures for the project should be proportionate and reasonable and may include one or more of the following: • engineering: containment of noise generated; • materials: use of materials that reduce noise, (for example low noise road surfacing); • lay-out: adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through screening by natural or purpose built barriers; • administration: specifying acceptable noise limits or times of use (e.g., in the case of railway station PA systems).	NPSNN Para 5.198
New development should mitigate and reduce adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.	NPPF Section 15 Para 180
In preparing an FRA [flood risk assessment] an applicant should consider the risk of all forms of flooding arising from the project (including in adjacent parts of the United Kingdom), in addition to the risk of flooding to the project, and demonstrate how these risks will be managed and, where relevant, mitigated, so that the development remains safe throughout its lifetime.	NPSNN Para 5.94

Other Relevant Principles of Mitigation

1.4.3. In addition to the national policy outlined above, other relevant guidance has influenced the design of essential mitigation. Other relevant principles of mitigation are noted in Table 1-2 below.

Table 1-2 Other Relevant Principles of Mitigation

Mitigation principle	Source
Developments should mitigate and compensate their biodiversity impacts in order achieve no net loss of biodiversity, as far as the developments are reasonably able.	Road Investment Strategy 1 (Ref 6) and Road Investment Strategy 2 (Ref 7) Highways England Biodiversity Plan (Ref 8)
Ancient woodland, ancient trees and veteran trees are irreplaceable. Consequently you should not consider proposed compensation measures as part of your assessment of the merits of the development proposal.	Standing advice from Natural England and Department for Environment Food and Rural Affairs (DEFRA) (Ref 9)
New woodland creation can be effective where it links to and extends existing woodland, as long as it does not affect: • other semi-natural habitats • heritage features	Standing advice from Natural England and Department for Environment Food and Rural Affairs (DEFRA)
Approaches to integration and minimising the impact of disturbance of new roads within the rural or urban landscapes and improving the landscape character of existing roads as the basis for good environmental landscape design.	DMRB LD 117 Landscape Design (Ref 10)
The design and mitigation hierarchy outlined in LA 104 shall be applied to avoid, reduce and remediate adverse effects on biodiversity resources.	DMRB LD 118 Biodiversity Design (Ref 11)
This document includes design advice for roadside environmental mitigation and enhancement, including visual screening, noise barrier design and earth bund design.	DMRB LD 119 Roadside environmental mitigation and enhancement (Ref 12)
As a general rule, compensation should be focused on the same type of ecological features as those affected and equivalent levels of ecological 'functionality' sought.	CIEEM guidelines for Ecological Impact Assessment (Ref 13)
Any replacement area should be similar in terms of ecological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the functions and conditions of those ecological features.	CIEEM guidelines for Ecological Impact Assessment
Compensation should be provided as close as possible to the location where effects have occurred and benefit the same habitats and species as those affected.	CIEEM guidelines for Ecological Impact Assessment
Replacement ratios of compensatory habitat greater than one-to-one are frequently appropriate because of the uncertainty inherent in compensation, particularly	CIEEM guidelines for Ecological Impact Assessment

Mitigation principle	Source
in cases which require ecological restoration, habitat creation or translocation of species or habitats. The scientific basis for deriving appropriate ratios is not exact and will vary depending on the habitat or species concerned. Increased replacement ratios can also help take account of the time lag in delivering compensation and regaining the same maturity, complexity and diversity of habitats and the full complement of associated species.	

1.5. Structure of this Technical Note

1.5.1. Section 2 of this TN discusses the approach to essential mitigation as has been informed by site survey work, the environmental impact assessment, legislation, policy and statutory consultee requirements. In addition, where possible the design has been informed by and has responded to specific comments made by consultees, including landowners.

1.5.2. Section 3 of this TN outlines the essential mitigation included in the Environmental Masterplan to reduce the environmental impacts of the Scheme. The elements / mitigation measures of the Masterplan are identified by unique IDs (e.g. **EG01**, which is a grassland plot). However, it should be recognised that environmental mitigation is not and cannot be designed on a plot by plot basis. A holistic description of essential mitigation provided in relation to impacts on the Lower Pool Local Wildlife Site (LWS) / Site of Biological Importance (SBI), Brookfield Farm LWS/SBI, and within the northern construction compound is provided in Sections 4, 5 and 6 respectively.

1.5.3. An additional set of drawings showing the unique IDs of each element and respective Environmental Function codes has been prepared for this TN (Environmental Masterplan with Environmental Function Codes - Appendix A).

1.5.4. Each mitigation measure is described using a Landscape Element Code (e.g. LE2.1). This is the standard description used as per the Design Manual for Roads and Bridges (DMRB) LA 117 to describe the mitigation proposal, e.g. species rich grassland. A table of the Landscape Element Codes and descriptors can be found in Appendix B of this report.

1.5.5. The purpose of each mitigation measure is categorised with an Environmental Function Code (e.g. EFA, EFB, EFE). This is the standard description used as per the DMRB LA 117 to explain the purpose / function of the mitigation proposed. A table of the Environmental Function Codes and descriptors can be found in Appendix C of this report.

1.5.6. The essential mitigation discussed in this note is secured through the Requirement 5 of the draft DCO, whereby the landscaping scheme must reflect the mitigation measures set out in the Register of Environmental Actions and Commitments (REAC) which can be found in the Outline Environmental Management Plan (OEMP) Version 3 [AS-112/6.11].

2. Approach to Essential Mitigation

2.1. Water Environment Approach

2.1.1. The drainage design has been developed to mitigate significant impacts upon the water environment (including related ecological receptors such as aquatic invertebrates, fish, aquatic macrophytes and riparian species) from highway runoff. This has been developed with regards to the technical standards as referenced in the Drainage Strategy [APP-201/6.3].

2.2. Noise Mitigation Approach

2.2.1. The ES Chapter 11: Noise and Vibration Version 3 [AS-085/6.1] describes the embedded and essential mitigation included in the design to reduce the impacts of the Scheme. Noise barrier locations have been identified based on noise modelling results, with consideration for consultation responses and other environmental disciplines to avoid secondary impacts (for example, landscape and visual impacts).

2.3. Landscape and Visual Mitigation Approach

2.3.1. The ES Chapter 7: Landscape and Visual [APP-046/6.1] describes the embedded and essential mitigation included within the design in order to integrate the design into the landscape and minimise visual impacts. Having regard to the relevant National and local policy, Highways England identified the following objectives for the landscape planting strategy as noted in the ES Chapter 7: Landscape and Visual [APP-046/6.1]:

- filter, screen and contain some of the more prominent components of the Scheme in existing views from visual receptors [Landscape Function EFA – Visual Screening];
- provide compensatory planting for trees, hedgerows, woodland and grassland lost as a result of permanent land take within the Scheme, and to reinstate planting removed due to site clearance activities [Landscape Function EFB – Landscape Integration];
- restore previously lost field boundaries or landscape/ vegetation patterns [Landscape Function EFB – Landscape Integration];
- reinforce the existing vegetation pattern/ and typologies by planting species found locally [Landscape Function EFB – Landscape Integration];
- provide visual interest to people travelling on new and modified sections of road, as well as local residents, pedestrians and cyclists, and users of nearby public rights of way [Landscape Function EFE – Visual Amenity];
- assist the integration of drainage features and watercourse channel realignment works into the surrounding landscape framework and pattern [Landscape Function EFB – Landscape Integration];
- to utilise trees, shrub and grassland species that would not only provide an essential landscape mitigation (screening, amenity and integration) function, but also offer wider biodiversity benefits [Landscape Function EFD – Nature Conservation and Biodiversity];

- achieve a no net loss of habitat throughout the Scheme boundary [Landscape Function EFD – Nature Conservation and Biodiversity]; and provide a suitable landscape setting for Hilton Hall, whilst also reinforcing the designed parkland landscape [Landscape Function EFB – Landscape Integration].

2.4. Biodiversity Mitigation Approach

2.4.1. As discussed in the ES Chapter 8: Biodiversity Version 3 [AS-083/6.1], significant harm to biodiversity has been avoided where possible through the careful design of the Scheme. Embedded mitigation is described in the ES Chapter 2: The Scheme [APP-041/6.1].The design for the Scheme has evolved through an iterative process and mitigation implemented to reduce the scale of effect of the Scheme.

2.4.2. In line with NPSNN paragraph 5.38, the Secretary of State needs to take account of mitigation measures agreed with Natural England when making decisions on DCO applications. The summary of discussions with Natural England is found with the draft Statement of Common Ground [TR010054/APP/8.8P(B)].

2.4.3. Based on the surveys outlined in the ES Chapter 8: Biodiversity Version 3 [AS-083/6.1], mitigation requirements for habitats and species have been applied in line with the requirements of Natural England which are summarised in Table 2-1, and discussed in the following sections.

2.4.4. Draft European Protected Species Licences for Great Crested Newt (GCN), Bats and Badger have been submitted to Natural England and Letters of No Impediment have been received [APP-177/6.3]. This demonstrates agreement with Natural England to the mitigation proposed in relation to these species (or groups of species in the case of bats) in principle.

Table 2-1 Species and Habitat Mitigation Applied in line with the Requirements of Natural England

Species / Habitat	Requirement	Source
Ancient woodland loss	Compensation through provision of broad-leaved woodland at a ratio of 7:1 by area, with the area of loss including the potential damage to trees when working within the 15m buffer zone. Compensation planting should connect to existing areas of ancient woodland. Compensation planting is not considered within any biodiversity metric calculations for net loss / gain. Expand existing woodland areas by buffering to compensate for ancient woodland loss.	Agreed with Natural England in draft Statement of Common Ground.
Effects on ancient woodland	Compensation for the potential impacts from increased nitrogen deposition, through provision of broad-leaved woodland at a ratio of 1:1 to remain proportionate to the impacts of the Scheme.	Under discussion with Natural England in draft Statement of Common Ground.
GCN	Avoid-Mitigate-Compensate Hierarchy is to be followed.	Agreed with Natural England in draft Statement of Common Ground and

Species / Habitat	Requirement	Source
	Replace every breeding pond (and pond assumed to support GCN) lost with two additional ponds.	Letter of No Impediment (LONI).
Bats	Replacement of lost roosts at a ratio of 3:1.	Agreed with Natural England in the absence of a standard approach to mitigation (SOCG and LONI).
Ecology Ponds	Replace ecology ponds which do not support GCN on a 1:1 ratio.	Agreed with Natural England in draft Statement of Common Ground.
Badgers	Agreement to use of mammal tunnels to mitigate potential severance caused by the Scheme.	Agreed with Natural England in draft Statement of Common Ground.
Biodiversity Net Loss / Gains	Natural England expect to see at least 10% net gain achieved.	Under discussion with Natural England in draft Statement of Common Ground.

Loss of ancient woodland

2.4.5. Ancient woodland is an irreplaceable habitat and is consequently considered to be of nature conservation importance on a national scale, and its loss has to be compensated for.

2.4.6. There is currently no accepted guidance that specifies a set ratio of new planting to loss of ancient woodland. Each impact has to be approached on a case by case basis, and the reason for this is that although all ancient woodland is of national importance, within that broad category of importance each ancient woodland will be different and will warrant different levels of compensation.

2.4.7. The size of the woodland, its connections or isolation from other natural or semi-natural habitats, its management regimes, its intrinsic appeal and the diversity and rarity of flora and fauna it supports will all dictate levels of compensation, as will the scale of the impact upon the woodland.

2.4.8. In this case, the ancient woodlands are relatively small in scale, are not subject to management, generally inaccessible to the public and do not support important populations of species of flora or fauna that are nationally rare. In the case of Brookfields Farm, the woodland is also isolated by the A460 to the west and the M6 to the north and east.

2.4.9. There is no direct loss of woodland, though some encroachment within 15m of the woodland edge will occur during construction. As such, in liaison with Natural England a ratio of 7:1 new woodland planting to ancient woodland loss is considered appropriate.

Effects on ancient woodland from nitrogen deposition

2.4.10. ES Chapter 8: Biodiversity Version 3 [AS-083/6.1] of the ES, paragraph 8.8.8 states that Ancient woodland within 200 m of the ARN may be subject to impacts through

increased nitrogen deposition as a result of changes to traffic flows. This would not result in loss of the woodland, but could lead to changes in species composition within the affected woodland. Where this is the case, compensatory replacement woodland habitat would be provided at a ratio of 1:1 by area.

2.4.11. Like for like replacement (1:1 ratio) is considered to be proportionate to the effect on these woodlands, which is likely to be more subtle changes in species composition and distribution in those parts of the woodland affected, rather than total loss.

3. Scheme Mitigation

3.1. Landscape and Visual Mitigation

3.1.1. Environmental considerations have been taken into account during the development of the Scheme design, to avoid and reduce potential impacts on the prevailing landscape and visual receptors during operation of the Scheme. This iterative approach has led to a range of mitigation measures capable of reducing the magnitude of impacts being embedded within the Scheme design. Actions that have been taken that avoid or reduce potential landscape and visual effects include the following:

- landform modelling has been employed locally to increase screening – this includes a false cutting at a 1:2.5 gradient, which would aid screening of views from Brookfield Farm;
- woodland, tree and shrub planting along the route corridor would filter views from adjacent sensitive visual receptors;
- new planting would integrate the Scheme within existing landscape features, to mitigate or reduce visual impact, including when viewed from upper storeys of buildings;
- proposed planting on the remodelled and new embankments and cuttings have been designed to reinforce the existing vegetation and to complement the species composition found locally; and
- planting within the vicinity of Hilton Park to integrate the Scheme and its associated landscape planting into the parkland setting.

3.2. Noise Mitigation

3.2.1. Noise barriers are proposed at five locations across the Scheme in order to mitigate traffic derived noise levels for residents. These are located as shown in Table 3-1.

Table 3-1 Noise Barriers

Barrier ID	Description	Areas Mitigated
NB01	Approximately 1.5 metre (m) high reflective noise barrier on the east side of the existing A460 north of M6 Junction 11 in the vicinity of properties on Wolverhampton Road, which provides an insertion[1] loss of up to 2 dB at the top floor.	Properties on Wolverhampton Road, east of the M6 Junction 11
NB02	Approximately 3.0 metres high reflective noise barrier on the west side of the main line as it passes close to Brookfield Farm, which provides an insertion loss of up to 6 dB at The Bungalow.	Properties at Brookfield Farm, including The Bungalow
NB03	Approximately 4.0 metres high reflective noise barrier on the west side of the main line as it passes close to Dark Lane, which provides an insertion loss of up to 9 dB at the top floor of the properties.	Properties at Dark Lane and Park Road

[1] A measure of the effectiveness of noise control devices such as silencers, enclosures and barriers. The insertion loss of a device is the difference, in dB, between the noise level with and without the device present.

Barrier ID	Description	Areas Mitigated
NB04	Approximately 1.5 metres high reflective noise barrier on the north side of the M54 eastbound off slip on top of the existing earth bund and the proposed eastern extension of this earth bund incorporated into the design. This provides an insertion loss of up to 2 dB at the top floor of receptors in Featherstone.	Properties to the south of Featherstone
NB05	Approximately 3.0 metres high reflective noise barrier east of the proposed earth bund on the north side of the M54 extending to the new western dumbbell roundabout. This provides an insertion loss of up to 2 dB at the top floor of receptors in Featherstone.	Properties to the south and south-east of Featherstone

3.3. Water Environment Mitigation

3.3.1. Five drainage attenuation ponds (**DP01 – DP05**), filter drains, swales and new highway ditches have been incorporated into the overall water management strategy. These have been designed to mimic natural drainage as far as practicable, and to provide a number of other benefits to ecological habitat creation.

3.3.2. Ditch habitat is to be created as part of the water treatment and to compensate for the loss of riparian habitats to culverts. All features would develop into ecological habitats of benefit to aquatic macroinvertebrates, amphibian species and aquatic macrophytes.

3.3.3. A total of 408 m of watercourse habitat (exceeding the 355 m of watercourses that would be culverted). This includes 32 m of new ditchcourse to Watercourse 2; 280 m to Watercourse 3, and 96 m to Watercourse 4.

3.3.4. The proposed crossing of Latherford Brook (Watercourse 5) is an open span structure that will ensure the retention of habitats and a natural channel, bank and proposed mammal ledge post construction works, which will maintain connectivity for aquatic and riparian species and allow passage of otter and other mammals during high flow.

3.3.5. Enhancements of retained watercourses would also be undertaken. This would include some or all of; reducing artificial bank face profile, reducing non-native invasive plant species on banks, planting of riparian and channel margin vegetation, reducing sedimentation of channel bed, and improving channel morphotype richness.

3.4. Ancient Woodland Compensation

3.4.1. As noted in ES Chapter 8: Biodiversity Version 3 [AS-083/6.1], following the Scheme changes accepted on 29 October 2020 there would be no direct loss of ancient woodland as a result of the Scheme. However, there would be damage/loss of a total of 0.349 hectares (ha) of ancient woodland within a 15 m buffer of the construction works, affecting ancient woodlands at Brookfield Farm SBI and LWS, and Oxden Leasow (Whitgreaves Wood). This buffer zone is recommended to prevent the damage of tree roots and degradation of habitat. This damage/loss

would be compensated for at the agreed 7:1 ratio, providing 2.44 ha of new woodland.

3.4.2. Operational impacts have been identified in terms of nitrogen deposition as detailed in the ES Chapter 8: Biodiversity Version 3 [AS-083/6.1], which could result in impacts on 0.54 ha of ancient woodland within Brookfield Farm SBI and 0.33 ha of ancient woodland at Oxden Leasow (Whitgreaves Wood). Compensation planting would be provided on a ratio of 1:1 as is being discussed with Natural England, resulting in an additional 0.87 ha of woodland being provided.

3.4.3. A total of 3.31 ha of woodland planting is proposed to compensate for the impacts of the Scheme on ancient woodland.

3.4.4. The requirement to provide the planting in connection with existing ancient woodland has limited opportunities to locate compensation planting. This is proposed to be located in two areas (**AW01 and AW02**) which is adjacent to the existing area of ancient woodland within the Brookfield Farm LWS/SBI. This position is also preferred by Natural England due to the location being directly adjacent and therefore connecting to the ancient woodland within the Brookfield Farm LWS/SBI.

3.4.5. To provide additional compensation for the impact of the Scheme on the ancient woodland buffer area at Oxden Leasow (Whitgreaves Wood), it is proposed to implement ancient woodland enhancement measures in the form of conservation led management of ancient woodland within Brookfield Farm LWS/SBI and Oxden Leasow (Whitgreaves Wood). These measures would seek to develop and improve upon the woodland structure in retained woodland (note this is not shown on the Environmental Masterplan). Ancient woodland enhancement measures would be informed by survey and agreement of National Trust and would likely include selective thinning. The principles of these works have been discussed and agreed with the National Trust and Natural England.

3.5. Great Crested Newt Mitigation

3.5.1. Restricted land access affected GCN surveys during the preparation of the ES. In the ES Chapter 8 Version 1 [APP-047/6.1] and Version 2 [AS-025/6.1] and Appendix 8.11 [APP-183/6.2] assumptions were made on the presence of GCN within ponds which would be lost during construction. The Environmental Masterplan Version 1 showed the replacement of four ponds assumed to contain GCN on a 2:1 ratio, in addition to replacement terrestrial habitat. This resulted in eight new ecology ponds being created for GCN, in addition to four ecology ponds to replace other ponds lost during construction. 12 ecology ponds in total were required by the mitigation. This mitigation approach was agreed in principle with Natural England (refer to Appendix 8.3: LONI for GCN [APP-177/6.3].

3.5.2. During 2020, additional gap-filling surveys have been undertaken on waterbodies as outlined in the ES Chapter 8: Biodiversity Version 3 [AS-083/6.1]. The four ponds to be lost in which GCN were assumed have now been surveyed and GNC absence confirmed. There remains some assumption as to the presence of GCN within 13 waterbodies within the study area, however no ponds known or assumed to have GCN present will be impacted by the construction of the Scheme. Where assumptions on the presence of GCN has been made, if absence is proven through

later surveys this will not result in changes to the mitigation proposals or the total amount of land required for environmental mitigation purposes.

3.5.3. The Environmental Masterplan has since been updated (Version 2) to replace all ponds to be lost on a 1:1 ratio. Eight ponds would be provided to compensate for the loss of seven ponds and partial loss of two ponds which do not contain GCN. They would still provide suitable breeding habitat for local or expanding GCN populations.

3.5.4. Mitigation for the loss of terrestrial habitat within 500m of Known (and assumed) GCN ponds would include broad-leaved plantation woodland, species-rich grassland, species-rich hedgerows, and GCN hibernacula. This would provide a higher proportion of optimal habitats to increase the carrying capacity for GCN and support the future establishment of GCN populations. This habitat would be suitable for other protected and notable species including bats and birds. Ponds would also provide habitat for other amphibian species, macro-invertebrates and aquatic macrophytes.

3.5.5. Mitigation for the loss of suitable terrestrial habitat would still be provided by the Scheme in line with Natural England licence requirements (refer to Appendix 8.3: LONI for GCN [APP-177/6.3]; and Section 8.9 'Assessment of likely significant effects' of the ES for details[AS-083/6.1]). It should be noted that Appendix 8.3: Letter of No Impediment for GCN [APP-177/6.3] is based on Environmental Masterplan Version 1 (Figure 2.1 to 2.7 of the ES [APP-057 to 63/6.2] and 2019 survey results only. Natural England has confirmed that these changes do not require an updated LONI to be issued.

3.5.6. This approach is in line with the GCN Conservation Handbook (Ref 14) and GCN Mitigation Guidelines (Ref 15) which requires that terrestrial habitat losses within 500m of ponds supporting GCN (in this case both known and assumed) need to be compensated for through the creation of habitats suitable for GCN, with the habitat to be created within 500m of the existing ponds and ideally much closer. This would result in the continued availability of optimal terrestrial and aquatic habitat for GCN metapopulations and will maintain the favourable conservation status of the species, which is a requirement of the Habitats Regulations (Ref 16) and any licence granted under this legislation.

3.5.7. Although new ponds are not replacing lost GCN ponds, they would still be designed in line with the GCN mitigation guidelines and GCN conservation handbook in terms of size, profile and bank design (i.e. varied platforms and ledges to provide opportunities for egg laying vegetation to grow and platforms for displaying). This is to both ensure that they are suitable for future use by the species, but also that these design features will ensure that the ponds are suitable for a multitude of species groups. Ponds and the surrounding areas would be planted using recommended plant species within Highways England guidance in LA 118 with vegetation around the pond edge limited to avoid over shading. Linear woodland and hedgerows have been incorporated throughout the design to mitigate for habitats lost and ensure ecological connectivity within and across the Scheme, and into the wider landscape as this species relies on interchange of individuals between populations to maintain genetic diversity and population stability.

3.5.8. As reported in the ES Chapter 8: Biodiversity Version 3 [AS-083/6.1], the operational impacts to GCN as a result of habitat degradation once vegetation is established is considered to be negligible (an effect of neutral significance).

3.6. Bat Mitigation

3.6.1. The ES Chapter 8: Biodiversity Version 3 [AS-083/6.1] outlines mitigation proposals to compensate for habitat losses and loss of connectivity for bats as a result of the Scheme. The Scheme would largely result in the loss of habitats associated with lower levels of bat activity including open fields of arable and poor semi-improved grassland.

3.6.2. However, the Scheme would also result in the loss of some habitats that have higher levels of bat activity, including woodland and wetland associated with Lower Pool LWS/SBI and woodland edge and riparian habitats associated with Latherford Brook (Watercourse 5). The loss of woodland, wetland and severance of hedgerows would lead to the fragmentation of interconnected habitat that is used by the local bat population. The highest numbers of species are associated with woodland edge and wetland habitats associated with Lower Pool and Brookfield Farm LWS/SBIs. The Scheme would result in the loss of trees with high to moderate bat roost potential that are located off the A460, on land south of Dark Lane and within the Lower Pool SBI.

3.6.3. Construction would result in the loss of four noctule and pipistrelle roosts, and some habitats that may be used by a brown long-eared bat maternity roost located near Hilton Lane.

3.6.4. Mitigation would be implemented in line with Natural England EPS licence requirements (refer to Appendix 8.3: Letter of No Impediment for bats [APP-177/6.3]; and ES Chapter 8: Biodiversity Version 3 [AS-083/6.1] (Assessment of likely significant effects) for details.

3.6.5. Compensatory planting and habitat creation has been designed to offer optimal bat foraging opportunities with a mosaic of woodland, hedgerows, species-rich grassland and wetland. The Environmental Masterplan provides for the creation of 2.4 ha of standing water, 38.20 ha of species rich grassland and 15.3 ha of woodland habitat within the Order limits. This total excludes the mitigation included for individually important ecological features which is in addition to that required for the general habitat loss across the Scheme, and comprises the 3.31 ha of woodland compensation planting which would be undertaken for loss of, and nitrogen deposition impacts on, ancient woodland, 4.94 ha woodland planting to compensate for loss of Lower Pool LWS/SBI, and 2.54 ha woodland planting to compensate for the loss of Brookfields Farm LWS/SBI.

3.6.6. Linear habitat features, including 7.2 km of species-rich hedgerows, have been incorporated into the landscape design to mitigate for habitats lost and ensure ecological connectivity within and across the Scheme, and into the wider landscape is maintained post development. These linear features would form a network with existing habitats of importance to bats within the wider study area including those habitats that link to known roosts. The landscape design includes the creation of

habitats of value to foraging and commuting bats, (using recommended plant species) within Highways England guidance in LA 118.

3.6.7. Planting has been located to maximise opportunities for bats where possible. New woodland habitat is created to the west of the link road (**EW08**) and to the east (**EW05, SW05** and **EW07**) where there is known bat activity.

3.6.8. A mosaic of habitat is proposed to the south of Dark Lane with Plot **EG24** (species rich grassland) and associated woodland edge **EW10, EW11, EW12, EW13, SW06** and hedgerows **EH14** to provide optimal foraging habitat for bats. Replacement bat roosts would be provided at a ratio of 3:1, as agreed with Natural England. In order for mitigation to be successful, it is essential that replacement habitat is located within areas where bats are known to roost and forage. Consequently, this mitigation is likely to have a strong chance of success in this location. The proposed mitigation forms a critical part of Highways England's application to Natural England for a bat mitigation licence and has been agreed in principle with Natural England (see LONI [APP-177/6.3]).

3.6.9. Linear habitat and individual trees are provided to encourage crossing of the Scheme across two bridge locations; at the overbridge at Hilton Lane (including hedgerows **EH10, EH11, EH12, SH05**, ditch habitat **ED01**, individual trees **IT36, IT37, IT40, IT42, IT32, IT33, IT34, IT38, IT39, IT40, IT47, IT48, IT49, IT50**, and woodlands **SW05, EW07**), and the accommodation bridge to the north (including woodland **SW04, SW05** and hedgerow **EH08** and **IT12-IT25**). These are in locations where the road is in cutting therefore avoiding potential bat collision risk associated with this crossing. The Scheme would pass below Hilton Lane at 6 m below current ground level and the new bridge would be 1.7 m above existing ground level giving a difference of 7.7 m. The accommodation bridge would be 4 metres above ground level. This would provide access across the Scheme to woodland habitats (including new woodland plots **EW08, EW05, AW02, AW01** and Brookfield Farm LWS/SBI) and newly created wildlife ponds and species rich grassland.

3.6.10. There is also potential for connection over the existing A460 to the west through improved habitat along the eastern side of the A460 (**EW04** linking to **EW01** and **EW02)**. The new woodland habitat would maintain and improve upon the linkages to the retained areas of habitat, including those known to be regularly used by bats, and would therefore further reduce fragmentation impacts upon the local bat population.

3.6.11. Loss of the two confirmed (noctule and pipistrelle) and assumed day roosts (common species) and three assumed hibernation roosts (common species) in trees would be compensated for through the erection of three bat boxes for every roost loss. In line with the Natural England licence this would include 21 bat boxes including five Schwegler 1FD, four Schwegler 1FF, three Schwegler 2FN and nine Schwegler 1FW. Any additional work conducted under licence would also require the provision of alternative roosting opportunities, the nature of which would depend on the size and status of roost but would likely be in the form of bat boxes.

3.6.12. Once replacement habitat has established and improvement works to retained habitats have commenced the magnitude of impact of bat habitat loss and gain during construction would be negligible adverse impact in the design year on this

species assemblage of Local importance (an effect of neutral significance). The measures detailed above would be sufficient to ensure that should bat roosts be present, the Favourable Conservation Status of the local bat population would be maintained.

3.7. Mammal Mitigation

3.7.1. Mammal tunnels are proposed at three locations; near Brookfield Farm (**BT01**), east of Dark Lane (**BT02**) and a third which is in four sections under the M54 Junction 1 (**BT03, BT04, BT05 and BT06**). These are all required to address severance for known [redacted] in the area.

3.7.2. The three mammal tunnels, plus fencing, strategic planting and habitat creation would ensure that residual effects [redacted] are negligible and of neutral significance (see ES Chapter 8: Biodiversity Version 3 [AS-083/6.1]). This approach has been agreed with Natural England (see LONI [APP-177/6.3]) and will be developed further in detailed design.

3.8. Grassland Mitigation

3.8.1. As shown in Table 3-2, the Scheme in its entirety would result in the loss of 25.45 ha of improved grassland and 2.5 ha of species-poor semi-improved grassland (a total of 27.95 ha). There is currently no species-rich grassland within the Order Limits.

3.8.2. This loss is being mitigated for through the provision of 38.20 ha of species-rich grassland with a higher ecological value, at an approximate ratio of 1.5 ha created for every 1 ha lost. The replacement ratio of compensatory habitat greater than one-to-one is considered appropriate because of the uncertainty inherent in habitat creation and to take account of the time lag in delivering compensation. Grassland would provide habitat for amphibians, badgers, ground nesting birds and terrestrial invertebrates and an additional food source for foraging bats.

3.8.3. The grassland planting will not only compensate for the loss of existing grassland, but also arable farmland used by species such as ground nesting birds including skylark and lapwing. Replacement of arable farmland, and existing grassland with species-rich grassland is maximising the opportunities the Scheme present to provide an enhancement for biodiversity, rather than simply replacing lost habitats on a like for like basis.

3.8.4. This is in addition to amenity grassland planting, which is a specific mix of hardy grasses with a lower growth height than other grassland planting mixes and a lower ecological value (an additional 5.22 ha are proposed). Amenity grassland has a function to improve landscape integration (EFB) of the Scheme and provides visual amenity (EFE) for the road user. These are planted adjacent to the road where visibility is required for road users. Amenity grassland and species rich grassland included for amenity purposes are not discussed individually in this TN.

Table 3-2 Summary of Grassland Lost and Replaced

Existing habitat	Habitat loss (ha)	New habitat (refer to Environmental Masterplan)	Habitat gain (ha and linear kilometres (km))	Net permanent gain (ha and linear km)
Improved grassland (including amenity)	25.45	Amenity grassland	5.22	-20.23
Poor semi-improved grassland	2.50	Semi-improved neutral grassland	38.20	+35.70

3.8.5. There are three larger plots of grassland which would be provided primarily for the purposes of nature conservation biodiversity and landscape integration.

3.8.6. Plot **EG24** to the west of the new link road, south of Dark Lane and east of the A460 is proposed as species-rich grassland primarily for landscape integration purposes. This mitigation is to reinforce the designed landscape parkland of Hilton Park, part of which would be lost to the Scheme. Scattered individual trees (**IT64-IT70** and **IT73**) within this plot would create a similar appearance to the wider area of Hilton Park historic landscape and would reinforce the parkland character.

3.8.7. Plot **EG08** to the west of M6 Junction 11 is required to contribute to the matrix of habitats to support bats and to integrate the Scheme into the wider landscape.

3.8.8. Plot **EG47** is adjacent to the eastbound carriageway of the M54, south of Featherstone along Brookhouse Lane. The wider land in this location is primarily required to locate a drainage pond (Pond 1 in the drainage strategy, **DP05** on the Environmental Masterplan). This lined attenuation pond would perform a water quality function treating highway runoff in a Sustainable Urban Drainage System, providing storage up to and including the 100 year + 40% climate change, as requested by the Lead Local Flood Authority (LLFA), Staffordshire County Council (SCC). The location of the pond has been amended as a result of consultation with the landowner (see Consultation Report [APP-024/5.1] Table 5.14). The remainder of this field is anticipated to be unviable for the landowner to return to agricultural purposes. The buffer of species-rich grassland would provide a link to the woodland on the northern side of the M54 to the benefit of birds, terrestrial invertebrates and potentially linking bats to an additional food source. The species-rich grassland would also provide a wider connectivity to the watercourse on the eastern boundary of this field and provide stronger links to the rough grassland and woodland blocks to the west of the Scheme. A hedgerow (native species-rich) is proposed adjacent to the eastern side of Brookhouse Lane (**EH17**) to mitigate for the loss of hedgerow at this location and wider across the Scheme. This would provide a nature conservation and biodiversity function in support of the new pond and for birds, and a landscape integration function to strengthen the character by reinstating the currently gappy hedgerow.

3.9. Woodland Mitigation

3.9.1. Woodland planting is proposed for three primary reasons throughout the Scheme;

- to provide visual screening;
- for visual amenity; and
- to replace lost habitat (nature conservation and biodiversity).

3.9.2. The Scheme would result in the loss of 19.49 ha of broadleaved plantation and mixed plantation woodland, the majority of which is associated with roadside planting alongside the existing M54, M6 and A460 and is less than 30 years old. A total of 15.3 ha of woodland habitat is proposed to mitigate this loss (excluding ancient woodland compensation (see para 3.4.3) and SBI mitigation planting (See Sections 4 and 5)) (see Table 3-3 below). There would be a loss of 1.14 ha[2] of broadleaved semi-natural woodland predominantly from within Brookfield Farm LWS/SBI.

Table 3-3 Woodland Losses and Gains

Existing habitat	Habitat loss (ha)	Importance	New habitat (refer to Environmental Masterplan)	Habitat gain (ha and linear km)	Net permanent gain (ha and linear km)
Broadleaved woodland – semi-natural	1.14	Local and County	N/A	N/A	-1.14
Broadleaved woodland – plantation (including recently felled)	16.73	Local	Broadleaved plantation*	15.3	-1.43
Mixed woodland - plantation	2.76	Local and County	N/A	N/A	-2.76
* Does not include 3.31 ha woodland planting undertaken for loss of ancient woodland, 4.94 ha woodland planting to compensate for loss of Lower Pool LWS/SBI (see paragraph 4.3.10), and 2.54 ha woodland planting to compensate for the loss of Brookfields Farm LWS/SBI (see paragraph 5.2.4).					

3.9.3. Woodland to provide visual screening and visual amenity, whilst also compensating for the loss of habitat for biodiversity is proposed at several plots as noted in Table 3-4 and Table 3-5.

[2] The Environmental Statement Chapter 8: Biodiversity Version 3 noted a loss of 1.18 ha of broadleaved semi-natural woodland from these sites. However Scheme design changes have reduced the extent of loss by 0.04 ha, resulting in a total loss of 1.14 ha.

Table 3-4 Woodland Planting for Visual Screening

Plot	Description of function
SW01	To screen views from properties on Wolverhampton Road.
SW02	To screen views from properties at Brookfield Farm
SW03	To screen views of the accommodation bridge from properties at Brookfield Farm, the road user and wider views / to enhance the experience of users of the accommodation bridge itself
SW04	To screen views of the accommodation bridge from properties at Brookfield Farm and from wider views / to enhance the experience of users of the accommodation bridge itself
SW05	To screen views of the Scheme from properties on Hilton Lane and users of adjacent PRoW
SW06	To screen views from properties at Dark Lane
SW07	To screen views from properties on Cannock Road
SW08	To screen views from properties on Cannock Road
SW09	An extension of **SW07** which is provided to screen views from properties on Cannock Road. The break between the two is to provide space for utilities which cannot be planted upon.
SW10	To strengthen the screening of views properties to the south of Featherstone and provide landscape integration.
SW11	To strengthen the screening of views properties to the south of Featherstone and provide landscape integration.
SW12	To screen views of the M54 Junction 1 from Tower House Farm
SW13	To increase screening for Moseley Old Hall to restrict views of the M54

Table 3-5 Woodland Planting for Visual Amenity

Plot	Description of function
EW01	To replace woodland and strategic planting (adjacent to M6 Junction 11) lost during construction / to reduce views of the realigned M6 Junction 11 from Mill Lane and Little Saredon
EW02	To replace woodland adjacent to Mill Lane which was lost during construction
EW03	To replace woodland adjacent to Warstone Road which was lost during construction
EW04	To provide an area of strategic planting to reduce views of M6 Junction 11 from the south-west / to replace woodland and (adjacent to M6 Junction 11) lost during construction
EW06	To soften the appearance of the accommodation bridge / to enhance the experience of users of the accommodation bridge itself
EW07	To provide a buffer between the realigned PRoW and the Scheme
EW09	To provide a buffer between the Scheme and the Lower Pool SBI / to replace woodland adjacent to Lower Pool SBI lost during construction.

Plot	Description of function
EW10	To provide a more substantial buffer between the houses on the current A460, the former site compound and the Scheme / to replace woodland adjacent to the A460 lost during construction
EW11	To provide a buffer between the Scheme and the recreated parkland on the former site compound / to improve the visual amenity for users of the Scheme itself
EW12	To provide a buffer between the Scheme and the recreated parkland on the former site compound / to improve the visual amenity for users of the Scheme itself
EW13	To provide a more substantial buffer between the houses on the current A460, the former site compound and the Scheme / to replace woodland adjacent to the A460 lost during construction
EW14	To provide a buffer between the realigned track towards Hilton Hall and the Scheme.
EW15	To provide strategic planting between the roundabout and the mainline of the Scheme, breaking up the appearance of the highway
EW16	To provide strategic planting between the roundabout and the mainline of the Scheme, breaking up the appearance of the highway
EW17	To provide strategic planting between the roundabout and the mainline of the Scheme, breaking up the appearance of the highway
EW18	To provide strategic planting between the roundabout and the mainline of the Scheme, breaking up the appearance of the highway
EW19	To provide strategic planting between two arms of the roundabout, breaking up the appearance of the highway
EW20	To provide strategic planting between the northbound and southbound carriageways of the Scheme, breaking up the appearance of the highway
EW21	To provide strategic planting between the roundabout, slip road and the existing M54 carriageway, breaking up the appearance of the highway / to replace woodland adjacent to the M54 lost during construction
EW22	To provide strategic planting between the slip road and the existing M54 carriageway, breaking up the appearance of the highway / to replace woodland adjacent to the M54 lost during construction
EW23	To provide strategic planting between existing woodland blocks and the slip road onto the M54, breaking up the appearance of the highway and reinforcing the existing woodland / to replace woodland adjacent to the M54 lost during construction
EW24	To replace woodland and strategic planting (adjacent to M54 Junction 1) lost during construction / to reduce views of the realigned M54 Junction 1 from commercial properties to the south

3.9.4. Two woodland plots are proposed with a primary purpose of nature conservation and biodiversity (**EW05** and **EW08**).

3.9.5. These woodlands are proposed specifically to mitigate the loss of woodland habitat from within the Lower Pool SBI and Brookfield Farm SBI and to provide connectivity for bats across the Scheme.

3.9.6. **EW05** is located near M6 Junction 11, adjacent to the ancient woodland compensation planting (**AW01** and **AW02**) next to Brookfield Farm SBI. **EW05** is

located to the east of the link road on the opposite side of the carriageway to Brookfield Farm. This also adjoins the Brookfield Farm LWS/SBI.

3.9.7. Construction of the M6 Junction 11 would result in the loss of 0.71 ha of woodland comprising 14% of the Brookfield Farm LWS/SBI boundary. The permanent loss of woodland habitat and temporary loss of habitats in and adjacent to Latherford brook has the potential to adversely impact upon the integrity of the LWS/SBI habitats and as the Scheme goes through the LWS/SBI boundary, has the potential to lead to habitat fragmentation.

3.9.8. The majority of the LWS/SBI habitats would be retained and unaffected by the Scheme. To compensate for the loss of woodland habitat, excluding the ancient woodland which is compensated for separately, an additional 2.54 ha of woodland habitat is proposed south of the LWS/SBI east of the Scheme (**EW05**). Species rich grassland and hedgerows are also proposed on the Scheme embankments to allow for habitat connectivity to and from the Brookfield Farm LWS/SBI.

3.9.9. Taking into account the proposed habitats would take some time (functioning well developed scrub within 15 years and woodland within 30 + years) to establish, the Scheme is considered to have moderate negative adverse impact on the LWS/SBI as this mitigation establishes, resulting in an effect of slight significance in the medium term (10-30 years), reducing to an effect of neutral significance in the long term (beyond 30 years) once habitats are fully established.

3.9.10. **EW08** is located on the western side of the link road, north of Park Road. Construction of the Scheme would result in the loss of woodland and standing water habitats within Lower Pool LWS/SBI that without mitigation would have an adverse impact on the ecological function and integrity of the habitats (see ES Chapter 8: Biodiversity Version 3 [AS-083/6.1]). The impact would comprise the permanent loss of 2.04 ha (32.3%) of the SBI woodland. This mitigation is discussed in more detail in Section 4 of this TN.

3.10. Hedgerow Mitigation

3.10.1. Hedgerow planting would mitigate the loss of 3.4 km of hedgerows (none of which are 'important'). Approximately 7.2 km of replacement hedgerow would provide habitat for birds, terrestrial invertebrates, foraging habitat for bats and GCN. Table 3-6 outlines the proposed hedgerows and the purpose they would serve.

Table 3-6 Proposed Hedgerows

Plot ID	Length, metres	Primary Environmental Function		Description
SH01	264.04	EFA	Visual screening	Screening for properties near Wolverhampton Road
EH01	239.98	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow within the northern construction compound and provision of connectivity for **EP01**, **EW02** and other related habitats.

Plot ID	Length, metres	Primary Environmental Function		Description
EH02	258.57	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow within the northern construction compound and provision of connectivity for **EP01**, **EW02** and other related habitats.
EH04	186.49	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow within the northern construction compound and provision of connectivity for **EP01**, **EW02** and other related habitats.
EH03	366.10	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity to/from **EW01**
SH02	150.43	EFA	Visual screening	Screening for properties near Wolverhampton Road
EH05	600.65	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity between **EW05, EP02, EP03**, Brookfield Farm LWS/SBI, and ancient woodland replacement planting **AW01** and **AW02**.
SH03	341.89	EFA	Visual screening	Screening for properties near Brookfield Farm
EH06	187.56	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity between **DP02** and habitat providing bat connectivity over the accommodation bridge (**SW04, EH08, SW05**)
SH04	139.89	EFA	Visual screening	Screening for properties near Brookfield Farm – this hedge will be against the noise barrier proposed in this location (**NB02**)
EH07	183.37	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity over the accommodation bridge and plots **SW05** and **SW04** and hedgerow **EH08**.
EH08	298.75	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity over the accommodation bridge and plots **SW05** and **SW04**
EH09	443.36	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity over the accommodation bridge and plots **SW05** and other

Plot ID	Length, metres	Primary Environmental Function		Description
				woodland and linear habitat (including **EH08**).
SH05	301.48	EFA	Visual screening	Screening views of the road from the Shareshill direction (west) and for houses to the west of the Scheme on Hilton Lane
EH10	160.77	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity between newly created ponds **EP04** and **EP05, EW08**, and habitat providing bat connectivity over the Hilton Lane overbridge (**EH11, EH12, SH05**, ditch habitat **ED01**, individual trees **IT36, IT37, IT40, IT42, IT32, IT33, IT34, IT38, IT39, IT40, IT47, IT48, IT49, IT50** and woodlands **SW05, EW07**).
EH11	122.50	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity between newly created ponds **EP04** and **EP05, EW08**, and habitat providing bat connectivity over the Hilton Lane overbridge (**EH10, EH12, SH05**, ditch habitat **ED01**, individual trees **IT36, IT37, IT40, IT42, IT32, IT33, IT34, IT38, IT39, IT40, IT47, IT48, IT49, IT50** and woodlands **SW05, EW07**).
EH12	179.71	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity between newly created ponds **EP04** and **EP05, EW08**, and habitat providing bat connectivity over the Hilton Lane overbridge (**EH10, EH11, SH05**, ditch habitat **ED01**, individual trees **IT36, IT37, IT40, IT42, IT32, IT33, IT34, IT38, IT39, IT40, IT47, IT48, IT49, IT50** and woodlands **SW05, EW07**).
SH06	66.9	EFB	Landscape Integration	Landscape integration for the realigned section of Hilton Lane – reinstating hedgerows as field boundaries and as a highway boundary. This will also provide some visual screening from the Shareshill direction (west) and

Plot ID	Length, metres	Primary Environmental Function		Description
				for houses to the west of the Scheme on Hilton Lane.
SH07	185.4	EFB	Landscape Integration	This provides landscape integration by reinstating hedgerows as field boundaries and as a highway boundary. This will also provide some visual screening for properties on Park Road and the eastern end of Dark Lane.
SH08	220.42	EFA	Visual screening	Screening for properties along Dark Lane
EH13	64.86	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity between woodland plots and hedgerows (**EH14, SW06, EW11**).
EH14	202.22	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow and provision of connectivity between other woodland plots and hedgerows (**EH13, SW06, EW11**).
EH15	137.22	EFB	Landscape Integration	This will provide landscape integration for the realigned section of Hilton Lane by reinstating hedgerows as field boundaries and as a highway boundary.
SH09	503.29	EFA	Visual screening	Screening for properties at Tower House Farm.
SH10	749.15	EFA	Visual screening	Screening for users on the road facing side of proposed noise barrier **NB05**.
EH16	85.95	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow at this location and wider across the Scheme. This would provide a nature conservation and biodiversity function in support of the new pond and for birds, and a landscape integration function to minimise impacts on the landscape character of this area in connection with drainage pond **DP05, EG47** and retained woodland.
EH17	414.06	EFD	Nature conservation and biodiversity	Replacement for lost hedgerow at this location and wider across the Scheme. This would provide

Plot ID	Length, metres	Primary Environmental Function		Description
				a nature conservation and biodiversity function in support of the new pond and for birds, and a landscape integration function to minimise impacts on the landscape character of this area in connection with drainage pond **DP05, EG47** and retained woodland.

3.11. Individual Trees

3.11.1. In order to maximise landscape benefits upon Scheme opening, it is proposed to plant individual trees in prominent locations around the Scheme. This strategic planting is provided to reinforce the existing vegetation pattern and strengthen landscape character by replication of elements such as individual hedgerow or parkland trees.

3.11.2. This includes the locations as follows:

- within hedgerows in the area to be used as the northern construction compound to restore the those assumed to be lost within the existing hedgerows (**IT01-IT05, IT08, IT09**);
- east of the junction between the existing A460 and Mill Lane within hedgerow **EH03** (**IT06, IT07**);
- within proposed hedgerow **SH03** adjacent to the Scheme between Junction 11 of the M6 and Brookfield Farm (**IT10, IT11**);
- around both sides of the accommodation bridge to the south of Brookfield Farm (**IT12 – IT26**);
- within the proposed hedgerow running parallel to the west of the Scheme between the accommodation bridge (to the south of Brookfield Farm) and Hilton Lane (**IT07, IT08**);
- around both sides of the Hilton Lane overbridge (**IT27- IT29, IT30, IT31, IT36, IT37, IT40, IT42, IT47-54, IT56**);
- within the proposed hedgerows running parallel to proposed ditch running from Hilton Lane to the ecology ponds to the north of Dark Lane (**IT35, IT41, IT44-IT45, IT53, IT55, IT57-IT63**);
- scattered within the areas used for the southern construction compound (east of the existing A460 at Featherstone) (**IT64-IT70, IT73**). Scattered individual trees within plot **EG24** (species-rich grassland) would create a similar appearance to the wider area of Hilton Park historic landscape and would reinforce the parkland character as part of the parkland would be lost to the Scheme; and
- within proposed hedgerows running roughly parallel to farm access tracks between Hilton Park and Junction 1 of the M54 (**IT71, IT72, IT74-IT76, IT78-IT84**).

3.12. Net Loss in Biodiversity

3.12.1. Policy increasingly recognises that development should seek to achieve net gains in biodiversity but it is currently not a requirement for Nationally Significant Infrastructure Projects to deliver an overall net gain in biodiversity. A full discussion of the relevant policy on this point can be found in the Case for the Scheme [APP-220/7.2] and in Highway's England's response to First Written Questions 1.3.7 [TR010054/APP/8.10].

3.12.2. However, the Scheme is required to demonstrate how the project has taken opportunities to conserve and enhance biodiversity by NPSNN paragraph 5.23. The mitigation strategy has followed the mitigation hierarchy set out in NPPF paragraph 175.

3.12.3. A number of prescribed consultees provided comments on the approach taken by Highways England in assessing the impact of the Scheme on biodiversity and the mitigation and enhancements that should be provided in their responses to the statutory consultation on the Scheme in May-July 2019. The Environment Agency, Natural England and SCC all provided responses supporting an approach which would deliver biodiversity net gains. Detailed responses to all consultation comments received are provided in Annex P of the Consultation Report [APP-024/5.1].

3.12.4. In response to policy and prescribed consultee requirements, the Scheme has aimed to maximise opportunities to reduce harm to environmental assets and maximise benefits through design and mitigation. The Scheme has built in beneficial biological features in line with NPSNN paragraph 5.33 through delivery of enhancements to habitats and the creation of new habitats for both ecological and landscape/visual mitigation purposes.

3.12.5. A Habitat Metric Calculation exercise has been undertaken and is provided in detail at Appendix 8.2 Version 3 [AS-103/6.3]. Biodiversity units have been determined using the metric calculation published by Natural England, referred to as The Biodiversity Metric 2.0 (Ref 17 and Ref 18).

3.12.6. The calculation considers habitat losses through construction of the Scheme within the Scheme boundary, and the effects of temporary land-take within habitats (for instance land used for construction that would subsequently be restored to its former use upon completion of the works) compared against the restoration and compensation measures provided.

3.12.7. The Biodiversity Metric Calculations (Appendix 8.2 Version 3 [AS-103/6.3]) show that following completion of the Scheme, total biodiversity units would be marginally higher, with an area based gain of 2.21% of units, a linear based gain of 29.01% and a gain of 2.23% of river based units (assuming enhancement of 200 metres of retained watercourse).

3.12.8. There is currently very little guidance on what "net loss", "no net loss" and "net gain" of biodiversity constitutes in terms of percentages of biodiversity units. Table 11.9 of CIRIA C776a Good practice principles for development (Ref 19) states that developments that result in a post development biodiversity baseline within 95-104%

of the original biodiversity baseline are considered to result in no net loss of biodiversity.

3.12.9. The Scheme is within the range -5 % to +5 % for river and area based habitats (woodland, grassland etc.) which can be classed as no net loss and can be classed as achieving a net gain in linear (hedgerow) habitats.

3.12.10. This guidance, as well as the fact that the Scheme will result in gains of habitat suitable for rare and declining species such as great crested newt, has been used to conclude that the Scheme will would result in no net loss of biodiversity. This is in line with the request made by SCC for no net loss of biodiversity, but does not meet the requirements of the Environment Agency and Natural England for biodiversity net gains. It should be noted, however, that no land is subject to compulsory acquisition for the sole aim of delivering no net loss in biodiversity or a net gain.

4. Lower Pool LWS and SBI

4.1. Impacts of the Scheme

Loss of Designated Habitats

4.1.1. Lower Pool LWS/SBI comprises an ornamental pool shaded by surrounding woodland. The woodland is not ancient although it is designated as part of the SBI and is characterised as broadleaved/mixed plantation with a variable species poor ground layer, which is absent in places (see Appendix 8.4 [APP-178/6.3]). The standing water contains both emergent and floating vegetation. These habitats have been found to support high levels of bat activity (see ES Appendix 8.7 [APP-179/6.3].

4.1.2. Construction of the Scheme would result in the direct, unavoidable and irreversible loss of woodland and standing water habitats within Lower Pool LWS/SBI. The ES Chapter 8: Biodiversity Version 3 [AS-083/6.1] and Table 4-1 below note the areas of habitat lost from within Lower Pool LWS/SBI. This comprises a total loss of 39.6% of the habitats within the LWS/SBI boundary, including 32.3% of the SBI woodland. Lower Pool LWS/SBI is an important ecological feature within the Scheme boundary and given the extent of the land take proposed the Scheme would have an adverse impact on the ecological function and integrity of the habitats.

Table 4-1 Habitat Losses from Lower Pool LWS and SBI

Existing habitat	Habitat loss (ha)	% of Habitat within LWS and SBI	Importance
Broadleaved woodland - plantation	2.04 ha	32.3%	County
Standing Water	0.46 ha	7.3%	County

Bats

4.1.3. Surveys have found high to moderate bat roost potential within trees located adjacent to land south of Dark Lane, located adjacent to the A460, located adjacent to Hilton Lane and located within the Lower Pool SBI. Bat roosts have been confirmed in the Lower Pool SBI. The Scheme would result in the loss of trees with negligible to low bat roost potential located off Dark Lane, trees with moderate to high bat roost potential located off Hilton Lane, and two confirmed bat roosts within the Lower Pool SBI.

4.1.4. The loss of woodland, wetland and severance of hedgerows would lead to the fragmentation of interconnected habitat that is used by the local bat population. The highest numbers of species observed are associated with woodland edge and wetland habitats associated within Lower Pool and Brookfield Farm SBI and LWSs. The Scheme would result in the loss of trees with high to moderate bat roost potential and two known bats roosts within Lower Pool LWS/SBI.

Landscape and Visual Effects

4.1.5. The introduction of the Scheme has the potential to introduce an extensive new feature in available views afforded to local residents within Featherstone, Hilton and Shareshill and users of the PRoW network (ES Chapter 7: Landscape and Visual

[APP-046/6.1]). Modifications to the form and alignment of Hilton Lane and Dark Lane were also identified as elements which would give rise to visual effects.

4.1.6. Viewpoints representing views from houses on Dark Lane and Park Road were considered in the assessment, and the design has responded providing screening for views.

4.2. Feedback Related to Lower Pool LWS and SBI

4.2.1. The compensation planting for the Lower Pool SBI has been a key consideration for both SCC and South Staffordshire Council (SSC). Extensive pre-application consultation has been undertaken, including a thorough review of the alignment in this location. On Lower Pool, SCC commented (see the Consultation Report [APP-024/5.1] for further details):

> "We remain concerned about possible effects on Lower Pool and Brookfield Farm Local Wildlife Sites (also known as SBIs) through permanent loss of habitat. This may also apply to woodlands that have not yet been confirmed as ancient. If avoidance is not possible, then mitigation effort should be excellent, including translocation and habitat creation with appropriate long-term aftercare."

4.2.2. SSC also commented:

> "Feedback from HE to date seems to suggest that environmental considerations have been a principal consideration in determining the alignment, in particular a desire to protect Lower Pools and the setting of Hilton Hall to the east. Whilst the Council recognises the importance of environment consideration, there are concerns that these have taken precedence over the impact on the amenity of residents living in Hilton. It is important that Highways England balance the views of statutory consultees like Historic England and Natural England with other statutory consultees like South Staffordshire Council, and the views of local residents."

4.2.3. Natural England have been consulted throughout the process. They have now provided formal comment in their Relevant Representation RR-037. In relation to bats, Natural England commented:

> "Bats – The project will result in the loss of two known small roosts of noctule and common pipistrelle bats. It may also impact on other small day and hibernation roosts in trees that have high potential to support bat roosts. Natural England have advised on an appropriate mitigation strategy which involves habitat improvements, sensitive lighting and erecting three bat boxes for every roost that will be lost. Natural England have assessed draft licence applications and have issued a 'letter of no impediment' confirming that it sees no impediment to granting a licence in the future should the situation on the ground not change."

4.2.4. Mitigation for the loss of habitat as a result of the Scheme has been developed with Natural England, in line with Natural England licence requirements (refer to Appendix 8.3: Letter of No Impediment for GCN [APP-177/6.3]; Appendix 8.3: Letter of No Impediment for Bats [APP-177/6.3]; and ES Chapter 8: Biodiversity Version 3 (Assessment of likely significant effects) [AS-083/6.1] for details).

4.3. Scheme Mitigation

Commitments made by Highways England

4.3.1. In response to stakeholder concerns and the environmental assessment, a mix of new woodland planting, standing water habitats and species-rich grassland are to be created to mitigate the loss of habitat at Lower Pool LWS/SBI.

4.3.2. Within this area and across the Scheme, new planting has been designed to offer optimal bat foraging opportunities with a mosaic of woodland, hedgerows and species-rich grassland.

4.3.3. Eight ecology ponds are proposed to be created across the Scheme, two of which fall within this area, to compensate for the loss of ponds lost as a result of construction.

Mitigation Proposed

4.3.4. South of Dark Lane, a mix of new woodland (**SW06**) and a screening hedgerow **SH08** is proposed to provide screening for Dark Lane residents at a ground level and to screen the existing fence from view for these residents.

4.3.5. This would be set within a mosaic of habitat, including remnants of woodland habitat from within Lower Pool LWS/SBI) (**RW19**) to the east of the plot, plus individual trees (**IT64-IT70, IT73**), retained woodland (**RW22**), new woodland (**SW07, EW10, EW11, EW12, EW13**) and hedgerows (**EH14**) to the south.

4.3.6. North of Park Road and west of the new link road, a new woodland (**EW08**), environmental ponds (**EP04** and **EP05**) and species-rich grassland (**EG24**) would be provided. The new woodland will provide a screening function for residents along Park Road and is connected to the retained wooded border of the plot adjacent to the A460 and Hilton Lane, whilst also a direct connection / continuation of the Lower Pool LWS/SBI woodland habitat. A combination of new ditch (**ED01**), hedgerow (**EH12, EH10, SH07**) and individual trees (**IT35, IT41, IT44-IT45, IT53, IT55, IT57-IT63**) would be provided to the south-east extent of this plot west of the new link road.

4.3.7. Connectivity is provided between the southern mitigation areas, wider mitigation proposals and the retained habitat from within Lower Pool SBI through hedgerows (**EH13, EH14, SH07**, and **SH08**), species-rich grassland (**EG24**) and woodlands (**EW08, SW06**). Connectivity is provided across the new link road around the proposed overbridge at Hilton Lane through hedgerows **EH10, EH11, EH12, SH05,** ditch habitat **ED01**, individual trees **IT36, IT37, IT40, IT42, IT32, IT33, IT34, IT38, IT39, IT40, IT47, IT48, IT49, IT50**, and woodlands **SW05, EW07**. This would also provide access for bat species across the Scheme to new woodland habitats (linking plot **EW08** to new habitats created further to the north, retained areas of habitat from within Lower Pool LWS/SBI, new woodland **EW09**) and newly created wildlife ponds and species rich grassland.

4.3.8. East of the new link road, retained woodland from the Lower Pool LWS/SBI (**RW18, RW17**) would be supplemented with new woodland (**EW09**) and species-rich grassland (**EG29**).

4.3.9. Furthermore, a diversion of Watercourse 3 under the Scheme and an associated mammal tunnel (**BT02**) will provide additional connectivity to the retained habitat to the east of the link road.

Justification for Mitigation

4.3.10. Habitat losses would be compensated for by a total of 6.29 ha of habitat creation, in the form of 4.94 ha of woodland planting, and 0.57 ha of standing water surrounded by 0.78 ha of grassland. This ratio of habitat compensation to loss is considered appropriate given the importance of the LWS and the length of time it takes new woodland planting to establish.

4.3.11. In accordance with the mitigation approach, new habitat would be connected to the retained LWS/SBI habitats and newly created ponds by species rich grassland proposed on the road embankments, tree and hedgerow planting at the base of the embankments and hedgerow planting.

4.3.12. The fields identified for pond creation, grassland and woodland planting to the south of Dark Lane and the area north of Park Road would provide screening for the residents of this area and is a direct connection / continuation of the Lower Pool SBI woodland habitat. This would replace foraging habitat for bats and other species using Lower Pool SBI and provide a mosaic of habitat for other protected and notable species as is discussed in the following sections.

4.3.13. This area (and the features described above) would provide optimal foraging habitat for bats. Surveys have found high to moderate bat roost potential within trees located adjacent to land south of Dark Lane, located adjacent to the A460, located adjacent to Hilton Lane and located within the Lower Pool SBI. Bat roosts have been confirmed in the Lower Pool SBI. The Scheme would result in the loss of trees with negligible to low bat roost potential located off Dark Lane, trees with moderate to high bat roost potential located off Hilton Lane, and two confirmed bat roots within the Lower Pool SBI. Replacement bat roosts would be provided at a ratio of 3:1, as agreed with Natural England. In order for mitigation to be successful, it is essential that mitigation for the loss of habitat is located within areas where bats are known to roost and forage. Consequently, this mitigation is likely to have a strong chance of success in this location.

4.3.14. Other areas, for example land directly north-east of the Hilton Lane, contains trees with negligible and moderate bat roost potential but at substantially lower numbers. Mitigation here less likely to be successful. The proposed mitigation would form a critical part of Highways England's application to Natural England for a bat mitigation licence.

4.3.15. The potential to provide woodland planting to the east of the new link road was considered. However, due to the presence of the designed landscape of Hilton Park and the Shrubbery (a feature of the historic parkland) on the eastern side of the link; any additional planting would result in adverse effects on these receptors. Lower Pool and its surrounding woodland, features of the historic parkland, were designed with an area of grassland between the Hall and the Lower Pool. This area formed part of the former 'pleasure ground' made up of pasture fields, interspersed with trees. Therefore, woodland planting in this location would have an adverse effect on

the designed landscape and cause further change to the setting of the Grade I Hilton Hall and associated buildings. Consultation with Historic England has confirmed they require the retention of form of features within the retained historic park such as the historic boundary of Lower Pool/The Shrubbery, and they would have serious concerns should proposals seek extend the woodland into the open parkland between The Shrubbery and the Hall, as this could substantially alter the parkland.

4.3.16. Areas further north and east of the link road are considered less appropriate as they do not have the same level of existing bat activity and would not provide the same level of connectivity for the local sites affected by the Scheme.

4.3.17. Consideration was also given to providing the woodland to the south of Dark Lane, however this conflicted with the current relatively open nature of views from upper floors of properties on Dark Lane, and historic parkland character within the view.

4.3.18. The retained habitat close to the roosts, along with the habitat compensation will ensure that quality foraging and commuting habitat will be available to the bats occupying the roost and their conservation status is unlikely to be affected. A desire to screen the views from ground level and the upper floors of these properties has been balanced with a need to protect the character in this area, which is currently dominated by farmland with scattered trees and views of woodland associated with Hilton Park.

5. Brookfield Farm LWS and SBI

5.1. Impacts of the Scheme

Loss of Designated Habitats

5.1.1. Construction of the junction linking the Scheme and the M6 would result in the direct, unavoidable and irreversible loss of approximately 0.71 ha of woodland comprising 15% of the LWS/SBI boundary. None of the woodland to be lost is considered to be ancient.

5.1.2. The Scheme would cross Latherford Brook (Watercourse 5) by a 10 m wide single span structure approximately 30 m in length which could result in a temporary loss of up to 71 m of existing channel during construction as some construction works to the margins of the primary channel will be required to install the new bridge abutments and wingwalls. Latherford Brook channel is approximately 1 – 2 m wide and supports both otter and water vole. The permanent loss of woodland habitat and temporary loss of habitats in and adjacent to Latherford Brook along the 70 m stretch affected has the potential to adversely impact upon the integrity of the LWS/SBI habitats and as the Scheme goes through the LWS/SBI boundary, has the potential to lead to habitat fragmentation.

5.1.3. As noted in Section 3.4, a total of 3.31 ha of woodland planting is proposed to compensate for the impacts of the Scheme on ancient woodland.

Bats

5.1.4. Woodland edge and riparian habitats associated with Latherford Brook (Watercourse 5) (within Brookfield Farm SBI and LWS) are known to support high levels of bat activity. The loss of woodland, wetland and severance of hedgerows would lead to the fragmentation of interconnected habitat that is used by the local bat population. Levels of bat activity are low to moderate, with highest levels of activity and highest numbers of species associated with woodland edge and wetland habitats associated with Lower Pool and Brookfield Farm SBI and LWSs.

5.2. Scheme Mitigation

5.2.1. A total of 3.31 ha of woodland planting is proposed to compensate for the impacts of the Scheme on ancient woodland in line with the compensation ratios agreed with Natural England [TR010054/APP/8.8P(B)]. The requirement to provide the planting in connection with existing ancient woodland leaves limited locations in which to provide this compensation planting. This is proposed to be located in two areas (**AW01** and **AW02**) adjacent to the existing area of ancient woodland and retained non-ancient woodland within the Brookfield Farm LWS/SBI. This location is also preferred by Natural England due to the location being directly adjacent and therefore connecting to the ancient woodland within the Brookfield Farm LWS/SBI.

5.2.2. The majority of the LWS/SBI habitats would be retained and unaffected by the Scheme. To compensate for the loss of woodland habitat, excluding the ancient woodland which is compensated for separately; an additional 2.54 ha of woodland habitat is proposed south of the LWS/SBI east of the Scheme (**EW05**). Woodland **EW05** would be located near M6 Junction 11, east of the link road and adjacent to

the ancient woodland compensation planting (**AW01** and **AW02**) next to Brookfield Farm LWS/SBI. This woodland also performs a secondary landscape integration function, to integrate the Scheme within the existing landscape features.

5.2.3. Species rich grassland (including **EG18** in this location) and hedgerows (including **EH05**) are also proposed on the Scheme embankments to allow for habitat connectivity to and from the Brookfield Farm LWS/SBI and new woodland planting. This new habitat will provide connectivity to new ecology ponds **EP02** and **EP03** and linear planting at the accommodation bridge and Hilton Lane to encourage crossing of the link road.

5.2.4. Taking into account that the proposed habitats would take some time (functioning well developed scrub within 15 years and woodland within 30 + years) to establish, the Scheme is considered to have moderate negative adverse impact on the LWS/SBI as this mitigation (excluding the ancient woodland compensation planting) establishes, resulting in an effect of slight significance in the medium term (10-30 years), reducing to an effect of neutral significance in the long term (beyond 30 years) once habitats are fully established. This ratio of habitat compensation to loss is considered appropriate given the importance of the LWS and the length of time it takes new woodland planting to establish.

6. Northern Construction Compound Area

6.1. Scheme Mitigation

6.1.1. There would be a loss of habitats for the operation of the construction compound. At the northern construction compound, lost habitat would subsequently be replaced with better quality habitats created to compensate for losses in this location, and for the loss of hedgerow, standing water (ponds) and woodland across the Scheme.

6.1.2. Hedgerows **EH01, EH02** and **EH04** would replace those lost during construction. In conjunction with species rich grassland **EG08**, these would provide connectivity to the newly created woodland **EW02** and ecology pond **EP01**.

6.1.3. Individual trees are proposed within the replacement hedgerows to restore those assumed to be lost within the existing hedgerows (**IT01-IT05, IT08, IT09**).

6.1.4. Overall, this mitigation will contribute to the matrix of habitats to support both GCN and bats and to integrate the Scheme into the wider landscape (EFB).

7. Conclusions

7.1.1. The application of essential mitigation to reduce the impacts of the Scheme has been an iterative process taking into account survey information, assessment predictions and relevant principles of mitigation as set out in policy and relevant guidance and standards.

7.1.2. Ongoing consultation with statutory consultees has led to the production of a mitigation strategy that is proportionate to the impacts being addressed. Where possible landowner concerns have influenced the positioning of mitigation, however the design situates mitigation in locations where they have the best chance of success.

7.1.3. The Scheme has built in beneficial biological features in line with NPSNN paragraph 5.33 through delivery of enhancements to habitats and the creation of new habitats for both ecological and landscape/visual mitigation purposes.

7.1.4. A Biodiversity Metric Calculation exercise has been undertaken which shows that following completion of the Scheme, total biodiversity units would be marginally higher than the existing situation. The Scheme is within the range -5 % to +5 % for river and area based habitats (woodland, grassland etc.) which can be classed as no net loss of biodiversity, and can be classed as achieving a net gain in linear (hedgerow) habitats in accordance with CIRIA C776a Good practice principles for development (Ref 19).

8. References

Ref 1 Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

Ref 2 EU Directive 2014/52/EU

Ref 3 Highways England (2019) Design Manual for Roads and Bridges LA 104

Ref 4 Department for Transport (2014) National Policy Statement for National Networks. Available online at: www.gov.uk/government/publications

Ref 5 Secretary of State for Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework

Ref 6 Department for Transport Road Investment Strategy: 2015 to 2020

Ref 7 Department for Transport Road Investment Strategy 2: 2020 to 2025

Ref 8 Highways England (2015), Highways England Biodiversity Plan

Ref 9 Standing advice from Natural England and Department for Environment Food and Rural Affairs (DEFRA) Available online at: https://www.gov.uk/topic/planning-development/protected-sites-species

Ref 10 Highways England (2019) Design Manual for Roads and Bridges LD 117 Landscape Design

Ref 11 Highways England (2019) Design Manual for Roads and Bridges LD 118 Biodiversity Design

Ref 12 Highways England (2020) Design Manual for Roads and Bridges LD 119 Roadside Environmental Mitigation and Enhancement

Ref 13 Chartered Institute of Ecology and Environmental Management (2019). Guidelines for Ecological Impact Assessment in the UK and Ireland.

Ref 14 Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001), Great Crested Newt Conservation Handbook, Froglife, Halesworth.

Ref 15 English Nature (2001) Great crested newt mitigation guidelines. English Nature, Peterborough.

Ref 16 The Conservation of Habitats and Species Regulations 2017 http://www.legislation.gov.uk/uksi/2017/1012/contents/made

Ref 17 Natural England (2019). Natural England Joint Publication JP029 The Biodiversity Metric 2.0 auditing and accounting for biodiversity USER GUIDE

Beta Version. First published 29th July 2019 . Available online at: http://publications.naturalengland.org.uk/publication/5850908674228224.

Ref 18 Natural England (2019). Natural England Joint Publication JP029 The Biodiversity Metric 2.0 auditing and accounting for biodiversity TECHNICAL SUPPLEMENT. Beta Version. First published 29th July 2019. Available online at: http://publications.naturalengland.org.uk/publication/5850908674228224.

Ref 19 Baker, J., Hoskin, R, Butterworth, T (2019) Biodiversity net gain. Good practice principles for development. Part A: A practical guide. CIRIA. Available online at: https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf

Ref 20 Natural England (2020) Relevant Representation. Available online at: https://infrastructure.planninginspectorate.gov.uk/projects/west-midlands/m54-to-m6-link-road/?ipcsection=relreps

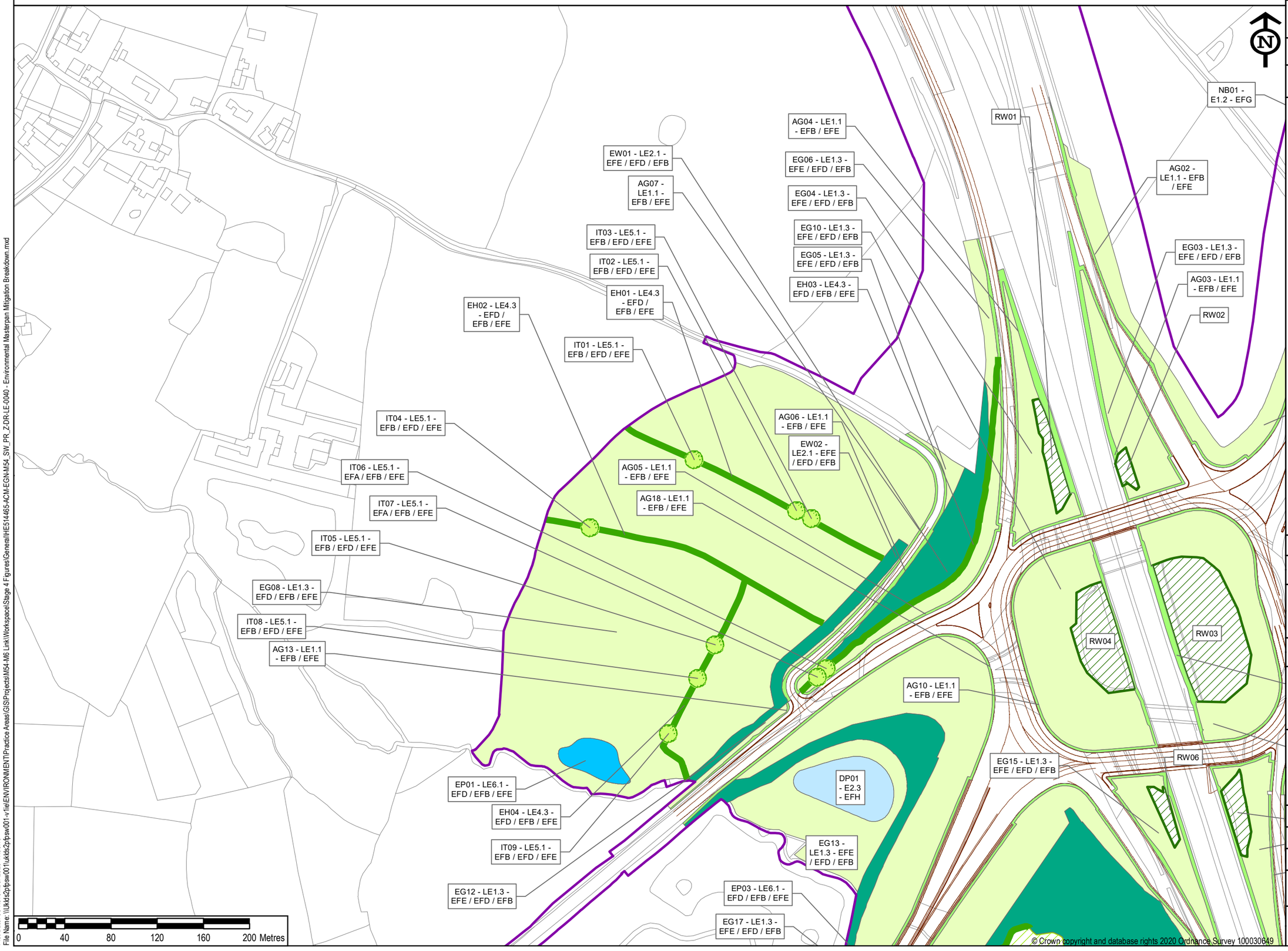
Appendix A Environmental Masterplan

PLOT ID CODES

AG##	Amenity grass	ED##	Ditch	EW##	Woodland	RAW##	Retained ancient woodland
AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
BT##	Mammal tunnel	EH##	Hedge	IT##	Individual tree	SH##	Hedge - Screening
DP##	Drainage pond	EP##	Ecology pond	NB##	Noise protection wall	SW##	Woodland - Screening

ENVIRONMENTAL FUNCTION CODES

EFA	Visual screening	EFE	Visual Amenity
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality



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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

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LEGEND

- Scheme Boundary
- LE5.1 - Proposed individual tree
- LE7 - Proposed false cutting
- E1.2 - Noise protection wall
- E3.2 - Mammal tunnel
- LE4.3 - Proposed hedge
- LE6.2 - Proposed ditch
- Existing ancient woodland
- Existing woodland
- E2.3 - Proposed drainage pond
- LE1.1 - Proposed amenity grass
- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue: FOR INFORMATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of: highways england

Development Consent Order Number: TR010054

Project Title: M54 TO M6 LINK ROAD

Drawing Title: ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 1 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No.: 60536736	Suitability: S8
Scale @ A3: 1:3,120	Zone: M54 to M6 Link Road

Drawing Number: Highways England PIN	Originator	Volume	Rev
HE514465 M54_SW_PR_Z	-ACM	-EGN -	P04
Location		-DR - EG - 0040 (Type | Role | Number)	

Plot Date: 03 November 2020 11:03:18
File Name: \\Ukkds2pfpsw001\ukds2pfpsw001-v1\ie\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 4 Figures\General\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0040 - Environmental Masterpan Mitigation Breakdown.mxd

PLOT ID CODES

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AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
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ENVIRONMENTAL FUNCTION CODES

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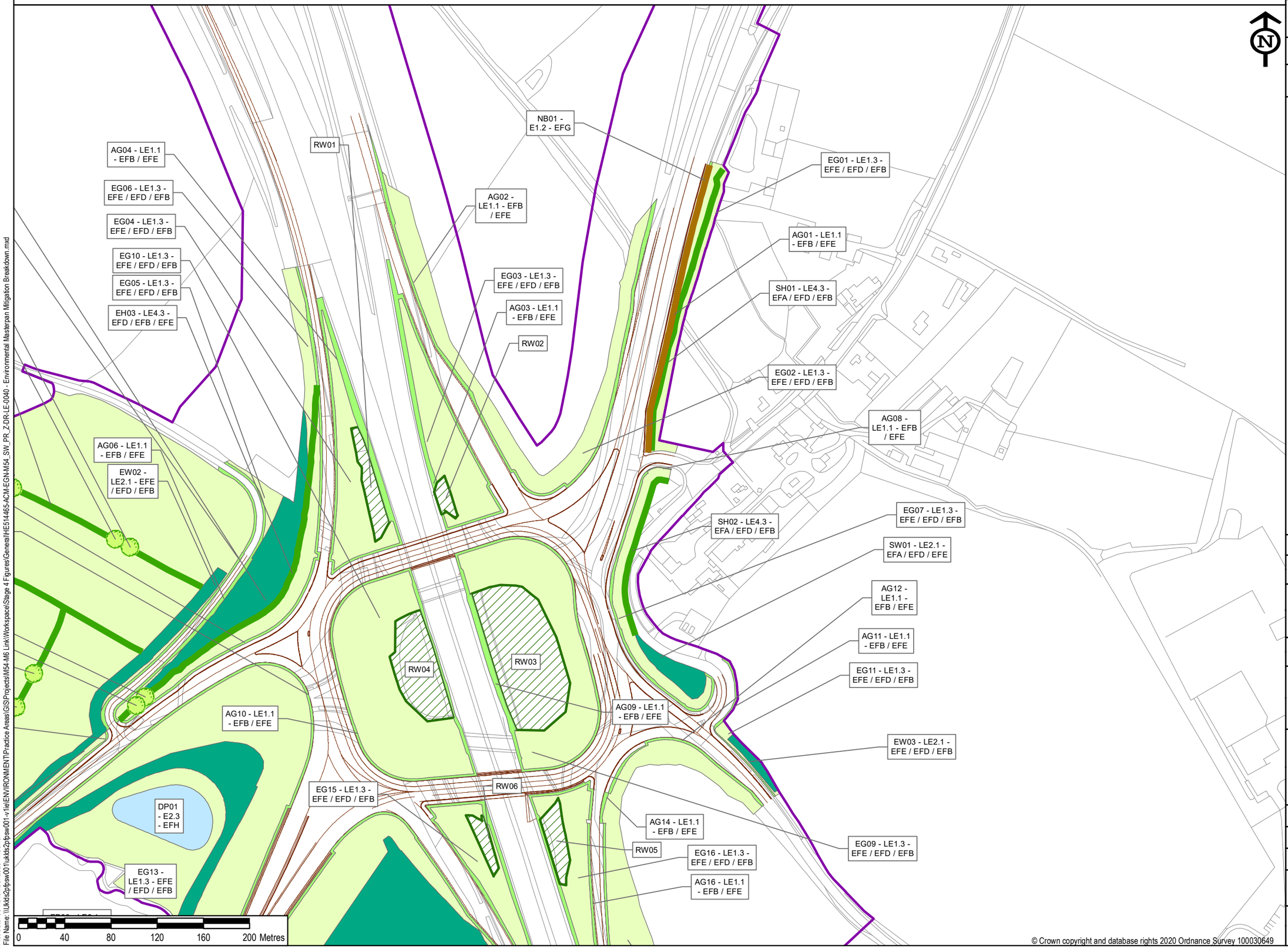
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality



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LEGEND

- Scheme Boundary
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- LE7 - Proposed false cutting
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- E3.2 - Mammal tunnel
- LE4.3 - Proposed hedge
- LE6.2 - Proposed ditch
- Existing ancient woodland
- Existing woodland
- E2.3 - Proposed drainage pond
- LE1.1 - Proposed amenity grass
- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue: FOR INFORMATION

Client
Highways England
The Cube
199 Wharfeside Street
Birmingham
B1 1RN

Working on behalf of highways england

Development Consent Order Number: TR010054

Project Title: M54 TO M6 LINK ROAD

Drawing Title: ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 2 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No.: 60536736	Suitability: S8
Scale @ A3: 1:3,120	Zone: M54 to M6 Link Road

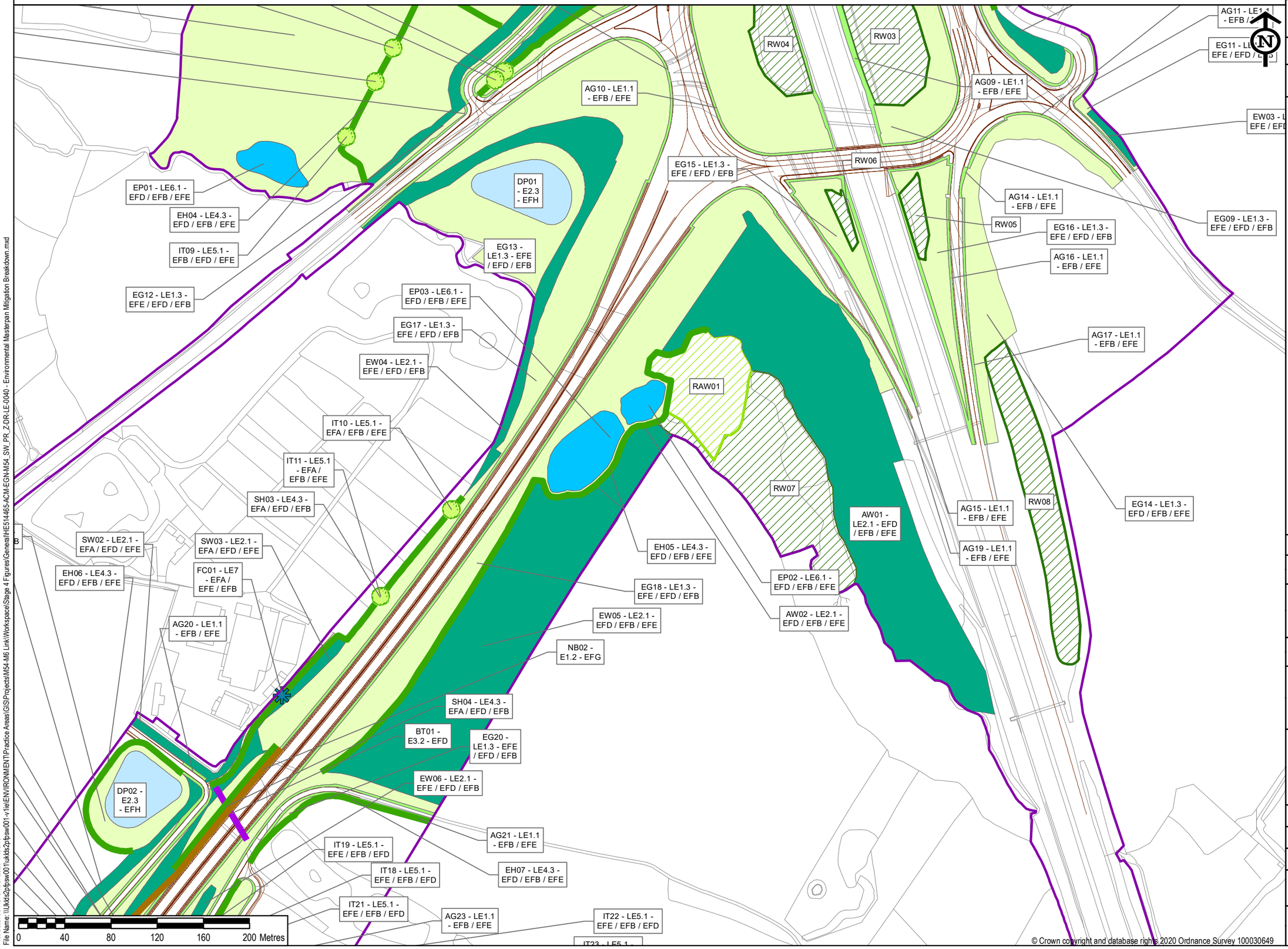
Drawing Number: Highways England PIN	Originator	Volume			Rev
HE514465	-ACM	-EGN -			P04
Location: M54_SW_PR_Z		-DR - EG - 0040			
		Type	Role	Number	

PLOT ID CODES

AG##	Amenity grass	ED##	Ditch	EW##	Woodland	RAW##	Retained ancient woodland
AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
BT##	Mammal tunnel	EH##	Hedge	IT##	Individual tree	SH##	Hedge - Screening
DP##	Drainage pond	EP##	Ecology pond	NB##	Noise protection wall	SW##	Woodland - Screening

ENVIRONMENTAL FUNCTION CODES

EFA	Visual screening	EFE	Visual Amenity
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

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LEGEND

- Scheme Boundary
- LE5.1 - Proposed individual tree
- LE7 - Proposed false cutting
- E1.2 - Noise protection wall
- E3.2 - Mammal tunnel
- LE4.3 - Proposed hedge
- LE6.2 - Proposed ditch
- Existing ancient woodland
- Existing woodland
- E2.3 - Proposed drainage pond
- LE1.1 - Proposed amenity grass
- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue: FOR INFORMATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of: highways england

Development Consent Order Number: TR010054

Project Title: M54 TO M6 LINK ROAD

Drawing Title: ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 3 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No.	Suitability
60536736	S8
Scale @ A3	**Zone**
1:3,120	M54 to M6 Link Road

Drawing Number: Highways England P/N	Originator	Volume	Rev
HE514465	-ACM	-EGN -	P04
M54_SW_PR_Z		-DR - EG - 0040	
Location		Type | Role | Number	

Plot Date: 03 November 2020 11:03:18
File Name: \\ukhds2pfpsw001\ukhds2pfpsw001-v1\ie\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 4 Figures\General\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0040 - Environmental Masterpan Mitigation Breakdown.mxd

PLOT ID CODES

AG##	Amenity grass	ED##	Ditch	EW##	Woodland	RAW##	Retained ancient woodland
AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
BT##	Mammal tunnel	EH##	Hedge	IT##	Individual tree	SH##	Hedge - Screening
DP##	Drainage pond	EP##	Ecology pond	NB##	Noise protection wall	SW##	Woodland - Screening

ENVIRONMENTAL FUNCTION CODES

EFA	Visual screening	EFE	Visual Amenity
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality

IT13 - LE5.1 - EFE / EFB / EFD
EG19 - LE1.3 - EFE / EFD / EFB
SW02 - LE2.1 - EFA / EFD / EFE
SW03 - LE2.1 - EFA / EFD / EFE
IT14 - LE5.1 - EFE / EFB / EFD
SW04 - LE2.1 - EFA / EFD / EFE
EH06 - LE4.3 - EFD / EFB / EFE
FC01 - LE7 - EFA / EFE / EFB
IT12 - LE5.1 - EFE / EFB / EFD
AG20 - LE1.1 - EFB / EFE
EW05 - LE2.1 - EFD / EFB / EFE
IT16 - LE5.1 - EFE / EFB / EFD
NB02 - E1.2 - EFG
IT15 - LE5.1 - EFE / EFB / EFD
SH04 - LE4.3 - EFA / EFD / EFB
IT17 - LE5.1 - EFE / EFB / EFD
BT01 - E3.2 - EFD
EG20 - LE1.3 - EFE / EFD / EFB
IT20 - LE5.1 - EFE / EFB / EFD
DP02 - E2.3 - EFH
EW06 - LE2.1 - EFE / EFD / EFB
IT27 - LE5.1 - EFA / EFB / EFE
IT28 - LE5.1 - EFA / EFB / EFE
AG21 - LE1.1 - EFB / EFE
IT37 - LE5.1 - EFE / EFB / EFD
IT19 - LE5.1 - EFE / EFB / EFD
SH06 - LE4.3 - EFB / EFD / EFA
IT29 - LE5.1 - EFA / EFB / EFE
IT18 - LE5.1 - EFE / EFB / EFD
EH07 - LE4.3 - EFD / EFB / EFE
IT36 - LE5.1 - EFE / EFB / EFD
EG21 - LE1.3 - EFE / EFD / EFB
IT40 - LE5.1 - EFE / EFB / EFD
IT21 - LE5.1 - EFE / EFB / EFD
AG23 - LE1.1 - EFB / EFE
IT22 - LE5.1 - EFE / EFB / EFD
SH05 - LE4.3 - EFA / EFD / EFB
IT42 - LE5.1 - EFE / EFB / EFD
IT23 - LE5.1 - EFE / EFB / EFD
RW09
IT24 - LE5.1 - EFE / EFB / EFD
IT26 - LE5.1 - EFE / EFB / EFD
IT25 - LE5.1 - EFE / EFB / EFD
AG22 - LE1.1 - EFB / EFE
EH08 - LE4.3 - EFD / EFB / EFE
IT35 - LE5.1 - EFB / EFD / EFE
IT33 - LE5.1 - EFE / EFB / EFD
IT41 - LE5.1 - EFB / EFD / EFE
IT30 - LE5.1 - EFA / EFB / EFE
IT32 - LE5.1 - EFE / EFB / EFD
IT44 - LE5.1 - EFA / EFB / EFE
IT31 - LE5.1 - EFA / EFB / EFE
IT34 - LE5.1 - EFE / EFB / EFD
IT45 - LE5.1 - EFA / EFB / EFE
SW05 - LE2.1 - EFA / EFD / EFE
IT46 - LE5.1 - EFA / EFB / EFE
RW10
RW09
EW07 - LE2.1 - EFE / EFD / EFB
EH09 - LE4.3 - EFD / EFA / EFE
RW10
EG22 - LE1.3 - EFE / EFD / EFB
EP04 - LE6.1 - EFD / EFB / EFE
IT38 - LE5.1 - EFE / EFB / EFD
EG23 - LE1.3 - EFE / EFD / EFB
RW17
IT43 - LE5.1 - EFE / EFB / EFD
IT39 - LE5.1 - EFE / EFB / EFD
RW17
EH11 - LE4.3 - EFD
- LE6.1 -

0 40 80 120 160 200 Metres

Plot Date: 03 November 2020 11:03:18
File Name: \\UKds2p5sw001\ukds2p5sw001-v1\ie\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 4 Figures\General\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0040 - Environmental Masterpan Mitigation Breakdown.mxd

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

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LEGEND

- Scheme Boundary
- LE5.1 - Proposed individual tree
- LE7 - Proposed false cutting
- E1.2 - Noise protection wall
- E3.2 - Mammal tunnel
- LE4.3 - Proposed hedge
- LE6.2 - Proposed ditch
- Existing ancient woodland
- Existing woodland
- E2.3 - Proposed drainage pond
- LE1.1 - Proposed amenity grass
- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue
FOR INFORMATION

Client
Highways England
The Cube
199 Wharfside Street
Birmingham
B1 1RN

Working on behalf of
highways england

Development Consent Order Number
TR010054

Project Title
M54 TO M6 LINK ROAD

Drawing Title
ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 4 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No.	Suitability
60536736	S8
Scale @ A3	Zone
1:3,120	M54 to M6 Link Road

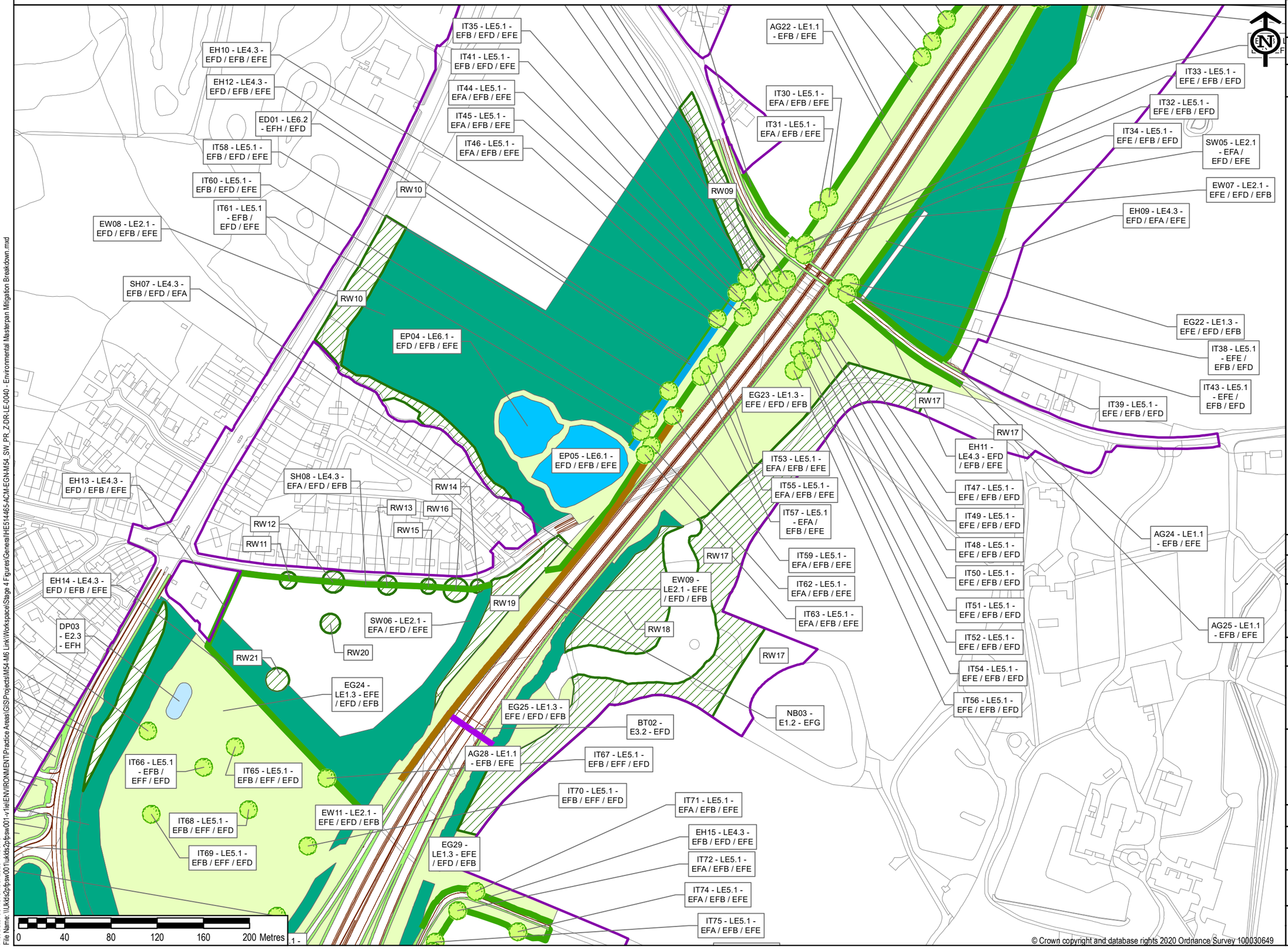
Drawing Number
Highways England PIN | Originator | Volume | Rev
HE514465 | -ACM | -EGN - | P04
Location | Type | Role | Number
M54_SW_PR_Z | -DR - EG - 0040

PLOT ID CODES

AG##	Amenity grass	ED##	Ditch	EW##	Woodland	RAW##	Retained ancient woodland
AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
BT##	Mammal tunnel	EH##	Hedge	IT##	Individual tree	SH##	Hedge - Screening
DP##	Drainage pond	EP##	Ecology pond	NB##	Noise protection wall	SW##	Woodland - Screening

ENVIRONMENTAL FUNCTION CODES

EFA	Visual screening	EFE	Visual Amenity
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality



Plot Date: 03 November 2020 11:03:18
File Name: \\Ukkds2p\sw001\ukkds2p\sw001-v1\ie\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 4 Figures\General\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0040 - Environmental Masterpan Mitigation Breakdown.mxd

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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LEGEND

- Scheme Boundary
- LE5.1 - Proposed individual tree
- LE7 - Proposed false cutting
- E1.2 - Noise protection wall
- E3.2 - Mammal tunnel
- LE4.3 - Proposed hedge
- LE6.2 - Proposed ditch
- Existing ancient woodland
- Existing woodland
- E2.3 - Proposed drainage pond
- LE1.1 - Proposed amenity grass
- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue
FOR INFORMATION

Client
Highways England
The Cube
199 Wharfside Street
Birmingham
B1 1RN

Working on behalf of highways england

Development Consent Order Number
TR010054

Project Title
M54 TO M6 LINK ROAD

Drawing Title
ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 5 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No. 60536736	Suitability S8
Scale @ A3 1:3,120	Zone M54 to M6 Link Road

Drawing Number Highways England PIN	Originator	Volume		Rev
HE514465 M54_SW_PR_Z	-ACM	-EGN -	-DR - EG - 0040	P04
Location		Type	Role Number	

PLOT ID CODES

AG##	Amenity grass	ED##	Ditch	EW##	Woodland	RAW##	Retained ancient woodland
AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
BT##	Mammal tunnel	EH##	Hedge	IT##	Individual tree	SH##	Hedge - Screening
DP##	Drainage pond	EP##	Ecology pond	NB##	Noise protection wall	SW##	Woodland - Screening

ENVIRONMENTAL FUNCTION CODES

EFA	Visual screening	EFE	Visual Amenity
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality

EP05 - LE6.1 - EFD / EFB / EFE
IT53 - LE5.1 - EFA / EFB / EFE
IT55 - LE5.1 - EFA / EFB / EFE
IT57 - LE5.1 - EFA / EFB / EFE
IT59 - LE5.1 - EFA / EFB / EFE
IT62 - LE5.1 - EFA / EFB / EFE
IT63 - LE5.1 - EFA / EFB / EFE
EH13 - LE4.3 - EFD / EFB / EFE
SH08 - LE4.3 - EFA / EFD / EFB
RW14
RW13
RW16
RW15
RW12
RW11
RW17
EW09 - LE2.1 - EFE / EFD / EFB
RW19
RW18
RW17
IT64 - LE5.1 - EFB / EFF / EFD
AG26 - LE1.1 - EFB / EFE
EH14 - LE4.3 - EFD / EFB / EFE
AG27 - LE1.1 - EFB / EFE
DP03 - E2.3 - EFH
RW22
SW06 - LE2.1 - EFA / EFD / EFE
RW20
RW21
AG29 - LE1.1 - EFB / EFE
EG27 - LE1.3 - EFE / EFD / EFB
EG26 - LE1.3 - EFE / EFD / EFB
EG24 - LE1.3 - EFE / EFD / EFB
EW10 - LE2.1 - EFE / EFD / EFB
AG30 - LE1.1 - EFB / EFE
EG25 - LE1.3 - EFE / EFD / EFB
BT02 - E3.2 - EFD
NB03 - E1.2 - EFG
AG28 - LE1.1 - EFB / EFE
IT67 - LE5.1 - EFB / EFF / EFD
IT66 - LE5.1 - EFB / EFF / EFD
IT65 - LE5.1 - EFB / EFF / EFD
IT70 - LE5.1 - EFB / EFF / EFD
IT71 - LE5.1 - EFA / EFB / EFE
EG28 - LE1.3 - EFE / EFD / EFB
IT68 - LE5.1 - EFB / EFF / EFD
EW11 - LE2.1 - EFE / EFD / EFB
SW07 - LE2.1 - EFA / EFD / EFE
IT69 - LE5.1 - EFB / EFF / EFD
EG29 - LE1.3 - EFE / EFD / EFB
EH15 - LE4.3 - EFB / EFD / EFE
IT73 - LE5.1 - EFB / EFF / EFD
IT72 - LE5.1 - EFA / EFB / EFE
IT74 - LE5.1 - EFA / EFB / EFE
IT75 - LE5.1 - EFA / EFB / EFE
EW12 - LE2.1 - EFE / EFD / EFB
EG33 - LE1.3 - EFE / EFD / EFB
SW08 - LE2.1 - EFA / EFD / EFE
EW13 - LE2.1 - EFE / EFD / EFB
IT76 - LE5.1 - EFA / EFB / EFE
AG31 - LE1.1 - EFB / EFE
BT04 - E3.2 - EFD
RW23
SW10 - LE2.1 - EFA / EFD / EFE
AG32 - LE1.1 - EFB / EFE
IT77 - LE5.1 - EFA / EFB / EFE
IT78 - LE5.1 - EFA / EFB / EFE
EG35 - LE1.3 - EFE / EFD / EFB
SW09 - LE2.1 - EFA / EFD / EFE
EG31 - LE1.3 - EFE / EFD / EFB
SH09 - LE4.3 - EFA / EFD / EFB
EW15 - LE2.1 - EFE / EFD / EFB
EG36 - LE1.3 - EFE / EFD / EFB
AG33 - LE1.1 - EFB / EFE
EW14 - LE2.1 - EFE / EFD / EFB
BT03 - E3.2 - EFD
EG30 - LE1.3 - EFE / EFD / EFB
NB04 - E1.2 - EFG
EG37 - LE1.3 - EFE / EFD / EFB
EG32 - LE1.3 - EFE / EFD / EFB
IT79 - LE5.1 - EFA / EFB / EFE
IT80 - LE5.1 - EFA / EFB / EFE
RW24
AG35 - LE1.1 - EFB / EFE
EW17 - LE2.1 - EFE / EFD / EFB
EW16 - LE2.1 - EFE / EFD / EFB
SW11 - LE2.1 - EFA / EFD / EFE
EG38 - LE1.3 - EFE / EFD / EFB
RW25
EG39 - LE1.3 - EFE / EFD / EFB
AG38 - LE1.1 - EFB / EFE
RW26
EG34 - LE1.3 - EFE / EFD / EFB
AG36 - LE1.1 - EFB / EFE
EW20 - LE2.1 - EFE / EFD / EFB
EW18 - LE2.1 - EFE / EFD / EFB
IT81 - LE5.1 - EFA / EFB / EFE
IT82 - LE5.1 - EFA / EFB / EFE
NB05 - E1.2 - EFG
AG34 - LE1.1 - EFB / EFE
IT83 - LE5.1 - EFA / EFB / EFE
AG37 - LE1.1 - EFB / EFE
IT84 - LE5.1 - EFA / EFB / EFE
EP06 - LE6.1 - EFD / EFB / EFE
EG41 - LE1.3 - EFE / EFD / EFB
EW19 - LE2.1 - EFE / EFD / EFB
BT06 - E3.2 - EFD
EP08 - LE6.1 - EFD / EFB / EFE
DP04

0 40 80 120 160 200 Metres

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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LEGEND

- Scheme Boundary
- LE5.1 - Proposed individual tree
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- E1.2 - Noise protection wall
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- Existing ancient woodland
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- E2.3 - Proposed drainage pond
- LE1.1 - Proposed amenity grass
- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue: FOR INFORMATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of: highways england

Development Consent Order Number: TR010054

Project Title: M54 TO M6 LINK ROAD

Drawing Title: ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 6 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No.	Suitability
60536736	S8
Scale @ A3: 1:3,120	Zone: M54 to M6 Link Road

Drawing Number: Highways England PIN	Originator	Volume	Rev
HE514465 M54_SW_PR_Z	-ACM	-EGN -DR - EG - 0040	P04
Location		Type | Role | Number	

Plot Date: 03 November 2020 11:03:18
File Name: \\Ukds2pfpsw001\ukds2pfpsw001-v1\e\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 4 Figures\General\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0040 - Environmental Masterpan Mitigation Breakdown.mxd

PLOT ID CODES

AG##	Amenity grass	ED##	Ditch	EW##	Woodland	RAW##	Retained ancient woodland
AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
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DP##	Drainage pond	EP##	Ecology pond	NB##	Noise protection wall	SW##	Woodland - Screening

ENVIRONMENTAL FUNCTION CODES

EFA	Visual screening	EFE	Visual Amenity
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality

EG33 - LE1.3 - EFE / EFD / EFB
SW08 - LE2.1 - EFA / EFD / EFE
BT04 - E3.2 - EFD
RW23
SW10 - LE2.1 - EFA / EFD / EFE
EW13 - LE2.1 - EFE / EFD / EFB
EW12 - LE2.1 - EFE / EFD / EFB
AG31 - LE1.1 - EFB / EFE
AG32 - LE1.1 - EFB / EFE
IT78 - LE5.1 - EFA / EFB / EFE
EG35 - LE1.3 - EFE / EFD / EFB
EW15 - LE2.1 - EFE / EFD / EFB
SW09 - LE2.1 - EFA / EFD / EFE
EG31 - LE1.3 - EFE / EFD / EFB
SH09 - EFA /
EG36 - LE1.3 - EFE / EFD / EFB
AG33 - LE1.1 - EFB / EFE
BT03 - E3.2 - EFD
EG30 - LE1.3 - EFE / EFD / EFB
EW14 - LE2.1 - EFE / EFD / EFB
NB04 - E1.2 - EFG
EG37 - LE1.3 - EFE / EFD / EFB
EG32 - LE1.3 - EFE / EFD / EFB
IT79 - LE5.1 - EFA / EFB / EFE
RW24
AG35 - LE1.1 - EFB / EFE
EW17 - LE2.1 - EFE / EFD / EFB
EW16 - LE2.1 - EFE / EFD / EFB
IT80 - LE5.1 - EFA / EFB / EFE
SW11 - LE2.1 - EFA / EFD / EFE
RW25
EG38 - LE1.3 - EFE / EFD / EFB
RW26
EG39 - LE1.3 - EFE / EFD / EFB
AG38 - LE1.1 - EFB / EFE
EG34 - LE1.3 - EFE / EFD / EFB
AG36 - LE1.1 - EFB / EFE
EW20 - LE2.1 - EFE / EFD / EFB
EW18 - LE2.1 - EFE / EFD / EFB
IT81 - LE5.1 - EFA / EFB / EFE
IT82 - LE5.1 - EFA / EFB / EFE
NB05 - E1.2 - EFG
AG34 - LE1.1 - EFB / EFE
AG37 - LE1.1 - EFB / EFE
IT83 - LE5.1 - EFA / EFB / EFE
IT84 - LE5.1 - EFA / EFB / EFE
EG41 - LE1.3 - EFE / EFD / EFB
EP06 - LE6.1 - EFD / EFB / EFE
EW19 - LE2.1 - EFE / EFD / EFB
RW27
BT06 - E3.2 - EFD
EP08 - LE6.1 - EFD / EFB / EFE
DP04 - E2.3 - EFH
EP07 - LE6.1 - EFD / EFB / EFE
AG40 - LE1.1 - EFB / EFE
AG41 - LE1.1 - EFB / EFE
AG42 - LE1.1 - EFB / EFE
EG40 - LE1.3 - EFE / EFD / EFB
EG44 - LE1.3 - EFE / EFD / EFB
SW12 - LE2.1 - EFA / EFD / EFE
BT05 - E3.2 - EFD
EG48 - LE1.3 - EFE / EFD / EFB
EW21 - LE2.1 - EFE / EFD / EFB
EG50 - LE1.3 - EFE / EFD / EFB
AG45 - LE1.1 - EFB / EFE
EG43 - LE1.3 - EFE / EFD / EFB
EW22 - LE2.1 - EFE / EFD / EFB
EW23 - LE2.1 - EFE / EFD / EFB
EG51 - LE1.3 - EFE / EFD / EFB
EW24 - LE2.1 - EFE / EFD / EFB
AG43 - LE1.1 - EFB / EFE
02
EG42 - LE1.3 - EFE / EFD / EFB
EG45 - LE1.3 - EFE / EFD / EFB
AG44 - LE1.1 - EFB / EFE
AG46 - LE1.1 - EFB / EFE
EG49 - LE1.3 - EFE / EFD / EFB

0 40 80 120 160 200 Metres

Plot Date: 03 November 2020 11:03:18
File Name: \\Ukds2pfpsw001\ukds2pfpsw001-v1\e\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 4 Figures\General\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0040 - Environmental Masterpan Mitigation Breakdown.mxd

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

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LEGEND

- Scheme Boundary
- LE5.1 - Proposed individual tree
- LE7 - Proposed false cutting
- E1.2 - Noise protection wall
- E3.2 - Mammal tunnel
- LE4.3 - Proposed hedge
- LE6.2 - Proposed ditch
- Existing ancient woodland
- Existing woodland
- E2.3 - Proposed drainage pond
- LE1.1 - Proposed amenity grass
- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue
FOR INFORMATION

Client
Highways England
The Cube
199 Wharfeside Street
Birmingham
B1 1RN

Working on behalf of
highways england

Development Consent Order Number
TR010054

Project Title
M54 TO M6 LINK ROAD

Drawing Title
ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 7 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No.	Suitability
60536736	S8
Scale @ A3	Zone
1:3,120	M54 to M6 Link Road

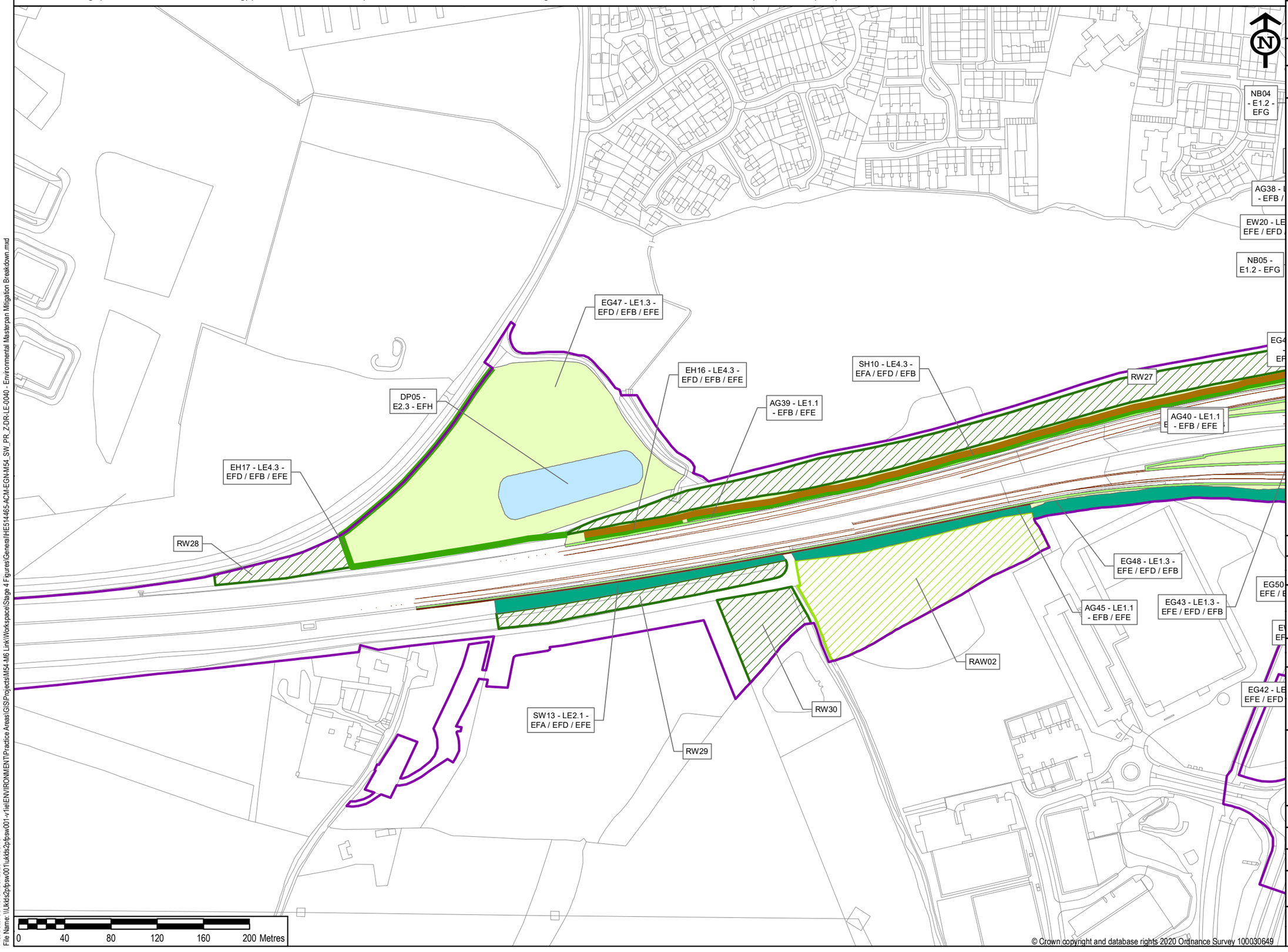
Drawing Number Highways England P/N	Originator	Volume	Rev
HE514465	-ACM	-EGN -	P04
M54_SW_PR_Z		-DR - EG - 0040	
Location		Type | Role | Number	

PLOT ID CODES

AG##	Amenity grass	ED##	Ditch	EW##	Woodland	RAW##	Retained ancient woodland
AW##	Ancient woodland replacement	EG##	Species rich grassland	FC##	False cutting	RW##	Retained woodland
BT##	Mammal tunnel	EH##	Hedge	IT##	Individual tree	SH##	Hedge - Screening
DP##	Drainage pond	EP##	Ecology pond	NB##	Noise protection wall	SW##	Woodland - Screening

ENVIRONMENTAL FUNCTION CODES

EFA	Visual screening	EFE	Visual Amenity
EFB	Landscape integration	EFF	Heritage
EFC	Enhancing the built environment	EFG	Auditory amenity
EFD	Nature conservation and biodiversity	EFH	Water quality



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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

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LEGEND

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- LE1.3 - Proposed species rich grassland
- LE2.1 - Proposed woodland
- LE6.1 - Proposed ecology pond

Revision Details	By / Check	Date	Suffix

Purpose of issue: FOR INFORMATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of: highways england

Development Consent Order Number: TR010054

Project Title: M54 TO M6 LINK ROAD

Drawing Title: ENVIRONMENTAL MASTERPLAN MITIGATION BREAKDOWN SHEET 8 OF 8

Designed	Drawn	Checked	Approved	Date
LC	LC	AL	TP	03/11/2020

Internal Project No.	Suitability
60536736	S8
Scale @ A3: 1:3,120	Zone: M54 to M6 Link Road

Drawing Number: Highways England PIN	Originator	Volume	Rev
HE514465 M54_SW_PR_Z	-ACM	-EGN - -DR - EG - 0040	P04
Location		Type | Role | Number	

Plot Date: 03 November 2020 11:03:18
File Name: \\Ukkds2pfpsw001\ukkds2pfpsv001-v1\ei\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 4 Figures\General\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0040 - Environmental Masterpan Mitigation Breakdown.mxd

Appendix B Landscape Element Codes

Table B: Landscape Element Codes

Code	Definition
LE1.1	Amenity grass areas
LE1.2	Grassland with bulbs
LE1.3	Species rich (or conservation) grassland
LE1.4	Rock and scree
LE1.5	Heath and moorland
LE1.6	Open grassland
LE2.1	Woodland
LE2.2	Woodland edge
LE2.3	High forest
LE2.4	Linear belts of shrubs and trees
LE3.1	Amenity tree and shrub planting
LE3.2	Ornamental shrubs
LE3.3	Groundcover
LE3.4	Climbers and trailers
LE4.1	Ornamental species hedges
LE4.2	Native species hedges (trimmed)
LE4.3	Native species hedgerows
LE4.4	Native hedgerows with trees
LE5.1	Individual trees
LE6.1	Water bodies and associated plants
LE6.2	Banks and ditches
LE6.3	Reed beds
LE6.4	Marsh and wet grassland

Code	Definition
LE7	Hard landscape features
P3.1	Cultural heritage feature
P3.2	Conservation area
E1.1	Noise-reducing surface
E1.2	Noise barrier-built elements
E1.3	Noise-reducing earthworks
E2.1	Water pollution control measures
E2.2	Surface-water outfalls
E2.3	Soakaways
E3.1	Protected species
E3.2	Ecological protection measures
E4.1	Injurious weeds
E4.2	Legislated pests

Appendix C Environmental Function Codes

Table C: Environmental Function Codes

Code	Definition
EFA	Visual screening
EFB	Landscape integration
EFC	Enhancing the built environment
EFD	Nature conservation and biodiversity
EFE	Visual amenity
EFF	Heritage
EFG	Auditory amenity
EFH	Water quality