

**NORTH LITTLEHAMPTON, SOUTHERN LYMINSTER BYPASS,
WEST SUSSEX**

ECOLOGICAL MANAGEMENT PLAN

Final Document

August 2017

Preliminary Ecological Appraisals • Protected Species Surveys and Licensing • NVC • EcIA • Management Plans
Habitats • Badger • Bats • Hazel Dormouse • Birds • Reptiles • Amphibians • Invertebrates • Riparian and Aquatic Species

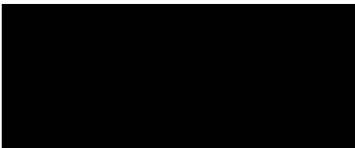
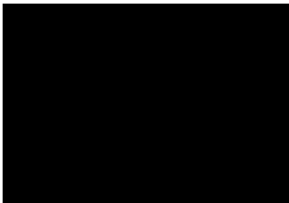
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This report may or may not be suitable to support a planning application. Should this report contain recommendations for further survey work or assessment, the results of this would be required in order to support a planning application.

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¹ Chartered Institute of Ecology and Environmental Management (2015). *Guidelines for Ecological Report Writing*. Technical Guidance Series. <http://www.cieem.net/publications/23/ecological-report-writing>

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1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been contracted by Persimmon Homes Limited to prepare an Ecological Management Plan (EMP) for the Southern Lyminster Bypass Road centred on National Grid Reference (NGR) TQ 0312 0365.

The road is required to service the mixed use development to the north of Toddington Lane comprising the construction of up to 1260 dwellings, associated facilities, employment areas and open space (Arun District Council planning reference LU/47/11).

Within this document where reference is made to 'the site' this refers to the Southern Lyminster Bypass Road and reference to the 'wider site' relates to the mixed use development. The relative location of the site in relation to the wider site is show in **Map 1**.

This EMP has been written to support a Reserved Matters application to Arun District Council for the site. Under LU/47/11 there are three conditions relating to ecology (**Table 1**).

Table 1: Ecological conditions

Condition	Details
19	Development shall not begin until further ecological surveys have been carried out and submitted to the Local Planning Authority. These surveys shall relate to water voles, bats, birds, invertebrates and reptiles.
20	Prior to the commencement of development on any phases of development east of the new road than spans the railway line (running north – south), details of appropriate mitigation, and a programme of implementation, in relation to water voles, bats, birds, invertebrates and reptiles shall be submitted to an approved in writing by the LPA.
21	No development within any phase or sub phase shall commence until details of an ecological management plan for the construction phase of that element of the development has been submitted to and approved in writing by the Local Planning Authority. The management plan shall be implemented in accordance with the approved plans.

The EMP is based on the results of ecological surveys and assessments carried out by ECOSA and White Young and Green (WYG) between 2008 and 2016 (**Table 2**). Further details of the species surveys and results are provided in Section 4.0.

Table 2: Summary of ecological surveys

Species Group/Species	2008	2009	2015	2016	2017
Ecological scoping Phase One habitat survey ²	✓	-	-	-	-
Ecological constraints appraisal ³			✓		-
Updating walkover survey ⁴	-	-	-	✓	-
Reptile survey ⁵	-	-	✓	-	-
Great crested newt survey ⁶	-	-	✓	-	-
Bat emergence / re-entry surveys	-	-	-	-	✓

The results of the surveys have been used to provide mitigation and enhancement proposals within the Southern Lymminster Bypass. The main area of suitable habitat for a range of breeding birds and terrestrial invertebrates is present in the floodplain grazing marsh in the north of the site. The area impacted by the Southern Lymminster Bypass contained common and widespread species with limited potential for notable breeding birds / terrestrial invertebrates, as a result further surveys for the species groups has not been undertaken.

There are no waterbodies within the site and therefore water vole is not covered further by this EMP.

1.2 Aims and Scope of Document

The aim of this document is to outline the proposed ecological management required at the site. The management plan sets out the management prescriptions for the site in order to retain the long-term ecological value. This plan covers a period of 10 years following the commencement of the development.

1.3 Site Setting and Description

The Southern Lymminster Bypass is situated in the South Coast Plain Natural Character Area, described by Natural England as follows⁷:

“The South Coast Plain National Character Area (NCA) is a flat, coastal landscape with an intricately indented shoreline lying between the dip slope of the South Downs and South Hampshire Lowlands and the waters of the English Channel, Solent and

² White Young and Green (2009) Proposed Lymminster Bypass (South) North Littlehampton - Ecological Scoping / Phase 1 Habitat Survey. White Young and Green, Droxford, Hampshire

³ White Young and Green (2014) Toddington Lane, North Littlehampton - Ecological Constraints Appraisal. White Young and Green, Droxford, Hampshire

⁴ An ecological walkover survey was undertaken by ECOSA on 13th January 2017

⁵ White Young and Green (2014) Proposed Lymminster Bypass (South) North Littlehampton - Reptile Presence / Absence Survey Report. White Young and Green, Droxford, Hampshire

⁶ White Young and Green (2014) Toddington Lane, North Littlehampton - Great Crested Newt Presence / Likely Absence Survey Report. White Young and Green, Droxford, Hampshire

⁷ Natural Areas are defined by Her Majesty's Stationery Office as 'biogeographic zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation' (Biodiversity: The UK Steering Group Report, HMSO, 1995).

part of Southampton Water. The coastline includes several major inlets which have particularly distinctive local landscapes and intertidal habitats of international environmental importance for wildfowl and waders. Chichester Harbour Area of Outstanding Natural Beauty lies within the NCA and the foothills of the South Downs, along the northern boundary, fall within the South Downs National Park.

Some three per cent of the area is designated as a Site of Special Scientific Interest, and there are four Special Protection Areas, two Special Areas of Conservation and four Ramsar sites: Chichester and Langstone Harbour, Pagham Harbour, The Solent and Southampton Water and Portsmouth Harbour.”

The site is located in the County of West Sussex situated centrally along the south coast of England. The site comprises a linear feature originating from the North Littlehampton development in the north and joining with the A259 Worthing Road in the south. The West Coast railway line crossed perpendicular to the site towards its northern edge, immediately south of Toddington Lane.

The immediate surrounds of the site comprise residential housing to the east and an allotment to the west, the housing associated with new development surrounds the site in the north.

The site extends from the southern edge of the wider development (see **Map 1**) and covers an area of approximately 4.8 hectares (ha). Prior to demolition and clearance works taking place in the north of the site between 2016 and early 2017 this area contained greenhouses, hardstanding and a Leyland cypress tree lines. At the time of submission (June 2017) the greenhouses have been demolished and work is well underway on housing in this area. The area to the south of Toddington Lane comprises a plant nursery, the main West Coast railway line and fields to the south.

The wider landscape comprises a combination of agricultural land to the north and urban area associated with Littlehampton to the south. Littlehampton town centre is located approximately 1km south.

1.4 Site Proposals

Proposals detailed in the outline planning permission were for the construction of a road joining the North Littlehampton housing development in the north to Worthing Road (A259) in the south. As of June 2017 all building demolition works in the north of the site have now been completed, there are buildings still present on the plant nursery site adjacent to the railway.

Details of the proposals are provided in Persimmon Homes Drawing No SLB1 and SLB2 dated August 2017 (see **Appendix 1**). For the purposes of this management

plan, construction works are referred to as “Year 0” with the management plan covering subsequent years “Year 1 – 10”.

2.0 MANAGEMENT PLAN OBJECTIVES

2.1 Introduction

This section provides an overview of the objectives of the EMP for the Southern Lymminster Bypass. Specific objectives for each individual habitat type are detailed within the management prescriptions.

2.2 Overview of Management Plan Objectives

The overarching objective of the EMP is to enhance the long-term ecological value of the site. These will be achieved through the following measures:

- Prescriptions for safeguarding protected species through the site preparation and construction works;
- Creation of new, native species-rich and wildlife friendly habitats to enhance biodiversity at the site; and
- Establishment of long-term management prescriptions for new and retained habitats to ensure the habitat diversity and suitability for wildlife is maintained.

2.3 Structure of the Management Plan

Species specific management and mitigation measures detailed in Section 4.0. Management prescriptions for each of these habitat types are detailed individually within Section 5.0.

3.0 GENERAL MANAGEMENT PRESCRIPTIONS

3.1 Introduction

This section provides an overview of the general management prescriptions for the Southern Lyminster Bypass.

3.2 Review

As part of on-going monitoring and review process, the management plan will be periodically reviewed in order to ensure that the objectives are being met. Details of this review process are provided within Section 6.0.

3.3 Responsibilities

Management responsibilities will be transferred to the management company that has been established for the development.

3.4 Contractors

The proposed management works will be undertaken by specialist contractors with suitable experience in the management measures proposed. Monitoring and review will be undertaken in conjunction with suitably qualified ecologists with other specialists, such as arboricultural consultants employed/consulted as necessary.

4.0 SPECIES-SPECIFIC MANAGEMENT

4.1 Introduction

This section provides an overview of the species-specific mitigation measures and management prescriptions for the Southern Lyminster Bypass.

4.2 Badger

During the walkover survey undertaken by ECOSA in December 2016 attention was paid to locating evidence of badgers. A single hole badger sett was recorded along the western edge of the site, at the time of the survey the hole was disused (see **Map 3**). Given the dense bramble in the south of the site it is possible that other evidence of badger remains hidden.

It is recommended that if animal burrows are identified during site clearance these should be inspected by an ecologist prior to removal. No further recommendations in relation to badger are considered necessary.

4.3 Bats

Pre-demolition the northern end of the site contained large greenhouses. All buildings in the north of the site were assessed to have negligible bat roosting potential by WYG Ecology³ and were consequently demolished in summer 2016. In addition, trees on site were surveyed by ECOSA in December 2016⁴ for potential bat roosting features such as cracks, splits or holes, but none were identified as containing bat roosting features (see **Map 3**).

Three buildings are still present in the plant nursery area to the south of Toddington Lane. One is a large greenhouse which sits directly in the path of the road. The other two buildings are a residential property and adjacent outbuilding which will be demolished as part of the development proposals. These two buildings are within the wider site but not within the red line of the road, however they will be demolished to facilitate the development. Emergence surveys of the residential property and adjacent outbuilding carried out during May-June 2017 did not record any roosting bats.

To the north of the railway line the site provides limited bat foraging and commuting opportunities in the form of tree line and small sections of hedgerow. To the south of the railway line the site comprises linear horse grazed fields with associated defunct species-poor hedgerows. Bat transect surveys undertaken by WYG Ecology² had recorded a small range of common and widespread species across the wider site.

Information from the Bat Conservation Trust interim guidance on Artificial Lighting and Wildlife⁸ has been used to provide further information on the site lighting strategy. There are two strands to the lighting strategy in relation to biodiversity:

- Lighting design, specifically in relation to the technical specification of the lighting and design of the luminaires
- Location of the lighting, whilst considering public Health and Safety

With these considerations in mind, the lighting engineers have used the following recommendations to design strategy to minimise light spill onto hedgerows:

- The minimum amount of lighting will be used to fulfil the task;
- Utilising the lowest lux level luminaire available which conforms to the lighting requirements for adopted roads and in turn minimises the light output onto on-site and adjacent woody vegetation;
- Luminaires fitted with back louvres, where necessary, to prevent backwards light spill onto woody vegetation;

As an enhancement bat boxes will be erected, this will include two Schwegler 1FF and two Schwegler 2F bat boxes within suitable trees or buildings on or within close proximity to the site. If Schwegler bat boxes are unavailable a suitable alternative woodcrete / WoodStone[®] box will be used.

To encourage the continued movement of bats across the landscape trees will be planted along the route to provide 'hop-over' locations for bats (see **Appendix 1**).

In England, bats and their habitat are fully protected under the Wildlife and Countryside Act 1981 through inclusion in Schedule 5. In addition, all bat species are protected under the Conservation of Habitats and Species Regulations 2010. Refer to **Appendix 2** for details.

4.4 Birds

During the walkover survey undertaken by ECOSA in December 2016, a small range of common and widespread species were recorded from the site including robin *Erithacus rubecula*, magpie, *Pica pica*, jackdaw *Corvus monedula*, woodpigeon *Columba palumbus*, blackbird *Turdus merula* and blue tit *Cyanistes caeruleus*. Given the winter timing of the survey it was not possible to confirm whether these species breed on the site, however their presence during the breeding season is considered likely.

⁸ Bat Conservation Trust (2014) Artificial Lighting and Wildlife, Interim Guidance: Recommendations to Help Minimise the Impact of Artificial Lighting

Woody vegetation clearance to facilitate the development will be undertaken outside the main breeding bird season of March to August, inclusive, or if this is not possible, an ecologist will be present immediately prior to clearance to check vegetation. Active nests will be left with an undisturbed 5-10m buffer until nesting ends naturally. If nests are identified then there is the potential for the programme of the works to be affected.

On-site inclusion of new native tree planting (**Paragraph 5.3**) will provide new suitable nesting habitat for breeding birds. A pole mounted barn owl box will be erected on the road embankment (**Figure 1**). Ecological gains associated with the wider development will provide significant enhancement for breeding birds, especially in association with the Central Wetland and retained reservoirs to the west of the site.

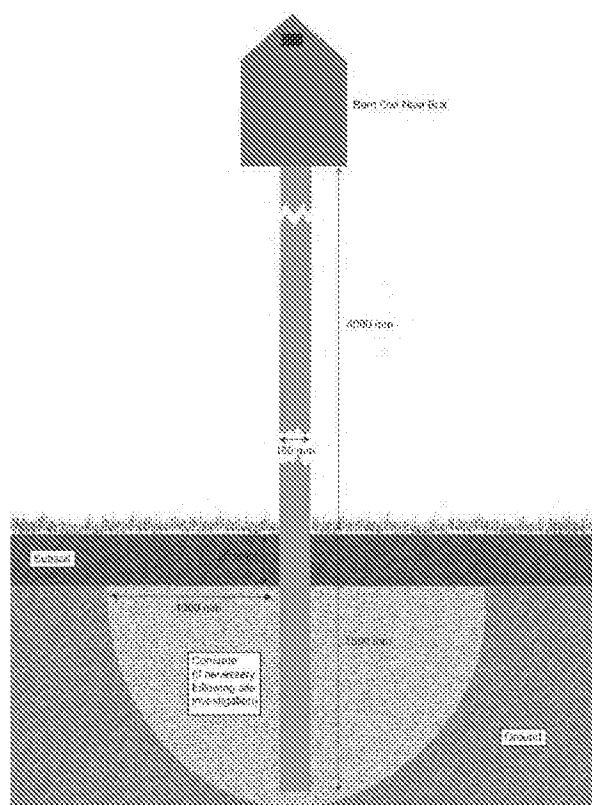


Figure 1: Illustration of pole mounted barn owl box to be erected on site

4.5 Reptiles

Reptile surveys were carried out across the wider by WYG Ecology during 2008² and the specific area covered by Southern Lymminster Bypass in 2015⁵. During these surveys a maximum of two common lizard *Zootoca vivipara* was recorded within the site.

As a result of the surveys carried out by WYG during 2015 a mitigation strategy was prepared. The details of the strategy are reproduced below:

“Given that three reptiles were recorded, reptile displacement northwards along the proposed route from the southern boundary and then eastwards from the road is considered to be the best option. Reptile displacement can only be undertaken during animals’ active period which runs from mid-March until mid-October and in suitable weather conditions. Reptile capture may not take place between November and February, as reptiles are not active during this period.

Reptile Displacement

It is recommended that a two phased displacement of the works area is undertaken between March and October. An Ecological Clerk of Works (ECOW) will supervise the strimming of the vegetation firstly to a height of 300 mm then to a height of 150 mm. A finger tip search will then be conducted to check for reptiles. If any reptiles are found they will be translocated to the eastern retained section of this area of the site. Following the clearance of the area the erection of reptile exclusion fencing will take place and then finalised with a destructive search this must be agreed with the Local Planning Authority Ecologist before implementation.

Fence Installation

Temporary reptile-proof fencing will be installed around the entirety of the proposed works area to protect the retained suitable reptile habitat from the construction phase of the development and which will also be utilised as a receptor area for displaced reptiles. The fencing will either be specifically made reptile fencing or posts with plastic fencing as detailed below:

- *Fence constructed from polythene or similar impermeable material.*
- *Supported by wooden posts dug at least 300 mm into the ground and standing at least 600mm above ground.*
- *The plastic sheet will be dug 150 mm into the ground with a 100 mm horizontal ‘lip’ turning back away from the working area.*
- *The plastic will be buried with compacted backfill so that no gaps remain.*

- *The plastic will be nailed to the fence posts and folded over at the top, away from the working area, and stapled to form an overhang.*
- *The plastic must contain no holes and, at the meeting of two sheets, the join must be secured with 100 mm waterproof tape.*
- *The fence must remain in place around the whole development area for the entire duration of the works phase.*
- *The fence must be maintained and any defects fixed as soon as possible.*
- *The areas where fencing is to be installed will be hand searched for reptiles by an ecologist prior to installation of the fence to ensure that no reptiles are harmed during this operation.*

Destructive Search

Following the successful completion of the displacement of reptiles from the areas of proposed construction, these areas will be destructively cleared. This will involve two parts, hand search and a mechanical search, completed to the following specifications:

- *A suitably qualified ecologist will supervise all aspects of the destructive search;*
- *Hand searches will be conducted, including the removal of debris on the ground in order to remove potential refuges;*
- *Using a medium sized excavator (approximately 8-10 tonnes) with a toothed bucket carry out a gradual scrape of the top one to two inches (25-50 mm) of top soil;*
- *Both the areas from where soil is removed and the subsequent spoil heaps should be checked for reptiles and amphibians;*
- *Carry out deeper scrapes where necessary, such as beneath rot systems, buried material, cracks or holes in the ground;*
- *The excavated spoil will be stored as directed by the ECOW, in consultation with the developers, in an area identified as unsuitable as reptile habitat.*

Habitat Management

It is recommended that the vegetation located within the areas of retained habitat adjacent to the proposed road be allowed to grow and to be seeded with native species to create a tall wildflower/grassland meadow to enhance the habitat providing an important reptile foraging habitat by encouraging invertebrates to the area.”

As an enhancement measure, two log piles will be installed in the eastern buffer area to enhance the site for reptiles (**Figure 2** and **Figure 3**). Log piles do not require

regular maintenance but should be repaired/replaced if subject to damage/vandalism.
The log piles will be constructed by an ecologist.



Figure 2: Unfinished log piles with rubble centre



Figure 3: Completed log pile with turf covering

Widespread reptile species (slow-worm *Anguis fragilis*, common lizard and grass snake *Natrix natrix*) are protected under the Wildlife and Countryside Act 1981 against harm, see **Appendix 2** for details.

4.6 Invertebrates

The site largely supports common and widespread habitats which are likely to support a range of common and widespread terrestrial invertebrate species. No evidence to suggest the presence of any rare or notable assemblages of terrestrial invertebrates were recorded as part of walkover survey undertaken by ECOSA in December 2016. Previous invertebrate surveys have concentrated on surveying the area associated with the Black Ditch to the north of the site².

There are no specific recommendations for invertebrates, however the new habitat creation and management regimes will provide enhanced resource for terrestrial invertebrate species.

5.0 HABITAT-SPECIFIC MANAGEMENT

5.1 Introduction

This section provides an overview of the habitat and specific management objectives and prescriptions for the Southern Lyminster Bypass.

5.2 Site Overview

The Southern Lyminster Bypass area comprises generally low quality habitats including rough grassland both unmanaged and heavily grazed, tall ruderal vegetation, a small number of scattered semi-mature trees, and species poor defunct hedgerows. All habitats comprise common and widespread species.

The proposed development will result in the loss of a significant proportion of these habitats. The more ecologically important features to be affected by the proposals include:

- Felling four semi-mature trees;
- Removal of 100m of species-poor hedgerow;
- Clearance of rough grassland

There is scope for habitat enhancement as part of the long-term strategy for the site.

5.2.1 Objectives for Grassland

The specific objectives for the grassland habitat are to:

- Increase ecological value of grassland habitats on site through creation of native species rich areas of planting; and
- Introduce a suitable management regime for grassland, in order to encourage herbaceous diversity and provide suitable habitat for a range of species.

5.2.2 Mitigation and Enhancement

New areas of grassland will either comprise a native wildflower lawn turf such as Wildflower Turf Species Rich Lawn Turf or an appropriate grassland mix specified by the landscaping contractor (see **Appendix 1**).

5.2.3 Management Prescriptions

On-site grassland will be cut on a rotational basis, once during the spring (April to May) and once during the autumn (August to September), arisings will be removed.

5.3 Native Tree and Hedgerow

Native trees and hedgerows will be removed to facilitate the development the treatment of removal work in relation to protected species is detailed in Section 4.0. A small number of trees present on the boundary of the site will be retained.

5.3.1 Objectives for Native Tree and Hedgerow

The specific objectives for the native tree are:

- The protection of retained trees
- The establishment and maintenance of new tree planting and hedgerow.

5.3.2 Mitigation and Enhancement

Any trees not to be removed during construction will follow protective measures in line with BS 5837:2012 *Trees in Relation to Design, Demolition and Construction – Recommendations*. This document outlines the use of tree protection barriers to be used for the duration of the construction phase. These barriers are proposed to shield the boundary vegetation from damage during construction.

A number of trees will be included within the development, these will comprise native species. Following previous comments from the Local Planning Authority it is recommended that a proportion of these specimens comprise whitebeam *Sorbus aria* as this is a characteristic native species associated with the area. A native species hedgerow will be located either side of the road to the north of the southern roundabout (see **Appendix 1**). Species will consist of:

- Field maple *Acer campestre*;
- Dog wood *Cornus sanguinea*;
- Hazel *Corylus avellana*;
- Hawthorn *Crataegus monogyna*;
- Holly *Ilex aquifolium*;
- Crab apple *Malus sylvestris*;
- Blackthorn *Prunus spinosa*;
- Dog rose *Rosa canina*; and
- White beam *Sorbus aria*.

There will also be extensive native tree and shrub planting which will utilise a similar species mix.

5.3.3 *Management Prescriptions*

The hedgerow planting will be subject to management annually in order to maintain a dense bushy structure, ensure health and safety. Management works will be undertaken over winter (October to February) in order to avoid the nesting bird period.

6.0 MONITORING AND REVIEW

A review of the mitigation and enhancement measures implemented will be undertaken by a suitably qualified ecologist following the completion of the bypass. Following the implementation of the proposed mitigation and enhancement measures, any necessary revisions to the EMP will be made.

It is proposed that the third party responsible for implementation of this management plan carry out regular *ad hoc* monitoring at the site to establish any obvious deviations or faults. Where any issues are highlighted, a suitably qualified ecologist will be consulted for advice where necessary.

An integral part of the management plan process will be a system of monitoring and a formal progress review. There will be a review meeting at the end of five years, post-completion, attended by the landowner and management contractor, to discuss the progress of the activities undertaken. This will enable issues to be identified and resolved where required. The meeting will take place to judge the effectiveness of the plan's aims, objectives and prescriptions.

The monitoring and review process will comprise a review report to include the following elements:

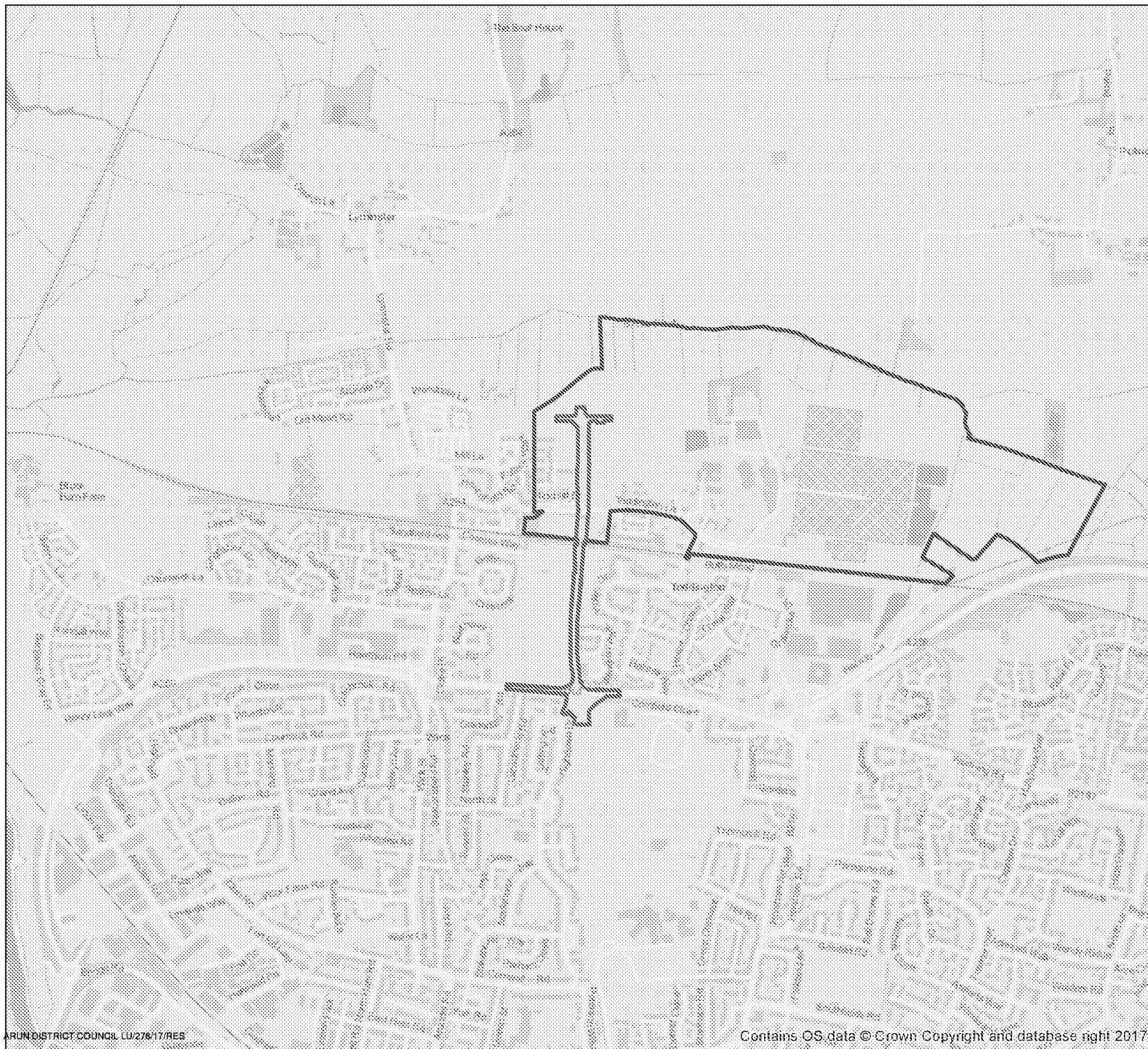
- Details of extent, timing and outcome of all works undertaken in the previous five years;
- Managing agent's assessment of effectiveness of works undertaken and the EMP as a whole; and
- Recommendations for next five year's management requirements.

7.0 TIMETABLE OF MANAGEMENT AND MONITORING WORKS

Management Prescription		Section Reference	Year ⁹										
			0	1	2	3	4	5	6	7	8	9	10
Construction Phase Mitigation and Enhancement	Protection of retained trees in accordance with BS 2012:5387	5.3.2	+										
	Vegetation clearance necessary to be undertaken outside of nesting bird season (March to August), where this isn't possible supervision of an ecologist required	4.4	+										
	Erection of bat and barn owl nest box	4.3, 4.44	+										
	New landscaping implemented at the site including new grassland seeding and tree and hedgerow planting	5.2.2, 5.3.2	+										
Habitat Management	Amenity Grassland and species-rich grassland management, as necessary (year-round), arisings removed	5.2	+	+	+	+	+	+	+	+	+	+	+
	Management of hedgerow habitat to be undertaken outside of nesting bird season (March to August)	5.3.3	+	+	+	+	+	+	+	+	+	+	+
Monitoring and Progress Review	<i>Ad hoc</i> monitoring by management contractors	6.0		+	+	+	+	+	+	+	+	+	+
	Five-year management review	6.0						+					+

⁹ The exact timescales for the construction of the development are unknown. For the purposes of this management plan, construction works are referred to as "Year 0" with the management plan covering subsequent years "Year 1 – 10".

Map 1 Site Location Plan



NORTH LITTLEHAMPTON (SOUTH LYMINSTER BYPASS ROAD), WEST SUSSEX

ECOLOGICAL MANAGEMENT PLAN

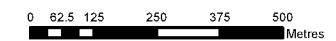
Map 1 - Site Location Plan

Client:	Persimmon Homes Thames Valley
Date:	July 2017
Status:	Final

KEY

-  Site Boundary (South Lyminster Bypass Road)
-  Wider Site Boundary

Scale at A4: 1:15,000



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Map 2 Phase 1 Habitat Plan

NORTH LITTLEHAMPTON (SOUTH LYMINSTER BYPASS ROAD), WEST SUSSEX

ECOLOGICAL MANAGEMENT PLAN

Map 2 - Phase 1 Habitat Plan

Client: Persimmon Homes Thames Valley

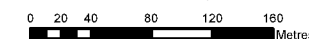
Date: July 2017

Status: Draft

KEY

-  Site Boundary
-  Wider Site Boundary
-  Scattered Trees
-  Dense / Continuous Scrub
-  Improved Grassland
-  Tall Ruderal / Rough Grassland
-  Rough Grassland
-  Buildings
-  Developed Area
-  Hardstanding
-  Railway Line
-  Species-Poor Intact Hedgerow
-  ① Building Number

Scale at A4: 1:5,000

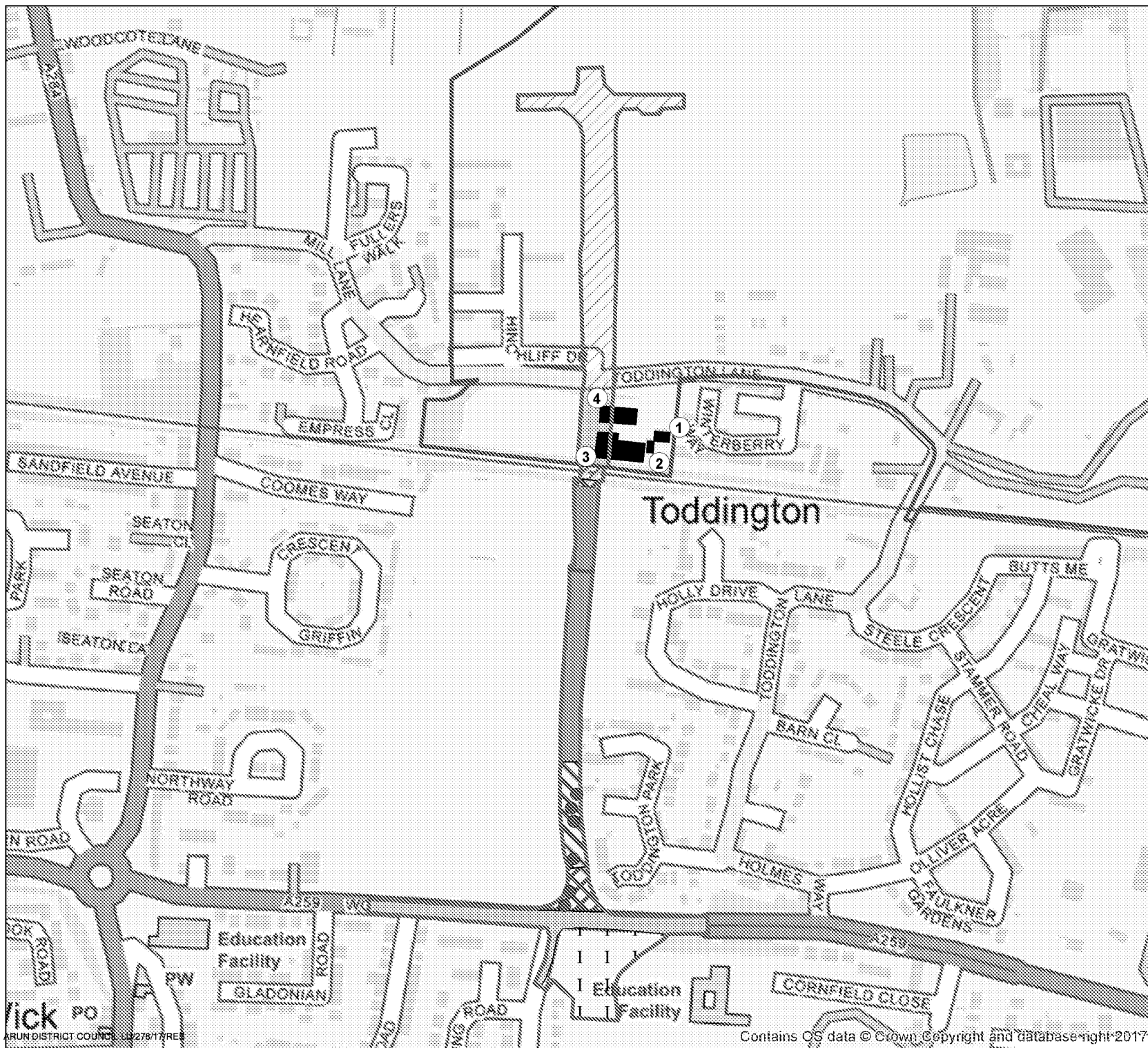


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Map 3 Ecological Constraints Plan



Source: Esri, DigitalGlobe, GeoEye, AeroCast, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

NORTH LITTLEHAMPTON (SOUTH LYMINSTER BYPASS ROAD), WEST SUSSEX

ECOLOGICAL MANAGEMENT PLAN

Map 3 - Ecological Constraints Plan

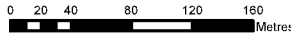
Client:	Persimmon Homes Thames Valley
Date:	July 2017
Status:	Draft

KEY

- Site Boundary
- Wider Site Boundary
- Area Suitable for Breeding Birds
 - Trees Suitable for Breeding Birds
- Area Suitable for Reptiles
 - Disused Badger Sett

N.B. Impacts associated with the wider site boundary are not shown.

Scale at A4: 1:5,000



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creative minds safe hands

Persimmon Homes

North Littlehampton: Southern Lymminster Bypass

Landscape Proposals SLB1

1 of 2

Maintenance and Management

All landscape areas to be maintained in accordance with B.S. 7370 Part 3: 1991 and Part 4: 1993, including weed control, and adjustment to tree stakes and ties. Maintenance operations to successfully establish plants shall be carried out for the first 5 years after planting.

Maintenance operations for successful plant establishment shall include watering; weed control; fertiliser application; pest and disease control; pruning; and litter picking.

Any plants which, within a period of 5 years from the date of planting, die, are removed or become seriously damaged shall be replaced in the next planting season with others of similar size and species, to be agreed in writing by the Local Planning Authority. For all new landscape areas, the following maintenance programme shall be undertaken:

Inspections: necessary	January - December. Replace dead plants when necessary
Watering:	January, and when necessary through periods of drought
Pest and disease control:	January
Litter removal:	January - December
Weed control:	February - May, July, and September
Prune:	February - November
Fork over planting beds:	March
Cut grass and trim edges:	March - October
Apply fertiliser:	April
Lightly fork over planting beds:	September
Rake / scarify grass	September

Watering: Water to establish trees and there after during periods of drought. Water should be applied slowly to avoid soil erosion. Watering shrubs shall be carried out to maintain vigorous plant growth. Water shall soak into the ground; it is not sufficient to dampen the surface. Water must be applied slowly to avoid damage to plants.

Weed control: Hand weed to remove all weeds and their roots using a hoe, trowel or fork. Apply a herbicide to kill re-growth when required.

Fertiliser: Applications of fertiliser to be carried out early in the growing season. Ensure correct fertiliser application. Inspect once a month and after very heavy winds. Adjust ties if necessary to conform to stem growth or to prevent chafing.

Pruning: At the appropriate season for the species, pruning to be carried out to remove all damaged diseased or dead wood. Prune shrubs to ensure the plant is kept well balanced and in good shape.

Pest and disease control: To be carried out if necessary and in accordance with best practice.

Litter removal: Collect and remove all extraneous rubbish.

Fork over planting beds: Pick up trodden or compacted soil surfaces to aerate the soil without damaging the plants.

Mowing: Amenity grass areas shall be managed to a height of 40mm. Species rich grass areas to be mowed as advised by the supplier.

Raking/Scarifying: Relieve thatched conditions and remove dead grass in the autumn over all grassed areas.

Spiking (Aeration): Aerate to increase water, nutrient and oxygen movement into the soil.

General: If grass surface is disturbed by over use, restore by liming or lifting with a fork.

Water efficiency: Water efficiency has been considered in the selection of trees, native planting, and ornamental shrubs which has been informed by the site's water strategy to avoid unnecessary water use after the initial 5 year establishment period. Bark mulch will also be applied to new planting areas to suppress weeds and retain moisture within the soil.

Long term maintenance:

Long term maintenance and management objectives will continue after the first five years of plant establishment and will last for 10 years. Long term maintenance objectives will include selective pruning to improve health, tree form and longevity; periodic maintenance as necessary; selective thinning of trees; removing dead or damaged trees; and pest and disease control.

0 10 20 30 40 50 100 metres
Scale 1:1,000 @ A1

A088461 SLB1-SLB4.dwg

August 2017

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Key

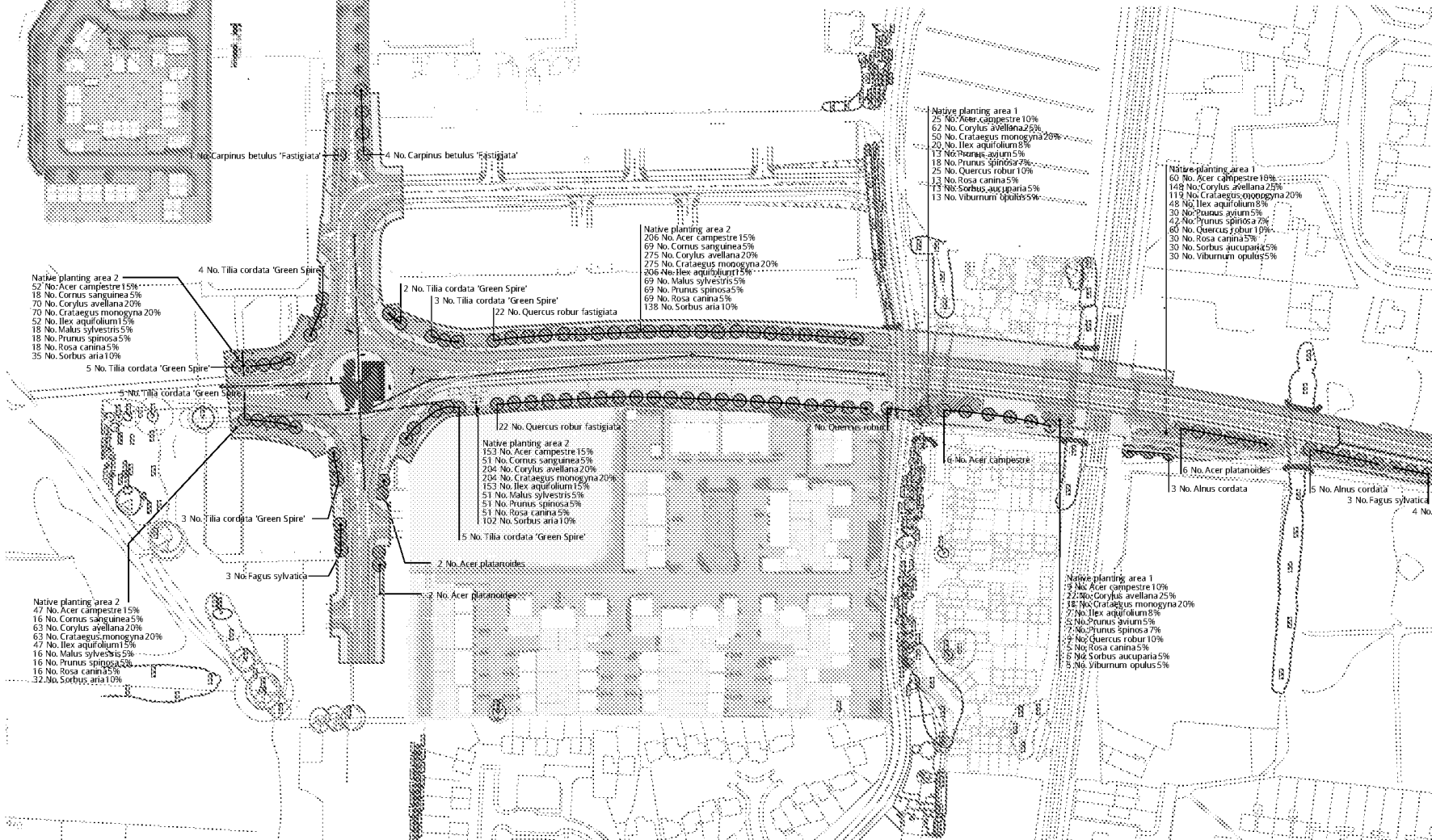
- Site boundary
- Existing vegetation retained (shown indicatively)
- For existing tree information, refer to Barrell tree report
- Category B trees to be retained
- Category C trees to be retained
- Root protection areas
- Tree to be felled to accommodate development
- Construction exclusion zone (Refer to Barrell Tree Consultancy for arboricultural assessment & method statement)

Proposed features

- Tree planting

- Native tree and shrub planting - type 1
- Native tree and shrub planting - type 2
- Native tree and shrub planting - type 3
- Native hedge planting
- Amenity grass
- Species rich grass
- Groundcover
- Proposed acoustic fence - 3.5m high (Oak board fence. Softwood boarding (25x100mm) infill, butt jointed in 2 layers with staggered joints. Hardwood capping. Gravel board to be buried 100mm below ground level. Treatment of fence: Alkaline Copper Quaternary (ACQ). Refer to the noise report for details.
- Proposed lighting column
- Proposed visibility splays

- 10m diam. clearance zone around lighting column to avoid tree canopy clashing with lighting column.
- Proposed drainage features
- Proposed Southern Water rising main with 3m offset
- Vegetation 'hop-over' locations for bats (All mature trees or tree stands are to be retained or planned to create a vegetated 'hop-over'. These will maintain connectivity for commuting, and/or foraging bats by guiding the bats up and over the link road and the height of traffic.
- Pole mounted Barn Owl box
- Gradients along highway to be smoothed out to tie into existing levels
- Proposed hard landscape
- Footway and highway: tarmac
- Blister tactile paving - buff colour.
- Tree grille





Persimmon Homes

North Littlehampton: Southern Lyminster Bypass

Landscape Proposals SLB2

Plant schedule 2 of 2

Tree Number	Species	Height	Girth	Specification
76 No.	Quercus robur fastigiata	400-450cm		Feathered specimen 18x: RB
15 No.	Fagus sylvatica	450-500cm 20-25cm		Sem-Mature : 13x: RB
12 No.	Quercus robur	450-500cm 20-25cm		Sem-Mature : 13x/4x: RB
33 No.	Tilia cordata 'Green Spire'	500-550cm 20-25cm		Sem-Mature : 13x/4x: RB
13 No.	Acer platanoides	500-550cm 20-25cm		Sem-Mature : 13x/4x: RB
10 No.	Acer campestre	450-500cm 20-25cm		Sem-Mature : 13x/4x: RB
8 No.	Alnus cordata	500-550cm 20-25cm		Sem-Mature : 13x/4x: RB
No.	Corylus heterophylla	500-550cm 20-25cm		Sem-Mature : 13x/4x: RB

Semi-mature trees to be provided with 2.4m clear stem

Shrub Number	Species	Specification	Density
394 No.	Lonicera pileata	6 bbs : C	6/C

Climbers Number	Species	Specification	Height	Density
274 No.	Hedera colchica 'Denata'	Several Shoots : 2 bbs : C	60-80cm	0.5/C
264 No.	Hedera colchica 'Denata Variegata'	Several Shoots : 5 bbs : C	60-80cm	0.5/C
499 No.	Hedera helix	Several Shoots : 3 bbs : C	140-600cm	0.5/C

Native Hedge Number	Species	Specification	Height	Density
24 No.	Cornus sanguinea	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	0.3/Cr Double Staggered at 0.25m offset
93 No.	Corylus avellana	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	0.3/Cr Double Staggered at 0.25m offset
93 No.	Crataegus monogyna	1+ 1 or 1/1 : Branched : seed raised : B	40-60cm	0.3/Cr Double Staggered at 0.25m offset
70 No.	Ilex aquifolium	C: Leader and laterals	40-60cm	0.3/Cr Double Staggered at 0.25m offset
24 No.	Malus sylvestris	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	0.3/Cr Double Staggered at 0.25m offset
34 No.	Prunus spinosa	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	0.3/Cr Double Staggered at 0.25m offset
47 No.	Sorbus aria	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	0.3/Cr Double Staggered at 0.25m offset
70 No.	Acer campestre	1+ 1 or 1/1 : Transplant : seed raised : B	60-80cm	0.3/Cr Double Staggered at 0.25m offset
24 No.	Rosa canina	1+ 1 or 1/1 : Branched : 23 bbs : B	60-80cm	0.3/Cr Double Staggered at 0.25m offset
Total : 469 No.				

Native planting mix 1 Number	Species	Specification	Height	Density
175 No.	Acer campestre	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
89 No.	Prunus spinosa	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
175 No.	Quercus robur	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
433 No.	Corylus avellana	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
124 No.	Prunus spinosa	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
89 No.	Viburnum opulus	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
89 No.	Rosa canina	1+ 1 or 1/1 : Branched : 23 bbs : B	60-80cm	1/Cr
342 No.	Crataegus monogyna	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
89 No.	Sorbus aucuparia	1+ 1 or 1/1 : Transplant : seed raised : B	60-80cm	1/Cr
140 No.	Ilex aquifolium	C: Leader and laterals	40-60cm	1/Cr
Total : 1751 No.				

Native Planting mix 2 Number	Species	Specification	Height	Density
172 No.	Rosa canina	1+ 1 or 1/1 : Branched : 23 bbs : B	60-80cm	1/Cr
172 No.	Malus sylvestris	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
172 No.	Cornus sanguinea	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
680 No.	Corylus avellana	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
172 No.	Prunus spinosa	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
509 No.	Acer campestre	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
680 No.	Crataegus monogyna	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
342 No.	Sorbus aria	1+ 1 or 1/1 : Transplant : seed raised : B	40-60cm	1/Cr
509 No.	Ilex aquifolium	C: Leader and laterals	40-60cm	1/Cr
Total : 3408 No.				

Native Planting mix 3 Number	Species	Specification	Height	Density
92 No.	Cornus sanguinea	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/m²
181 No.	Corylus avellana	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/m²
75 No.	Cornus sanguinea	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
140 No.	Corylus avellana	1+ 1 or 1/1 : Branched : 22 bbs : B	40-60cm	1/Cr
32 No.	Rosa canina	1+ 1 or 1/1 : Branched : 23 bbs : B	60-80cm	1/m²
25 No.	Rosa canina	1+ 1 or 1/1 : Branched : 23 bbs : B	60-80cm	1/Cr
Total : 554 No.				

0 10 20 30 40 50 100 metres

Scale 1:1,000 @ A1

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August 2017

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- Gradients along highway to be smoothed out to tie into existing levels

Proposed hard landscape

- Footway and highway: tarmac
- Blister tactile paving - buff colour.
- Tree grille

Outline specification

Ground Preparation:
Protection of existing woodland, trees and hedges against damage to be in accordance with the BS 5837:2012 - Trees in relation to design, demolition and construction - Recommendations. Proactive fence to be approved.

Tree specification and planting to be in accordance with BS 8545:2014 - Trees: from nursery to independence in the landscape.

Excavations to B.S. 8000 part 1:1989. Excavated material removed off-site: good quality subsoil/topsoil stored on-site for re-use.

Landscape planting areas to have a minimum depth of soil of 500mm and grass areas will have 300mm.

Loosen formation level with single line ripper, driven 450mm deep at 1m centres, when ground conditions are dry.

Supply approved imported subsoil to B.S. 3601:2013 Specification for subsoil and requirements for use - Multipurpose subsoil to make up any deficiency in on-site subsoil. Spread and level to depth of:

- 200mm for planting areas
- 200mm for grass areas

Supply approved imported topsoil to B.S. 3882:2015 Specification for topsoil - Multipurpose subsoil to make up any deficiency in on-site topsoil. Spread and level to depth of:

- 300mm for planting areas
- 100mm for grass areas

Cultivate all landscape areas to a loose and friable 60th suitable for grass seeding or planting. Collect and remove from site all stones, bulkiers' rubble and other deleterious material over 50mm in any dimension.

Excavate planting pits to the following dimensions:
Semi-mature trees: 1200 x 1200 x 700mm depth
Feathered Trees: 500 x 500 x 500mm depth
Container grown shrubs: 300 x 300 x 300mm depth

Backfill tree pits with 100/300mm depth subsoil and 400mm topsoil including Melcourt Topgrow peat free planting compost or similar approved at a rate of 0.125m³/pit.

Backfill shrub pits with topsoil including Melcourt Topgrow peat free planting compost or similar approved at a rate of 1.0m³/20m².

Notch planting of transplant sized shrubs:

- Notching: Make a vertical 'Y', 'L', 'T' or 'H' notch. Care to be taken around roots of existing trees.

- Depth: To accommodate full depth of roots.
- Planting: plant shrub, close notch with root collar at ground level and firm the soil.
- Spacing of plants: 1 metre centres.

Plant arrangement:
Planting to be carried out on a random mix basis subject to the following conditions:

- Tree species: max. 5 no. plants & min. 3 no. plants per block
- Shrub species: max. 7 no. plants & min. 3 no. plants per block.

Plant protection:
Tree shelters: standard tree shelters to be provided to each transplant sized tree / shrub, such as Tubex Standard TreeShelter, or equivalent. Shelter height to be 0.6m, green colour with supporting cane.

Amenity Grass Areas:
Tree shelters: standard tree shelters to be provided to each transplant sized tree / shrub, such as Tubex Standard TreeShelter, or equivalent. Shelter height to be 0.6m, green colour with supporting cane.

Species Rich Grass Areas:
Do not spread fertiliser onto the grass. Species rich grass areas to be sown at a rate of 4g/m² with a suitable seed mix such as EMI Basic General Purpose Meadow mix.

Planting Areas:
Plant specification to be in accordance with the HTA National Plant Specification: 03/02

Supply and plant, incorporating slow release fertiliser N:P:K : 4:19:10 ENMAG or similar approved at the following rates:
Semi-mature trees: 130g / tree pit
Feathered trees: Feathered Trees: 100g / tree pit
Container grown shrubs: 70g / m²

Provide and fix tree stakes and ties to the following dimensions:
Semi-mature trees: overall length 1500; height above ground: 750mm
Feathered Trees: overall length 1250mm; height above ground: 600mm

Provide and spread evenly over all planting areas an organic graded bark flakes or similar approved bark mulch to a depth of 50mm.

General Notes:
Substitutions, if made, should be similar in size, form and water demand.

Maintenance:
Refer to sheet SLB1

Appendix 1 Proposed Site Layout

Appendix 2 Protected Species Legislation

Bats

All UK bat species are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2010. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence to:

- Deliberately capture, injure or kill any such animal;
- Deliberately disturb any such animal, including in particular any disturbance which is likely:
- To impair its ability to survive, breed, or rear or nurture their young;
- To impair its ability to hibernate or migrate;
- To affect significantly the local distribution or abundance of that species;
- Damage or destroy a breeding site or resting place of any such animal;
- Intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

In addition, five British bat species are listed on Annex II of the Habitats Directive. These are:

- Greater horseshoe bat *Rhinolophus ferrumequinum*;
- Lesser horseshoe bat *Rhinolophus hipposideros*;
- Bechstein's bat *Myotis bechsteinii*;
- Barbastelle *Barbastella barbastellus*; and
- Greater mouse-eared bat *Myotis myotis*.

In certain circumstances where these species are found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status. Outside SACs, the level of legal protection that these species receive is the same as for other bat species.

Water vole

The water vole is listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is afforded limited protection under Section 9 of this Act. This makes it an offence to:

- Intentionally kill, injure, or take (handle) a water vole;
- Intentionally or recklessly damage or destroy or obstruct access to any structure or place which water voles use for shelter or protection; or
- Intentionally or recklessly disturb water voles while they are using such a place.

Breeding Birds

With certain exceptions, all wild birds, their nests and eggs are protected by Section 1 of the Wildlife and Countryside Act 1981 (as amended). Therefore, it is an offence, to:

- Intentionally kill, injure or take any wild bird;
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- Intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 subject to various controls. Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- Intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- Intentionally or recklessly disturb the dependent young of any such bird.

Reptiles

The four widespread species of reptile that are native to Britain, namely common or viviparous lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*, are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence to:

- Intentionally kill or injure any of these species.

The remaining native species of British reptile (sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*) receive a higher level of protection via inclusion under Schedule 2 of the Conservation of Habitats and Species Regulations 2010. They are afforded full protection

under Section 9(4) of the Act and Regulation 41 of the Regulations (in England and Wales only) and the Wildlife and Countryside Act 1981 (as amended). The distribution of these species are restricted to only a few sites in England.